The official record of the State Board of Health of Massachusetts : together with a phonographic report of the evidence and arguments at the hearing / by George C. Burpee and W.O. Robson.

Contributors

Tyler, John M.
Squire, John P.
Burpee, George C.
Robson, W. O.
Massachusetts. State Board of Health.
Francis A. Countway Library of Medicine

Publication/Creation

Cambridge : Welch, Bigelow, 1874.

Persistent URL

https://wellcomecollection.org/works/d2u7becu

License and attribution

This material has been provided by This material has been provided by the Francis A. Countway Library of Medicine, through the Medical Heritage Library. The original may be consulted at the Francis A. Countway Library of Medicine, Harvard Medical School. where the originals may be consulted. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

No. 32. B. 20.

BOSTON
MEDICAL LIBRARY
ASSOCIATION,
19 BOYLSTON PLACE,

Received .....

By Gift of .....

32. B. 20.

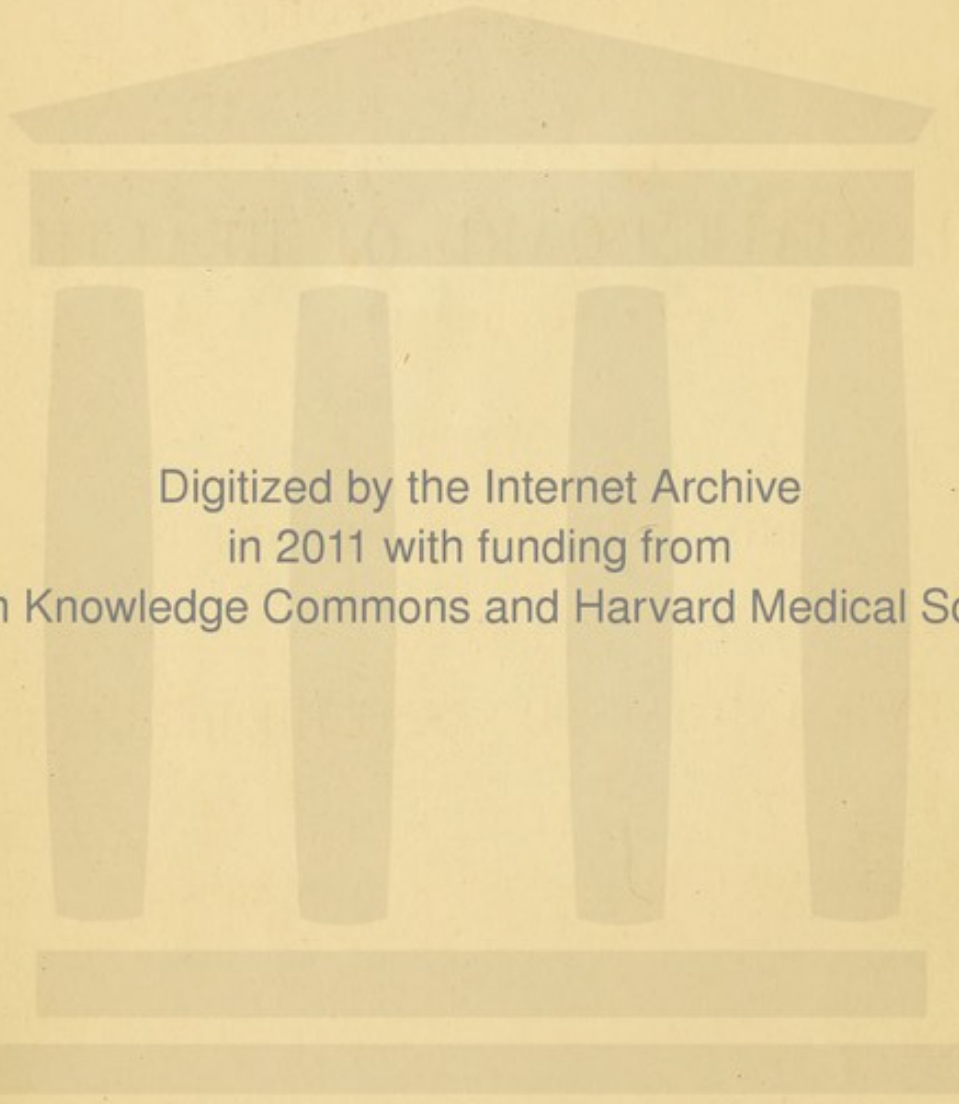
Dr. Chas F. Folsom

With Compliments of

John P. Squire & Co

Given by

J J. Putnam



Digitized by the Internet Archive
in 2011 with funding from
Open Knowledge Commons and Harvard Medical School

http://www.archive.org/details/officialrecordof00tyle

JOHN M. TYLER *et al.*, PETITIONERS,

vs.

JOHN P. SQUIRE *et al.*, RESPONDENTS.

THE OFFICIAL RECORD

OF

THE STATE BOARD OF HEALTH,

OF MASSACHUSETTS;

TOGETHER WITH

A PHONOGRAPHIC REPORT

OF THE

EVIDENCE AND ARGUMENTS AT THE HEARING,

BY

GEORGE C. BURPEE AND W. O. ROBSON.

CAMBRIDGE:
WELCH, BIGELOW, AND COMPANY,
University Press.
1874.

CONTENTS.

	Page
Official Record of the State Board of Health	3
Communication of Board to Respondents	3
Protest of Respondents	6
Letter of Board to Mayor, etc., of Somerville	12
Case for Petitioners	17
Mr. McIntire's Opening Argument for Petitioners	18
Testimony of Samuel Slocumb	21
Memorial of Cunard Steamship Company (presented through Respondents)	33
Testimony of Charles O. Welch	35
" Dr. C. H. Farnsworth	38
" Henry S. Hills	42
" Jonas Woodard	44
" Asa Tyler	50
" William S. Soule	54
" Joseph Burdakin	58
" Grove H. Loomis	62
" Prof. Charles E. Munroe	65
" Stephen P. Sharples	94
" Dr. Samuel L. Abbot	111
" Miss Jennie Arms	117
" James Hunter	118
" Charles E. Meyer	120
" William G. Russell, Esq.	124
" Joseph Magoun	125
" James Lee, Jr.	134
" Mrs. Lydia T. Rooney	136
" Mrs. Jane Binney	138
" Mrs. Mary W. Clark	140
" Miss Maria Spare	141
" Mrs. Charlotte Fogg	142

Testimony of Dr. Samuel A. Durgin 144
" Hon. Alonzo W. Boardman 147
" Dr. Benjamin S. Shaw 151
" Dr. John B. Taylor 153
" Dr. Anson P. Hooker 154

Case for Respondents 157
Mr. Derby's Opening Argument for Respondents 158
Report of Committee of Boston Board of Trade 183
Testimony of John P. Squire 186
Testimony and Report of Professor Eben N. Horsford 211
Testimony and Report of Charles E. Avery 256
Testimony of Charles A. Goodrich 269
" Everett L. Colson 279
" John M. Graves 281
" Edward Burnham 283
Record of Winds at East Cambridge 285
Testimony of Joseph S. Pike 292
" Dr. Hezekiah C. Bickford 295
" John S. Lyon 297
" Obadiah George 300
" Samuel W. Burpee 303
" Gen. Samuel E. Chamberlain 304
" Hon. Jonathan Stone 308
" Oliver Ayers 313
" Zimri H. Cobleigh 316
" Jacob Abbott 320
" John H. Rapp 321
Letter from E. H. Janes 323
" Dr. Barnard 324
Testimony of Michael B. Crowe 327
Cut showing Turner's Tank-Gas Consumer 329
Testimony of William G. Carson 337
" Hon. George O. Brastow 344
" Hon. Estes Howe 350
" Hon. Isaac Bradford 354
" John M. Merrick 361
" Charles W. H. Martin 362
" Harvey George 363
" Alderman Curtis Davis 366

Testimony of Hon. James D. Greene 367
Table showing Growth in Population and Valuation of East Cambridge and Somerville 370
Table regarding Slaughtering and Rendering in New York 371
Testimony of Edward K. Richards 371
" Capt. Charles J. Adams 372
" James Alexander 375
" Hon. J. Warren Merrill 378
" Dr. Eben Jackson 385
" Brad. R. Throckmorton 386
" Hon. Henry O. Houghton 388
" Patrick McCabe 394
Record of Cambridge Board of Health 396
Testimony of Henry C. Lincoln 397
" David M. Oliver 399
" Luther P. Wiggin 401
" Columbus Tyler 403
" James Gould 406
" Hon. Horatio G. Parker 408
" George Upton 416
" E. L. Colson (recalled) 419
" Prof. E. N. Horsford (recalled) 419
" Capt. Thomas Cunningham 421
" Hon. Hamlin R. Harding 427
" Watson B. Hastings 432
" Nathaniel Jackson 436
" William Bliss 437
" Alderman Edward Kendall 439
" Hon. Knowlton S. Chaffee 444
" J. G. Chase 451
" J. R. N. Squire, Esq. 458
" John L. Porter 459
" J. G. Chase (recalled) 460
" William M. Richings 460
" Alderman John McSorley 462
" Perry Clark 467
" John H. Stevens 468
" John P. Squire (recalled) 469
" Charles E. Avery (recalled) 470
" Alderman Robert L. Sawin 471

Testimony of Rev. Samuel W. McDaniel 474
British Parliamentary Report of July, 1873 478

Rebutting Testimony for Petitioners 486
Testimony of Dr. B. Joy Jeffries 486
" Alderman George R. Brine 489
" S. P. Sharples (recalled) 497
Letter from Mr. Sharples to Professor Chandler 498
" Professor Chandler to Mr. Sharples 499
" Professor Winlock to Professor Horsford (put in by Respondents) 500
Testimony of Dr. S. H. Durgin (recalled) 501
" Isaac Sweetzer 505
" Hon. William H. Kent 507
" Thomas Dana 509
" George L. Mitchell 513
" Dr. Robert Willard (for Respondents) 515
Dr. Marcy's Article in "Boston Medical and Surgical Journal," 1872 . 517
Record of Mayor and Aldermen of Cambridge, 1873 519
Record of Mayor and Aldermen of Somerville, 1873 521
Letter from Clerk of Board of Health, and City Ordinance, of Cleveland, Ohio 523
" Dr. Stewart, Comm. of Health of Baltimore 524
" Dr. Reid, Health Officer of Chicago 525
Letters of Dr. Chandler, President of Health Department of New York 526
Testimony of A. Winthrop Hastings 526
" Joseph Magoun (recalled) 538
" Professor C. E. Munroe (recalled) 539

Additional Testimony for Respondents 541
Testimony of John P. Squire (recalled) 541
Letter from William L. Bradley to Dr. Henry I. Bowditch, Chairman of Board 542

Mr. Muzzey's closing Argument for Respondents 543

Mr. McIntire's closing Argument for Petitioners 575

OFFICIAL RECORD

OF

THE STATE BOARD OF HEALTH.

A QUARTERLY Meeting of the Board was held at the State House on Wednesday, October 1, 1873, at 10.30 A. M. Present: Messrs. Bowditch, Davis, Hoadley, Webster, Frothingham, and Derby. At 11.30 A. M., by appointment previously made, the Board received the parties engaged in slaughtering and packing swine and rendering fats in the vicinity of Miller's River, in Somerville and Cambridge, concerning whose establishments formal complaints had been presented to the Secretary since the last meeting of the Board. The following remarks, having been drawn up in writing, and receiving the assent and approval of the Board, were read by the Secretary: —

GENTLEMEN, — The circumstances under which we have asked you to be present at our meeting to-day are as follows: Nine petitions concerning your establishments engaged in slaughtering and packing hogs and melting fats, in the vicinity of Miller's River, in East Cambridge and Somerville, were presented to us on the 25th of September, 1873. The petitioners declare themselves prepared to show that these establishments are noxious and offensive, and call upon us to close them. The law of 1871, Chapter 167, General Statutes, makes it our imperative duty to order you to cease and desist from pursuing your business if these charges are proved. It is notorious that the portions of East Cambridge and Somerville which you occupy are regarded as offensive; that a public nui-

sance exists in that locality. It is also generally believed that acrid and nauseating vapors, coming from the boiling of fats, are a chief cause of this nuisance; and that these vapors deprive, at certain times, thousands of persons of their inherent right to the enjoyment of unpolluted air. These opinions are so prevalent that we see no reason for ignoring them at this time and place. It is evident that the stoppage of your business, under the law referred to, without provision being made for its continuance in a more favorable location, where it could be conducted without offence, would entail great loss upon yourselves, great suffering on thousands of persons who are either directly or indirectly in your employment, and would seriously interfere with the commerce of the port of Boston.

Under somewhat similar circumstances, two years ago, the butchers of cattle and sheep were invited to meet this Board, and the result of the conference was the building of an Abattoir where about one half of the slaughtering and rendering of Brighton is now done without offence to any one, and in which we believe will soon be concentrated all the business of that kind in the neighborhood of Boston. We have now invited you to meet us, together with the complainants, that opportunity might be given, in an informal and friendly way, for any propositions which you may desire to make concerning the important interests at stake. Should you be willing to propose that within a reasonable time the business of slaughtering hogs and rendering fats would be transferred by you from the crowded vicinity of Miller's River to some other place where you could have the benefits of ample space, railroad connections, and direct drainage to deep water with strong currents, and where, by concentration, the requirements of public health could be observed, we think a basis might be found for an arrangement satisfactory to all parties, and of great advantage to the sanitary and commercial interests of the neighborhood and of the State. The present meeting will occasion no loss of time in the settlement of these important questions, as in case no conclusion is reached satisfactory to the petitioners, a time will be fixed at once for the opening of the hearings at this place.

After the reading of the above address the Board left the room for half an hour, that the parties might have opportunity for free consultation among themselves. At the expiration of the time

above named, the Board returned and were addressed by Mr. Muzzey and Mr. E. H. Derby (both counsel for Mr. Squire, one of the parties complained of), and by Mr. McIntire for the petitioners. It was then stated by the Chairman that three hearings must be had on petitions previously received before the Miller's River cases could be taken up.

A meeting of the Board was held at the State House, on Wednesday, October 22, 1873, at 10.30 A. M. Present: Messrs. Bowditch, Davis, Hoadley, Webster, Frothingham, and Derby. A petition was received, signed by John M. Tyler and others, asking that the powers given to the Board by Chapter 167, Acts of 1871, General Statutes, be exercised to cause John P. Squire & Co. to cease and desist from keeping and slaughtering hogs, and melting and rendering in their establishment in the cities of Cambridge and Somerville.

Whereupon it was

Ordered, That a hearing be had on this petition on the first day of December, 1873, at 10 o'clock A. M., at the State House in Boston, and that the above-named parties be notified by the Secretary of the time and place appointed for the said hearing, three days at least before the said first day of December.

A meeting of the Board was held at the State House on Monday, December 1, 1873, at 10 A. M. Present: Messrs. Bowditch, Frothingham, Hoadley, Webster, Newhall, and Derby. A hearing was had, on the petition of John M. Tyler and others, concerning the establishment of John P. Squire & Co. Mr. McIntire appeared for the petitioners, Mr. Muzzey and Mr. E. H. Derby appeared for J. P. Squire & Co. Mr. J. P. Squire was present. The following witnessed were examined: Samuel Slocumb, Charles O. Welch, Charles Henry Farnsworth, Henry S. Hill. A memorial from Mr. Alexander, representing the Cunard Steamship Company, was presented by Mr. Muzzey, and received by the Board. Previous to the introduction of testimony the following protest against the proceedings of the Board was presented by Mr. Muzzey: —

(Copy.)

In State Board of Health,
December 1, 1873.

In the matter of John P. Squire *et al.*, on complaint of John M. Tyler *et al.*

And now come the respondents, and object that this Board cannot lawfully proceed to hear the complaint against said respondents, because all of said Board are not in attendance.

By their Attorney,

(Signed) H. W. Muzzey.

At 1.30 P. M. the Board adjourned till December 2, 1873, at 9 A. M.

A meeting of the Board was held pursuant to adjournment on Tuesday, December 2, 1873, at 9 A. M., at the State House. Present: Messrs. Bowditch, Frothingham, Hoadley, Newhall, Webster, Davis, and Derby. The hearing on complaint against John P. Squire & Co. was resumed. The following witnesses were examined: Jonas Woodard, Asa Tyler, W. S. Soule, Joseph Burdakin, Grove H. Loomis, Charles E. Munroe. At 1½ P. M. the Board adjourned till December 3, 1873, at 9 A. M.

At the request of Mr. E. H. Derby, counsel for J. P. Squire & Co., the following additional record, concerning the attendance of members of the Board on the 2d of December, 1873, is herewith made: —

There were present at the opening of the proceedings, Messrs. Bowditch, Newhall, Hoadley, Webster, Frothingham, and Derby. Dr. Davis arrived at 10 A. M. Mr. Hoadley was absent from 10 till 11.45. Mr. Frothingham left at 1 P. M.

A meeting of the Board was held by adjournment on Wednesday, December 3, 1873, at 9 o'clock A. M., at the State House. Present at that hour: Messrs. Bowditch, Newhall, Webster, Frothingham, and Derby. Mr. Hoadley arrived at 9.14 A. M. Dr. Davis arrived at 10.07 A. M. At different times during the session of the Board, Messrs. Newhall, Derby, and Hoadley left the room for periods varying from one to five minutes. The hearing on complaint.

against John P. Squire & Co. was resumed. The testimony of Charles E. Munroe, which was not finished at the previous meeting, was continued. Mr. S. P. Sharples was then examined as a witness. At 1 P. M. the Board adjourned till Thursday, December 4, 1873, at 9 A. M.

A meeting of the Board was held by adjournment on Thursday, December 4, 1873, at 9 o'clock A. M., at the State House. Present at that hour: Messrs. Bowditch, Newhall, Frothingham, Webster, and Derby. Dr. Davis arrived at 10.02 o'clock. Dr. Derby left the room for three minutes between the hours of eleven and twelve. The hearing on complaint against John P. Squire & Co. was resumed. Mr. E. H. Derby, counsel for Mr. Squire, desired that the protest against proceeding without the presence of every member of the Board should be regarded as renewed from day to day. The examination of Mr. S. P. Sharples was continued The following witnesses were then examined: Dr. Samuel L. Abbot, Miss Jennie M. Arms, James Hunter, and Charles E. Meyer. At 1 P. M. the Board adjourned to meet on Friday, December 5, 1873, at 9 A. M.

A meeting of the Board was held at the State House on Friday, December 5, 1873, at 9 A. M. Present at that hour: Messrs. Bowditch, Newhall, Webster, and Derby. Mr. Frothingham arrived at 9.10 o'clock. Mr. Hoadley arrived at 11.34 o'clock. Dr. Davis arrived at 10.03 o'clock. The following witnesses were examined: William G. Russell, Joseph Magoun, James Lee, Jr., Lydia T. Rooney, Jane Binney, Mary W. Clark, Maria Spare, Charlotte Fogg, Dr. Samuel H. Durgin, Alonzo W. Boardman, Dr. B. S. Shaw, Dr. John B. Taylor, Dr. Anson P. Hooker. A letter from Dr. S. L. Abbot was received, giving certain dates which had been asked for by the counsel for Mr. Squire. The letter was read by the Secretary. The Chairman announced — after consultation with the members of the Board, during a recess of ten minutes — that the hearing would be continued on Monday December 8, 1873, at 9 A. M.

A meeting of the Board was held at the State House on Monday, December 8, 1873, at 9 A. M. Present at that hour: Messrs. Bowditch, Webster, Frothingham, Newhall, and Derby. Mr. Hoadley arrived at 9.14 o'clock. Dr. Davis arrived at 10.07 o'clock. The Secretary presented a letter from Dr. S. L. Abbot. Edwin F. Bowker presented a plan of the Miller's River District. Mr. E. H. Derby opened the defence of J. P. Squire & Co. The following witnesses were examined: John P. Squire, Eben N. Horsford. Mr. Frothingham, a member of the Board, was not present from 2 o'clock till 2.30 o'clock P. M. A recess was taken by the Board from 1 o'clock until 2 o'clock P. M. At 5 o'clock P. M. the Board adjourned until Tuesday, December 9, 1873, at 9 A. M.

A meeting of the Board was held at the State House on Tuesday, December 9, 1873, at 9 o'clock A. M. Present at that hour: Messrs. Bowditch, Newhall, Webster, Frothingham and Derby. Mr. Hoadley arrived at 9.14 A. M. Dr. Davis arrived at 10.10 A. M. The Chairman announced that the session of the Board would be closed at 2 P. M. this day, and that the next session would be on Friday, December 12, 1873, at 9 A. M. The examination of Eben N. Horsford was continued. The following witnesses were then examined: Charles E. Avery, Charles A. Goodrich, Everett L. Colson, Edward Burnham, John M. Graves. At 2 P. M. the Board adjourned.

A meeting of the Board was held at the State House on Friday, December 12, 1873, at 9 A. M. Present at that hour: Messrs. Bowditch, Webster, Hoadley, Frothingham, Newhall, and Derby. Dr. Davis arrived at 10.10 A. M. The following witnesses were examined: John M. Graves, Joseph S. Pike, Hezekiah C. Bickford, John S. Lyon, Obadiah George, Samuel W. Burpee, Samuel E. Chamberlain, Jonathan Stone, Oliver Ayers, Zimri H. Cobleigh, Jacob Abbott, John H. Rapp. A letter was read by Mr. McIntire from Mr. Barnard, of St. Luke's Hospital, in New York. A letter re-

ceived from the Sanitary Superintendent of the Board of Health of the city of New York was read by the Secretary. Adjourned at 1.30 P. M., until Monday, December 15, 1873, at 9 A. M., to meet in the Green Room, by consent of all parties.

A meeting of the Board was held at the Green Room of the State House on Monday, December 15, 1873, at 9 A. M. Present at that hour: Messrs. Bowditch, Webster, Newhall, Hoadley, and Derby. Mr. Frothingham arrived at 9.14 o'clock. Dr. Davis arrived at 10.15 o'clock. The following witnesses were examined: John H. Rapp, Michael B. Crowe, William G. Carson, George O. Brastow, Estes Howe, Isaac Bradford, John M. Merrick. At 1 o'clock, P. M. the Board adjourned to meet in the Green Room of the State House on Friday, December 19, 1873, at 9 A. M.

A meeting of the Board was held at the State House on Friday, December 19, 1873, at 9 A. M. Present at that hour: Messrs. Bowditch, Newhall, Hoadley, and Derby. Mr. Webster arrived at 9.07 o'clock. Mr. Frothingham arrived at 9.10 o'clock. The following witnesses were examined: Charles W. H. Moulton, Harvey George, Curtis Davis, James D. Greene, Edward K. Richards, Charles J. Adams, James Alexander, J. Warren Merrill, Dr. Eben Jackson, Brad. K. Throckmorton, Henry O. Houghton, Patrick McCabe, Henry C. Lincoln, David M. Oliver, Luther P. Wiggin, Columbus Tyler, James Gould. Dr. Davis arrived at 10.10 o'clock. The counsel for J. P. Squire & Co. presented statistics of population and of taxable property of Cambridge and Somerville. The counsel for the petitioners presented a copy of proceedings of City Councils of Cambridge in 1872. At 1 o'clock, P. M., the Board adjourned to meet at the State House on Saturday, December 20, 1873, at 9 A. M.

A meeting of the Board was held at the State House on Satur-

day, December 20, 1873, at 9 A. M. Present at that hour: Messrs. Bowditch, Newhall, Webster, Hoadley, and Derby. Mr. Frothingham arrived at 10 o'clock. Dr. Davis arrived at 10.10 o'clock. The following witnesses were examined: Horatio G. Parker, George Upton, Everett L. Colson, Eben N. Horsford, Thomas Cunningham, Hamlin R. Harding, Watson B. Hastings, Nathaniel Jackson, William Bliss, Edward Kendall, Knowlton S. Chaffee. Mr. Webster of the Board read some extracts from a Report on rendering in the city of Providence, made by Dr. Snow of that city. At 1.15 P. M. the Board adjourned to meet at the State House on Monday, December 22, 1873, at 9 A. M.

A meeting of the Board was held at the State House on Monday, December 22, 1873, at 9 A. M. Present at that hour: Messrs. Bowditch, Webster, Frothingham, Newhall, and Derby. Mr. Hoadley arrived at 9.15 A. M. The Secretary was absent from the room for twenty-five minutes to allow him to obey a summons from the Supreme Court. This absence was from 12.15 until 12.40 P. M. Mr. Frothingham acted as Secretary during the absence of Dr. Derby. The following witnesses were examined: J. G. Chase, J. R. N. Squire, John L. Porter, William M. Richings, John McSorley, Perry Clark, John H. Stevens, John P. Squire, Charles E. Avery, Robert L. Sawin, Samuel W. McDaniel, B. Joy Jeffries, George R. Brine, S. P. Sharples. Mr. John H. Stevens presented a plan of a new trap for drains. The counsel for J. P. Squire & Co. presented a Parliamentary Report, 1873, concerning slaughter-houses in London. Mr. S. P. Sharples presented an analysis of dried mud from Miller's River basin. Mr. S. P. Sharples presented a correspondence between himself and Professor Chandler of the Board of Health of New York, in August, 1873. At 1.10 P. M. the Board adjourned to meet on Tuesday, December 23, 1873, at 9 A. M.

A meeting of the Board was held at the State House on Tuesday, December 23, 1873, at 9 A. M. Present at that hour: Messrs. Bow-

ditch, Hoadley, Frothingham, Newhall, Webster, and Derby. Dr. Davis arrived at 10.10 A. M. The following witnesses were examined: Samuel H. Durgin, Isaac Sweetzer, William H. Kent, Thomas Dana, George L. Mitchell, Robert Willard, A. Winthrop Hastings, Joseph Magoun, Charles E. Munroe, John P. Squire. Counsel for petitioners presented an article by Dr. Marcy, published in the "Boston Medical and Surgical Journal," June 12, 1873; also, a record of the Board of Health of Cambridge, July 16, 1873, and July 23, 1873; also, a record of the Board of Health of Somerville, August 25, 1873; also, a letter and report from the Board of Health of Cleveland, Ohio; also, a letter from an Officer of Health of the city of Baltimore; also, a letter from an Officer of Health of the city of Chicago; also, a letter from Professor Chandler of New York, published in the "Boston Daily Advertiser," September 1, 1873; also, a letter from Professor Chandler, dated December 16, 1873, to Mr. A. Winthrop Hastings. At 1 P. M. the Board adjourned, to hear the arguments of counsel, until Monday, December 29, 1873, at 10 A. M.

A meeting of the Board was held at the Green Room of the State House, on Monday, December 29, 1873, at 10 A. M. Present at that hour: Messrs. Bowditch, Hoadley, Frothingham, Webster, Newhall, and Derby. Dr. Davis arrived at 10.20 A. M. The Secretary stated that he desired to place on record the presentation of the following documents to the Board: 1. A memorial of the Board of Trade of the city of Boston, with a memorandum of the exports of provisions and grain from the port of Boston, in 1872; 2. A record of the winds at East Cambridge during the autumn and a part of the summer of 1873, kept under the direction of J. P. Squire & Co.; 3. A document relating to the sewerage of Glasgow, Scotland; 4. A record of the winds kept by R. T. Paine. The Secretary called the attention of counsel and of all parties interested to the fact that several documents (a list of which was read) had been formally offered during the progress of the hearing, but had not been placed

in the actual keeping of the Board, and were not now in their possession. The counsel for J. P. Squire & Co. presented a letter from William L. Bradley. The counsel for the petitioners presented a letter from Professor Winlock, of the Cambridge Observatory. Mr. Muzzey then addressed the Board in behalf of J. P. Squire & Co. Mr. McIntire then addressed the Board in behalf of the petitioners.

At 1.30 P. M. the Board adjourned.

BOSTON, January 7, 1874.

I hereby certify that the foregoing is a true copy of the record of the State Board of Health in so far as it relates to the hearing upon the petition of J. M. Tyler, *et al.*, against J. P. Squire & Co., and I also certify that the record of the proceedings of each day was read and approved at the next meeting.

Attest,

GEORGE DERBY, M. D.,
Secretary of the State Board of Health.

[From the Record of the State Board of Health.]

The following letter to the Mayor and Board of Health of Somerville was sent on the 17th of September, 1873.

GENTLEMEN, — Your communication to the State Board of Health in relation to the establishment of John P. Squire & Co., in Cambridge and Somerville, and the establishments in Somerville of the Boynton Packing Company, the packing-house of Lincoln and Chamberlain, the slaughter-house of J. O'Brien, the rendering establishment of Charles O'Neil, and the establishment of Charles H. North & Co., was duly received on the 11th instant, and was presented on the following day, at a meeting of the Board. You request the Board to "visit and inspect those establishments, and to take such action as in its judgment will be most for the interest of the public." Upon proper application and proofs, this Board will exercise its full authority over any or all of these establishments engaged in what are known as noxious or offensive trades, but this authority is derived from the Statute of 1871, Chapter 167, and is limited by

the terms of the statute. By the second section of that chapter, this Board has the power, if, in their judgment, the public health or the public comfort and convenience shall require, to order any person or corporation carrying on any noxious or offensive trade in any town or city of more than four thousand inhabitants to desist, and cease from carrying on such trades in such places; and such order, if not obeyed by the person or corporation against whom it is issued, may be enforced by the Supreme Judicial Court. But it is specially provided by the statute, that on any application to said Board to exercise the powers in this section conferred upon them, a time and place for hearing the parties shall be assigned by said Board, and due notice thereof given to the party against whom the application is made, and the order before provided shall only be issued after such notice and hearing. You do not ask the Board to exercise the powers conferred upon it by this statute, but say that it would seem that, by those skilled in such matters, means could be devised, of much diminishing, if not wholly abating, the evils and nuisances complained of.

This Board might, as you request, visit and inspect the establishments named; but it would have no power whatever to enforce any directions or recommendations it might give to the offending parties. The Board has no legal authority to direct in what manner or in what place parties shall carry on their business. Responsibility for the manner in which trades known as noxious or offensive are carried on does not rest with the State Board of Health. Those engaged in such trades can insure themselves against our orders by so conducting their business that it shall not interfere with the public health, comfort, or convenience. If not noxious or offensive, the State Board of Health has no power to interrupt them. If noxious or offensive, they are liable to be ordered to cease and desist. This Board is always ready to give information and advice to whoever may ask it, but they know of no apparatus or method from the use of which will ensue the absence of offensive odors. The success of all such plans depends on the intelligence and skill with which they are managed. In view of the very general complaints during the summer of 1872, and of the great importance of the business carried on at East Cambridge and Somerville, not only to its proprietors, but to the surrounding population, and to the commerce of the State, a special visit was made on the 13th of June last, by order of the Board, to the largest establishment on Miller's River, and the great importance of avoiding all offence during the present summer to the people of the neighboring cities and towns was stated by the Secretary. The Board could do no more than this at the present time. It would seem, therefore, to be useless to again visit and inspect those places with a view merely of

giving directions or advice as to the manner in which the business therein shall be hereafter conducted. The unauthorized and voluntary interference of the Board would, in our judgment, be wholly unavailing toward the accomplishment of the object you have in view; but if you will present application for the exercise of our legitimate authority over the offending parties, we will, as in the case of all similar applications which have been received, order an early hearing, in conformity with the statute, and will take such action thereon as the evidence will justify.

In behalf of the State Board of Health,

Very respectfully yours,

(Signed) GEORGE DERBY, *Secretary.*

BOSTON, September 17, 1873.

TESTIMONY FOR THE PETITIONERS.

TESTIMONY FOR PETITIONERS.

FIRST DAY.

December 1, 1873.

THE hearing before the State Board of Health on a petition of citizens of Cambridge against the Slaughtering and Rendering Establishment of Messrs. John P. Squire & Co. was opened on Monday morning, December 1, 1873. Charles J. McIntire, Esq., appeared for the petitioners; and Hon. E. H. Derby and Henry W. Muzzey, Esq., for Messrs. J. P. Squire & Co. The communication of the petitioners and the notice served upon Messrs. J. P. Squire & Co. were read by the Secretary. The Chairman of the Board then asked if the petitioners were ready to be heard.

Mr. McIntire. The defendants are not here personally. I do not wish to proceed against them if my brother thinks they will be here soon.

Mr. Muzzey. I do not object, Mr. Chairman, for the reason that the defendants are not here personally; but I desire to ask whether a record of the attendance of the Board is kept.

The Chairman. Yes, sir, always.

Mr. Muzzey. Then, sir, I desire, in order that we may lose no rights in this case, now formally to object to proceeding with this hearing except in the presence of the full Board, and ask that this objection may go upon your record.

The Chairman. Will you put that in writing?

Mr. Muzzey. Yes, sir.

The Chairman. I don't know that the preparation of that document will necessarily detain us from going forward.

Mr. Muzzey. I understand that my objection is overruled, and that the Board proceeds with the hearing?

The Chairman. Yes, sir. Are there any witnesses here?

Mr. McIntire. Your Honors, there is one, if there are not two, witnesses present. It being election day in Cambridge, I suppose that they are detained. They will undoubtedly be here soon, or perhaps we can go on with what we have. So that no objection may interfere with this hearing, if your Honors think the other members of your Board will be present, I would prefer to wait, if it is only for a short time.

Mr. Derby. With regard to the objection made that the full Board is not present, your Honors said when it was first made that you would proceed?

The Chairman. Certainly; the protest can be made, and it will be entered upon our records.

Opening Argument for the Petitioners by Charles J. McIntire, Esq.

Mr. McIntire. Then, as we have one or two witnesses, perhaps we had better go on. Perhaps I had better state our reasons for presenting this petition, and what we propose to prove in relation to this establishment. It is a fact that is not denied, I believe, by the defendants themselves, that in the neighborhood that is called Miller's River, or those basins which constitute Miller's River Basin, there exists, and has existed for a considerable period of time, an intolerable nuisance, affecting the health, property, and comfort of the citizens who live near there; and that nuisance has been spreading and increasing from year to year, so that a year ago it became so intolerable that the citizens rose *en masse* in that part of Cambridge called East Cambridge, held an indignation meeting, and resolved to go before their City Board of Health against a nuisance which was within their own limits, namely, a portion of this manufactory,— the other places that we have brought before you being all in Somerville with the exception of Reardon's, about one fifth of the Squire manufactory being in the city of Cambridge. They resolved to go before their own City Board of Health and endeavor to abate the nuisance. They went there and had a long and protracted hearing, and fully established, as the Report of the City Board of Health shows, that we made out our case. But it was so late in the year, and the Board of Health being somewhat interested, one of the members having been convicted before your Honors of committing the same nuisance since then, that nothing was done, except some recommendations as to carrying on certain parts of the business. Thus it went on till last summer, when the smell increased. One evening, the 31st of July I think it was, about ten o'clock in the evening, there came up a most intolerable smell, and all the citizens were aroused and awakened. Meetings were called. One, held at the Ward-Room, calling upon citizens who were inclined to abate whatever nuisances existed, was taken possession of by people who were employed by a certain

gentleman, their own chairman was elected, and nothing was done. Another meeting, called a few nights later, was held; a committee was appointed with full power to look into the cause of the nuisance, and make such a report to the citizens as they deemed proper. This committee worked long and hard, and with consideration for every one. They examined these several establishments that they have presented to you, have been in them night and day, and have come to the conclusion that from them arises the nuisance of which the citizens complain. And when you asked us which one we should try first (for they could not all be tried together), we selected the petition against the defendants, because we deemed it to be the largest, the wealthiest, the most powerful, and the representative of all the rest, — the only one that is spoken of when this nuisance is mentioned. We can show your Honors that great numbers of hogs are brought to this establishment every week in the year. I think during the summer months there are some 1,500 hogs daily slaughtered at this establishment. We can show that the bringing of these hogs in the cars in hot weather is in itself (the smell arising from the hogs so long confined in the cars) a most intolerable nuisance. These hogs are brought upon the Grand Junction Railroad and landed on Cambridge Street, in the rear or by the side of Mr. Squire's factory, in car-loads. When they come in, and when they are driven out, the scent from these hogs will permeate the atmosphere for half a mile. And although the defendants say that they can remedy most of their evils, we do not know that they have as yet shown, or can show, that they can be remedied. We can show you that large quantities of fat are tried out in open kettles, and that the bad stench and foul gases arising from these open kettles, — and we will have perhaps some chemical testimony which will show it, — that the gases arising from these open kettles will color test papers.

We can and will endeavor to show that in large close tanks dead hogs and refuse matter of hogs that have been killed are placed and boiled up, and the grease or oil extracted, and that the stench which comes from it is thrown off into the atmosphere, although there are pretensions that it is run off into the water. Since then I think an apparatus has been put in by which they claim to burn this smell. But singularly enough, the same apparatus was put in operation on the 31st of July. The Board of Aldermen of Cambridge as a Board of Health were invited to visit it, and did so. They retired about half an hour before this terrible smell came up that colored the houses for an area of half a mile, — colored them deeply and darkly. Whether it was from the effect of the machine with which they claim to do away with those gases or not we cannot say. We simply present these facts. We can show you that

quantities of dead matter are thrown into the water there; the washings from the hogs and the water from the "scalding-tank," as it is called, bearing with it all the scurf and hair that falls from fifteen hundred hogs when they are scalded, has been thrown into the stream, and that it has been done since the establishment has been running. We will show you that the stench from what is called the gut-room, where the intestines are cleansed, is most intolerable, and that there is no remedy hardly for that. We can think of no remedy. In fact, we can show that the whole establishment, although it is kept as clean as such an establishment can be kept, is such a nuisance that it ought not to be tolerated in the midst of a thickly settled community such as that is. Now the defence always has been, when anything has been said in regard to this nuisance, that it comes from the river and the basins, — all these odors and gases arise from the basins, and not from this establishment. Admitting that in former times certain quantities of animal matter were thrown into the basins, and claiming that a large amount of sewage has been turned into them, they say that filling the basins will remedy all these evils. We will endeavor to show you that it will not; that the basin and the nuisance which arises from the basin itself is simply one of the effects of the nuisance itself, and not a cause, — simply one of the effects; and the other effects we will show you to be the discomfort of citizens, and the serious retarding of sick and convalescent patients.

I do not know that I need make any very extended opening. I think the whole that we can prove is embodied in what I have said. I think we can make out a perfect case; and I will say that what we ask is not, as your power as a Board enables you to do, to put your strong hand upon this establishment immediately, and tell them to close up right away, for we can stand the nuisance for a short time to accommodate them in seeking another and more fitting place to carry on this business. All we ask is, that, after hearing our testimony, if we establish our case as we claim we can, you tell them that within a certain time, which your Honors can of course come to a conclusion upon, that they will have sufficient time to remove in, and that they may remove to some more fitting place if they choose, where they may carry on their establishment. I have a few witnesses here, whom I will call now if your Honors are ready to hear them. Your Honors requested me to have a map here, showing the situation of these slaughter-houses. I will say that we have received a map used by the Joint Commission, prepared by Mr. Phineas Ball, and it is here for your examination.

After the map had been examined, the Chairman said, You may now proceed with your witnesses.

TESTIMONY OF SAMUEL SLOCUMB.

Question (by Mr. McIntire). Do you reside in Cambridge? *Answer.* Yes, sir.

Q. In what part of Cambridge do you live? *A.* At No. 73 Otis Street.

Q. You have been agent of the Boston Glass Company for some thirteen years, and are now treasurer of the Savings Bank? *A.* Yes, sir.

Q. How near do you live to the establishment of Messrs. J. P. Squire & Co? *A.* I should think about a third of a mile.

Q. Have you ever detected any of the different odors which arise from the locality where the Squire establishment is situated? *A.* Yes, sir.

Q. Will you describe these odors, or that odor as nearly as you can, and if there are different descriptions of odors, give them? *A.* Nearly all the odors that I smell have been sometimes of the scalding of hogs and sometimes of the live hogs themselves, also of fat.

Q. You say that you smelt something like hogs themselves, and something like the scalding of hogs. Was there any other smell that you detected? *A.* Yes, the trying of fat mixed with it. The odors come a great deal stronger at some times than at others.

Q. Are those all of the different smells that you detect? Do you detect this dock smell that they talk of? *A.* I have when I have been near the dock.

Q. These smells that you have just described you smell at your house, if I understand you? *A.* Yes, and in that vicinity.

Q. How far away from the establishment of Messrs. J. P. Squire & Co. have you detected them? *A.* I have detected the smells on Prospect Street and Cambridge Street, and near Main Street in Cambridgeport, nearly as far as Harvard Street.

The Chairman. How far is that?

Mr. McIntire. About three quarters of a mile.

Mr. Slocumb. I have lived in Cambridge ever since I was a boy.

Q. How long since Mr. Squire established himself on the basin? *A.* I should think about eighteen years.

Q. At that time what was that basin and what was this whole estuary called Miller's River? What was its condition at the time that he established himself there? *A.* It was clean, and I never smelt anything very bad there for years.

Q. Were there any other establishments on it when he established himself there? *A.* I do not know whether there was or not. If there were, they did not smell.

Q. At any time when you detected these smells did you trace them up to their source? *A.* I got this fall, or perhaps the last of the summer, a very severe smell one night, and I went with some other gentlemen to see if we could find what establishment it came from.

Q. Who were with you? *A.* Mr. Magoun, Mr. Hastings, and I don't know whether there was anybody else or not.

Q. At what time? *A.* I should say that we started out at about seven or half past. The strong odor we found occurred from six to half past six.

Q. What was the odor you detected that evening? *A.* The smell of dead hogs and melting lard mixed.

Q. Well, you say that you traced it. Will you explain where you went, what you did, and what you saw? *A.* I think we went down Fourth Street as far as Gore Street, and then walked up Gore Street. Well, in going down Fourth Street, when we got near Broad Street, we seemed to pass out of the current of the smell. We walked up on Gore Street, and after we had walked up there a piece we came again into the current. We passed up by Mr. Squire's, and went in between the blocks and the Grand Junction Railroad. As we went by Mr. Squire's, or after we passed his place, the smell was not nearly as strong. There was some little smell coming from North & Merriam's.

Q. If I understand you, you say that you commenced to go towards Mr. Squire's in the smell. As you proceeded you passed out of the current. *A.* Yes.

Q. And then got into it again? *A.* Yes.

Q. Did you go into Mr. Squire's establishment that evening? *A.* We did.

Q. What did you see there? *A.* They were trying lard, I think, in five open kettles, and I believe there was one close tank in operation. I forget whether they were running it or not. I think they were.

Q. In these five kettles, in which they were trying lard, did you detect any odor? *A.* The odor of lard; and one kettle, I thought, smelt a little stronger than the rest.

Q. What else did you see there at that time? *A.* I went into the slaughtering-house, and there were some little entrails of hogs lying upon the floor. There was some smell, as there would be in a slaughtering-house, similar to what we found out of doors. It smelt considerably; not a very agreeable smell to me. We went to where his scalding-tank was, and found that it had been emptied. We inquired of the men at what time it was run off, and one of them said it was run off into the river at half past six. It was the time, as near as I could judge, that we received the very severe smell that evening, and which obliged us to shut our windows down at once. I have been waked up several times by the same smell.

Q. What did these smells that you have been waked up by in the middle of the night produce? Did they produce any effect upon your house, or your ware in your house? *A.* They discolored the house. I think my house has never been much discolored. I live in a double house. There are two houses on my side, and one on the other side, that we have charge of, that have been discolored.

Q. That is how far away? *A.* Certainly a third of a mile. Perhaps a little more.

Q. Do you know whether that house was discolored before the night of the 31st of July last? *A.* It was; a year before. Mrs. Hudson's house was also discolored.

Q. Have you had occasion to pass up and down Medford Street, which is on the other side of the basin, towards Somerville? *A.* Yes, sir.

Q. Did you detect any odor there? and if so, what was it? Describe it. *A.* You mean this year?

Q. I mean at any time, as late as you please. *A.* The odor of the principal basin, where they used to have a gut through Medford Street, has, for several years, smelled considerably as you passed it.

The Chairman. What odors do you find there? *A.* A portion of it is

a dock smell, and appears to be rather the smell of hogs and pork, and such kind of things mixed together.

Q. Will you please describe that building in which the hogs are kept? *A.* It was a building from forty to fifty feet wide, and three hundred feet long, and is some fifty feet or more from the railroad.

Q. How many stories high? *A.* Three, I think.

Q. Have you ever been in that building? *A.* I have been in it.

Q. Do you know whether hogs are kept in each story? *A.* I have seen hogs kept in two stories, and I think in three.

Q. Whether there are any windows opening out into the open air? *A.* I think there are some windows on one side.

Q. When you were over there, on Medford Street, did you detect any of the smells from this establishment that you have spoken of before? I think you spoke of smelling the basin from the direction of this establishment. Did you detect any other smells? *A.* When I went up Medford Street, getting along against Mr. Squire's, I commenced to smell a new one, stronger than before, some distance off. Then, passing down on the railroad, between North & Merriam's, there was less smell. Then, as we got up to Mr. Squire's, some little distance, the smell was stronger, and as you got up near his buildings, it was not quite so strong, — not nearly so strong.

Q. Then between these places you smelt at times what you call the hog smell, as though hogs had been near there. Have you ever been present at the landing of hogs there? *A.* I don't recollect being there but once, when there was a landing of them for North & Merriam. There was considerable smell from the cars, and also from the hogs as they landed.

Q. Have you ever detected the scent of hogs at any other time, when you knew that hogs were landed at Squire's place? *A.* I have detected the scent of hogs often. I have n't been up there, so I could not tell at what place they were landed. You can smell them before they get there when the wind is southwest. You can smell them as they go over the railroad.

Q. When did you last detect that scent? *A.* One Sunday night I smelt it very strongly, perhaps six or eight weeks ago.

Q. You were a member of the committee appointed by the citizens, I believe, to inquire into the several causes of nuisances. Did you act upon that committee? *A.* I did, sir.

Q. What did you do in relation to this establishment as a member of this committee? Where did you go, and what did you see? *A.* We went nearly all over the establishment. We went into nearly all of the upper rooms, where they were slaughtering and scalding hogs.

Q. Did you detect any odors, arising from any of the different methods there? *A.* We detected odors of the scalding of hogs, which would always be smelt if you scalded but one.

Q. How far from the establishment, before you enter it, can you detect that odor when they are scalding them? *A.* You can smell it stronger when you are twenty or thirty feet off than when you are in the establishment.

Q. How far away can you smell it? *A.* I should think a mile, sir.

Q. Have you detected that smell and then immediately proceeded to the establishment and found them killing or scalding? *A.* No, sir; I have not. I was never in the establishment but a few times.

Q. Well, when you went through the establishment as a member of the committee, tell us if you detected any odors, and if you know their origin, or what they were. *A.* We smelt some odors in the slaughtering establishment and in the hog-room. The odor of chloride of lime was very strong; we could not smell anything else. It was very thick about the floor as though it had been newly sprinkled.

Mr. Derby. You detected the smell of the lime, did you, sir? *A.* Yes, sir.

Q. What kind of tanks were those in operation? *A.* I think all his open tanks were not running. There were two or three of the open tanks and one or two of the close tanks in operation. We went in to see what was said to be the burning of the gases from these tight tanks, under the boiler.

Q. Was there any scent from these tight tanks that you detected? *A.* There was some smell all over the buildings in different parts.

Q. How many times have you passed near the buildings during the past year? *A.* I should think a dozen or fifteen times.

Q. Whether you have detected any of these smells, each of these times? *A.* Sometimes I have been by there, and would not know that I was going by the building. At other times it would smell pretty strong.

Q. Was there any explanation made to you by Mr. Squire or any of his partners in relation to these tanks and what was put into them? *A.* He made an explanation, but I don't think that I paid attention. There was considerable said about dead hogs that came in on the cars. They were put into the ice and then put into the tanks. But I did not pay much attention to it at the time.

Mr. Muzzey. If he don't know what was said to him, I object.

Q. Did you hear Mr. Squire testify before the City of Cambridge Board of Health in relation to this matter? *A.* I did; but I cannot tell what he said, more than a portion of it.

Q. Do you remember anything that he said in relation to dead hogs brought in on the cars? *A.* I don't remember distinctly enough to tell what he did say. I noticed that in going through the buildings you smelt a certain smell in a certain department, and in another department you would find a smell a little different. I remember when I was in there with the Board of Mayor and Aldermen, Mr. Whitney, one of the Aldermen, requested a man to take up a scuttle in the floor. But he soon requested him to put it down again. There was a very strong smell came up from that scuttle. That was in that building on the side towards his building on Gore Street, next the slaughtering-house.

Q. What does this scuttle lead into? *A.* It leads into the water below.

Mr. Derby. The smell came up from the mud? *A.* Yes, sir; and stronger than I ever smelt it anywhere else.

Q. Was that the same kind of smell that you call the scalding of hogs, or hog-smell? *A.* That was a more sickening smell.

Q. These different smells that you perceive at your house, do you know that they have affected individuals? *A.* I know of other people. As far as my daughter is concerned, she has got up unwell in the morning from the effects of the smell. Mrs. Hudson, in the next house, told me that she vomited and that her daughter vomited.

Mr. Derby. That is certainly irregular evidence. He did not fix any time about his daughter's getting up with the effects of the smell.

Mr. Slocumb. That was not this last year. It was summer before last.

Q. This last year did you have any of these night smells? *A.* We have sometimes, but not so bad. The girl that lives with me sleeps in a chamber on the back side of the house, and she gets the smell a great deal stronger than I do.

Q. Do you know anything in relation to the effect of these gases on door-plates and silver-ware? *A.* They turn silver black.

Mr. Derby. Fix a place will you, sir?

Mr. McIntire. State an instance that you know of. *A.* I have forgotten whether it was the 31st of July that we had the stink that they talked about so much, that turned things perfectly black.

Q. What things? *A.* All silver articles.

Q. In your house? *A.* Yes, sir.

Q. On the 31st of July? *A.* Yes, sir. I have a water-pitcher that was striped very much like the outside of a house that has been made black by the gases there.

Q. Has your silver been discolored at any other time, when you have detected these smells? *A.* Yes, sir.

Q. How many times perhaps? *A.* Well, a good many times, of course, in the last year or two.

Mr. Derby. If you will be kind enough to fix the night.

Mr. McIntire. He says a great many times within the past two years.

Q. How many times within the last summer months? *A.* Well, I could not tell, because when there is a night comes that the door-plate or ware is discolored, the girl immediately cleans it up.

Q. Did you see it more than once within the past year? *A.* Yes, more than a dozen times within a year.

Q. In regard to unloading of these hogs, you say that you have passed between Mr. Squire's and North & Merriam's when they have landed their hogs there. *A.* They run their cars up beside the platform, and drive the hogs out on the platform and then into the buildings. I have seen the hogs driven into Mr. Squire's. I don't recollect that I have seen them come out of the cars. I have seen them driven into his passage-way.

Cross-Examination.

Q. (*by Mr. Muzzey*). How about the basins of Miller's River? You state that when Mr. Squire came and established himself on the basin, there was nothing of this kind there. At that time were there any slaughtering-houses in the city? *A.* There had been the Winchester slaughtering-house before, but I think they did not do anything after Mr. Squire came there.

Q. Up to nearly the time when Mr. Squire established himself, what had been the Winchester slaughtering-house in extent for several years? On a large scale? Was it a large establishment? *A.* They never killed in the summer, never after the 1st of June.

Q. Will you please answer my question? Was this an extensive establishment that Colonel Winchester had there? *A.* The establishment his father had there was extensive. The old Winchester place had been established for sixty years before Mr. Squire came and commenced the business of slaughtering on a large scale.

Q. You say there had been slaughtering of cattle there for sixty years? *A.* No, sir.

Q. How many years? *A.* I should think it was built about 1818, and was carried on until they gave it up, which was perhaps forty years.

Q. Well, you go back with it to about 1818? *A.* Yes, sir. I cannot tell just when they stopped. I know they did not slaughter during the summer.

Q. Well, before Mr. Squire came there the sewers of Cambridge were not emptied into the basin, were they? *A.* The sewers along the borders there with some drains ran into the basin.

Q. These were private drains, were they? *A.* Some of them.

Q. Do you remember any public sewers that discharged into the basin at the time Mr. Squire settled there? *A.* I don't know that there were any sewers.

Q. There have been many since that have discharged into it from Cambridge and Somerville? *A.* Shall I confine my answer to above Third Street, or shall I come down as far as Miller's River runs?

Mr. Muzzey. I want you to treat the entire river from its upper basin down to its mouth or estuary.

Q. Now, a great deal of sewerage has been poured into this basin, has there not, from Cambridge and Somerville sewers? *A.* I don't know a great deal about Somerville, but I should not think there was much from Cambridge sewers.

Q. Do you know that one half of the area of East Cambridge drains into Miller's River? *A.* I know it does n't. I know that where I live in Cambridge it drains into the Charles River.

Q. I mean the part of East Cambridge which inclines the other way. *A.* Well, if you take that, of course it does. It was drained on to the marshes; it was drained into Cambridge Street, under where Mr. Squire was.

Q. (*by a member of the Board*). Do you mean covered or open sewers?

Mr. Muzzey. I mean covered.

Mr. Slocumb. There was one through Cambridge and Gore Streets that discharged upon the marshes into a tank at low water, and then afterwards they built a new one down towards East Cambridge.

Q. (*by a member of the Board*). Do you mean into the Squire basin? *A.* No, sir. The sewer was built only a few years, and then it was open between Gore Street and Cambridge Street, and came to be rather a nuisance. Then we filled it up, and put a sewer through there ten or twelve years ago.

Q. (*by Mr. Muzzey*). Now, for ten or twelve years past, has not one of the city sewers of Cambridge emptied itself into the Squire basin, under his very establishment? *A.* There is one that must empty very nearly under his buildings.

Q. What do you call that sewer, Mr. Slocumb? *A.* I don't know what it is called.

Q. Is it called the Gore Street sewer, do you think, or the Cambridge Street sewer? *A.* I don't know that there is any Gore Street sewer there.

Q. The Gore Street or Cambridge Street sewer, is n't that what it is called? Is that the popular way of designating it? We speak of the Sixth Street sewer, the Medford Street sewer, etc. This is known as the Gore or Cambridge Street sewer, is it not? *A.* I don't know.

Q. When did you first visit the establishment of Mr. Squire, in your life? *A.* Well, that would be pretty hard to tell you. I recollect going there some years ago to get some oil, when I was at the Glass Works. That was perhaps some ten or fifteen years ago.

Q. When next were you there? *A.* It is impossible for me to tell.

Q. You mentioned an occasion about a year and a half ago. Do you refer to the time when the hearing was taking place before the Board of Aldermen in Cambridge? *A.* It took place after that.

Q. Was the visit you spoke of, in answer to Mr. McIntire's question, the visit you made at that time? *A.* Yes, sir.

Q. Mr. Magoun and Mr. Hastings were with you? *A.* Yes, sir. I will state the circumstances, so that you can understand my position. While I did not smell these establishments, I did not trouble them at all. I never smelt them at my house, until year before last.

Q. What part of the season? *A.* The whole summer.

Q. You mean the summer of 1872? *A.* Yes, sir.

Q. Previous to the visit you made a year ago last fall, had you been, in recent years, inside of the establishment? *A.* I don't recollect going there much. I attend to my own business and let other folks alone. I have been there but little.

Q. Did you ever make any inspection of the premises, and go through the establishment, before your visit with Mr. Magoun and Mr. Hastings? *A.* No, sir. I had never been there before to see them killing, though I had seen them kill in Cincinnati.

Q. Since that time have you been within the establishment? *A.* I have, once.

Q. And that is the time you speak of? *A.* We went with the committee appointed by the gentlemen who signed this complaint.

Q. When was that visit made? *A.* Well, I have forgotten. I should think some time in September or October of this year.

Q. Who accompanied you? *A.* Mr. Hastings, Mr. Magoun, Mr. Munroe, and Mr. Sharples.

Q. How about the place at the time you visited it this year, in comparison with the condition in which it was when you visited it a year ago? *A.* I should not think that there was any great change. Perhaps it was fully as clean as it was the year before.

Q. Was n't it cleaner? *A.* Well, it was about as clean as you could keep this kind of a place. You inquired about Mr. Winchester. I worked in his establishment some time.

Mr. Muzzey. I am putting questions to you that I want answered. Don't volunteer. You may say all you please after you have answered my questions.

Q. You say it was fully as clean if not cleaner. In any other respect, did you notice any difference or improvement, at the time of your last visit? *A.* I don't think there was any.

Q. Did you go into the same places and departments that you visited before? *A.* Yes, sir; and more.

Q. Mr. Squire made no objection to your going through the establishment? *A.* Not at all.

Q. You saw all at the second visit that you saw at your first, all and more? *A.* I should think I did. I think I went into more apartments.

Q. You were courteously received, shown through the establishment by Mr. Squire, and he knew what you had come for, did n't he? — He knew that you were a committee to prosecute him before the State Board of Health? — He made no objection, and furnished you with all the facilities you desired for examination of his place? *A.* Yes, sir.

Q. You speak of a smell that you detected once at Medford Street, which you thought traceable to Mr. Squire's establishment. How far off from his establishment could you perceive the smell? *A.* At Prospect Street, I guess. I think I said before as far as Harvard Street.

Q. Well, then, take the corner of Prospect and Harvard Streets. Do you mean to say that you traced back the smell to Mr. Squire's establishment? *A.* I did not trace it. I knew it came from these slaughtering establishments.

Q. Do you know that it did not come from Reardon's, or O'Neil's, that were nearer to you than Mr. Squire's? *A.* Reardon makes a very different smell when he makes it. It is a more severe stink.

Q. How is it at O'Neil's? *A.* I don't know that I ever smelt O'Neil's except when I was passing the premises.

Q. Well, where have you smelt the smell at Reardon's? *A.* I have smelt it on Cambridge Street, going by there; that is, I suppose it came from there. I do not know that it did. Taking your idea of it, I could not know because I did not go and trace it.

Q. You say that it is a worse stink than you smell anywhere else? *A.* I smelt it when I went into his building, and also when I went on to the street.

Q. Well, he tries in open kettles, does n't he? *A.* He did not when I went there.

Q. What was he doing? *A.* His kettle was not running, but he had a tight tank.

Q. Has he got a tight tank? *A.* Yes sir, he had one when I was there.

Q. How does O'Neil try? — With open kettles or with close tanks? *A.* I was never in his place but once, and that was last September or October.

Q. When you and the others were in company? *A.* Yes, sir.

Q. Now, you speak of perceiving the hog smell on the street. Do you know that the hogs that went to the Boynton establishment were driven through the streets until about a month ago? *A.* Yes, sir.

Q. Those received by North & Merriam were not, and those received by Mr. Squire were not. You know that to be a fact, don't you? *A.* Yes, sir. When I speak about the hog smell I mean on the railroad, between North & Merriam's and Squire's.

Q. You say you have never been there when the hogs were driven into Mr. Squire's establishment? *A.* I have seen hogs driven there; but I was over on the other side, near Milk Street, when I saw them.

Q. Which way were they being driven? *A.* Around the platform. I saw them going through that passageway where he drives them in.

Q. When you were present in the establishment, and Alderman Whitney had the trap lifted, was the tide out? *A.* I think it was nearly out.

Q. And the basin was exposed? *A.* Under Mr. Squire's it was, but probably not the whole basin.

Q. The trouble which your daughter had, of headache in the morning, has not made its appearance again? That was a year ago last summer. *A.* Well, she has not been troubled any, as far as I know, this summer. That was a year ago.

Q. You say that the night smells are not so bad as they formerly were. When did you first notice any improvement in that respect? *A.* I say that I have not noticed them so much this year as I did last year; that is, I refer to this summer last past, and the summer and fall before. I have not smelt them badly; but I have smelt them this year.

Q. In the winter, when the basin is frozen over, the people of East Cambridge get along pretty comfortably, don't they? *A.* When it is very cold weather they keep their windows shut, and they get along pretty comfortably; but as soon as they open the windows in the summer they get their houses filled with an odor not very agreeable. When the tide is out I have smelt the water itself.

Q. Is not the smell worse when the tide is out? *A.* I should think it was somewhat.

Q. When the basin is covered, the smell is not so bad as when the dock is exposed? *A.* It depends upon whether the sun is lying on it. I get the same smell by standing on Milk Street from that basin when it is half full, — precisely the same smell I would get if I were standing over his scalding-tank where he is scalding the hogs. There is so much of that runs in that it taints the whole water.

Q. How do you tell whether the gases you experience proceed from the basins or from the slaughtering of hogs? — How do you know what it is that blackens the houses and tarnishes the silver, when you only know this, that you get up in the morning and find that the effect has been produced during the night? *A.* I know that the smell which I perceive at my house, when I have been out and traced it, is not the smell of the basin, because when I go there at the same hour in the daytime I never get it. It is when something is let off from these establishments that we get it. I have no doubt about it.

Mr. Derby. Is it a matter of knowledge or observation? *A.* It is pretty near knowledge.

Mr. Derby. We don't want that; we want the fact.

Mr. Slocumb. When these tanks are blown off, or when the water is run off from the scalding-tanks, it creates a great deal more smell than at other times, and then is the time that the sulphur has colored the silver-ware.

Q. (*by Mr. Muzzey*). In what direction from Mr. Squire's establishment is your house? *A.* Northerly or northwesterly.

Q. At what time on the night of the 31st of July did you perceive the offensive odor? *A.* I cannot tell you. I was woke up that night, and it was the only night that I have been woke up on that account this year. I got up and closed my windows. I did not notice what time it was.

Q. You had been asleep, had you? *A.* Yes, sir.

Q. Do you remember at what time you retired? *A.* Nine o'clock or half past.

Q. Then you went to sleep and were awakened by the smell? *A.* Yes, sir.

Q. How long were you kept awake by it? *A.* Perhaps three or four hours.

Q. Was that on the night of the 31st of July? *A.* It was the night there was so much talk about the coloring of the houses.

Q. That is the only night that you have been waked up? *A.* Yes, sir.

Q. Well, last year you were waked up frequently by it, were you? *A.* Yes, sir; a great many times in the course of the year.

Q. Do you know when the city changed the direction of one of the sewers from Miller's River to Broad Canal? Was the change made last fall or not? *A.* I should think they began to take it across there in June. I saw it as I passed up Cambridge Street.

Q. So that part of the sewage that previous to last fall was turned into Miller's River is now diverted to Broad Canal. That is the Ninth Street sewer? *A.* Yes, but the object of that sewer was to take the sewage that had run on to the marshes.

Q. Whatever went into the basin previously, from this direction, was last year diverted into Broad Canal? *A.* Yes, sir.

Q. Are you among those citizens that have no faith in the filling in of the basin, the building of the great sewer? Do you believe that they are going to do the work or not? *A.* I have no doubt that it would be for the benefit of Cambridge and Somerville to have these basins filled, and if the land is good building-land it will be better for us than the low places.

Q. Well, do you approve of the sewer which the Legislature has ordered to be built there? Have n't you expressed yourself pretty strongly in condemnation of that sewer? *A.* I have said that they would not need it, except for the slaughtering establishments.

Q. Have you said it was a foolish thing to have it discharge at Craigie Bridge? *A.* I don't know that I have.

Q. Have you said anything like that about it? *A.* I don't think I have without some other connection with it.

Q. You don't think that you have condemned that as an imprudent piece of public work, do you? *A.* I think it may just as well go down the other way, where it would not cost half so much money, and I have said so.

Q. Exactly. You have expressed yourself pretty strongly in condemnation of the building of the sewer? *A.* If I have said anything, I have said that it was a pretty ridiculous matter to drain what is just the same as one part of the Charles River into another, and I think so now.

Q. Well, have n't you said another thing, that you did not want the sewer built; for if the land were filled and the sewer built, you would never get rid of the slaughtering-houses? *A.* I never made any such remark.

Q. Nothing in substance like that? *A.* No, sir.

Q. Have n't you said that, in substance, to Rev. Mr. McDaniel, of East Cambridge? *A.* No, sir.

Q. Nor anything like it? *A.* No, sir. I will tell you what I did say. I told Mr. McDaniel when he came to my house last winter and asked about the sewer, that I had not investigated the matter. Whether it was about the Gore Street sewer, or the Bridge Street sewer, or some other, I don't know. But I did say, if they would fill Miller's River, we should a great deal quicker get rid of the slaughtering-houses. That is what I told him.

Q. You did not say that you did not want the sewer built, because, if it were, you would not get rid of the slaughter-houses? *A.* No, sir.

Q. Have you ever held that opinion? *A.* No, sir. I don't hold it now.

Q. This you are certain of? *A.* Yes, sir.

Q. You have been very active in this matter of opposition to Mr. Squire? *A.* I have not.

Q. Have you not, sir? *A.* No, sir.

Q. Have n't you proposed other measures against Mr. Squire? *A.* No, sir. I have said it was only a matter of time in regard to these slaughter-houses being removed. I have n't said anything in regard to Mr. Squire's. I say it now and here, before all these gentlemen, that I have no doubt that it is a question of time, when you cannot slaughter there as they have been carrying it on.

Q. You have n't said much about this subject, Mr. Slocumb? Did not you testify at Cambridge against him last fall? *A.* I did.

Q. And presided over a meeting against him? *A.* Yes, sir; and I should do it again.

Q. There were two meetings, were there? *A.* Yes, sir. The chairman of one was the chairman of the other, and therefore I was chairman of both.

Q. You are a member of the committee? *A.* Yes, sir.

Q. You are the first witness called? *A.* Yes, sir.

Q. Did you go before the grand jury as a witness? *A.* Yes, sir. I was summoned before them, and was of course obliged to go.

Q. Have you also been before the government of the city of Cambridge, this year? *A.* I went there one evening.

Q. Did you make some remarks against this establishment there? *A.* I shall not say that I did against the establishment or against Mr. Squire. I am satisfied now where he got his information. I don't know what Mr. Squire said, but I can prove that the information was incorrect. What was said was said in my entry, all in about half a minute.

Q. Well, then something *was* said to Mr. McDaniel? *A.* I admit that I have said something to Mr. McDaniel.

Q. It was not anything of the kind that I suggested to you; that you did not want the sewer built and the land filled, etc.? *A.* I have told you what I said to Mr. McDaniel.

Q. I have n't asked you anything about that. Do you wish to go back and correct yourself? *A.* No, I don't. But I don't want you to say things that I have not said.

Q. Give me a little account of that meeting in East Cambridge. There was a public call, was there? *A.* Yes.

Q. And the people came in answer to it? *A.* Yes.

Q. You were candidate for chairman, and were elected? *A.* I don't know that.

Q. Was n't it so? Don't you know it? *A.* No, sir.

Q. Was Mr. McIntire —

Mr. McIntire. You are mistaken. Mr. Slocumb was not present.

Mr. Muzzey. That is all, then. I will show the facts otherwise.

Q. On coming away from the meeting, last summer, did you detect the odors, and find that they did not proceed from Mr. Squire's establishment? *A.* When we came out, we found a very severe smell

on the street. It was proposed, by fifteen or twenty, to walk up. and go around Mr. Squire's. My judgment was, that on that night more of the odor came from North & Merriam's than from Squire's. I have said so, and say so now.

Q. Did n't you attribute it at that time to Reardon's place, and say that it did not come from Squire's? *A.* I never heard Reardon's place spoken of at that time. The wind was not in the direction to bring it from Reardon's, to begin with.

Q. You thought that the smell came from North & Merriam's, more than it did from Squire's? *A.* There was some smell from Squire's that night.

Q. How much? *A.* Perhaps two thirds from North & Merriam's, and one third from Squire's. They smelt very badly.

Q. Was the smell from Squire's offensive? *A.* Yes, sir. It was offensive to me.

Q. Do you object to the frying of doughnuts in the kitchen? *A.* No, sir; for I like them very well.

Q. Do you object to the smell of cabbage in your kitchen? *A.* I should in my chamber, but I do not object to it in my kitchen, because it is necessary to have it.

Q. (*by Mr. McIntire*). You were asked about the grand jury. You say that you were summoned before it. Did you have anything to do in bringing the case before the grand jury? *A.* No, sir. I never heard of it, until last night.

Q. You have been asked if you believed that, if the basin were filled, you could not get rid of these establishments.

Mr. Muzzey. That is irregular. I asked him the question in order to quicken his memory.

Mr. McIntire. The opinion of a witness being asked on a certain subject, I think that I have a right to follow that up, and ask his full opinion on that matter.

Mr. Muzzey. I will not object.

Q. (*by Mr. McIntire*). I ask you what your opinion is in regard to the getting away of these smells by the filling up of these basins. *A.* My idea is, that if the basins are filled, the smells will be located so that there will be no question where they come from, and then we shall get rid of the slaughtering establishments very soon.

Mr. Muzzey. If you will allow us to say it, that is exactly the test which we wish to apply. Let us alone, Mr. Chairman and Gentlemen, until the sewer is built and the basin is filled, and they cannot detect any smell.

Q. You were employed at Winchester's. What did he kill there? *A.* Neat-cattle.

Q. How much waste is there in killing cattle as compared with killing hogs? *A.* I don't know, but I know that cattle are cleaner of themselves.

Q. Do you know whether they put anything into the river at that time. *A.* Nothing except their soap-kettles.

Q. What was done with the blood? *A.* The blood was run into tight wagons, under his slaughter-house. It stood on a very sandy, gravelly ground, and, in the spring, he would dig out about six or seven feet of the ground under the slaughtering establishment, and fill it in with clean sand and gravel.

Q. You say nothing was thrown into the river? *A.* They used to throw bones into the river.

Q. How long since the Ninth Street sewer, that runs into Broad Canal, was built? *A.* It was commenced last June, and finished in the fall.

Q. Then the greater portion, indicated by the map, of the water-shed formerly running on to the marshes is now turned into Broad Canal? *A.* Yes, sir.

Q. Well now, what I wish to ask you is simply this: Have you ever smelt the drainage that runs on to the marshes south of Cambridge Street? *A.* I never have, but I have on the north.

Q. (*by Mr. Newhall*). What became of the offal at Winchester's? *A.* It was all carted to his farm in Newton. He had wagons of his own, and carted it away.

Q. (*by a member of the Board*). Do we understand you that the sewers which discharge into the Broad Canal formerly discharged upon the marshes? *A.* They formerly ran down Otis, Thorndike, and Spring Streets, and ran upon the marshes, and then into a big ditch. The sewer was stagnant when it came to the marshes.

Memorial of the Cunard Steamship Company.

Mr. Muzzey. Mr. James Alexander, agent of the Cunard Steamship Company, is present, and desires to present a communication to the Board. Would you, Mr. McIntire, with the leave of the Board, delay the examination for a moment?

Mr. McIntire. I do not object.

The Chairman. Does he represent himself, or the Cunard Steamship Company? If the communication is in relation to property, the Board has heretofore decided that it cannot listen to anything of that nature in such a case as this. The whole question before us is one of public comfort and convenience. If the communication has any reference to this particular question, of course it can be received.

Mr. Derby. What he wishes to introduce here is the importance of the business coming from this establishment to commerce and trade. It is simply a memorial to that effect. It has already been presented to the Boston Board of Trade, and will now be presented to your Board. It is to show that if this establishment is broken up, it will break up to a great extent the export trade of the city of Boston. I wish to file the memorial and discuss it hereafter without interrupting the evidence.

The Chairman. I suppose the Board would be willing to have it filed. The Board is fully willing to admit the importance of this establishment, and of all the establishments on Miller's River; but they don't consider that it is within their province to consider the subject of property.

The memorial was then received and placed on file. It read as follows: —

CUNARD STEAMSHIP OFFICE, 80 STATE STREET,
BOSTON, November, 1873.

TO THE HONORABLE STATE BOARD OF HEALTH OF MASSACHUSETTS.

The Memorial of the Cunard Steamship Company, relative to a Pending Official Inquiry concerning the Pork-Packing Establishments of the City of Boston, showeth,

I. That five years ago (in 1868), your memorialists were compelled, for lack of trade from Boston, to abandon the sailing of their steamers from the port.

II. That in April, 1871, your memorialists were induced to attempt the experiment of resuming direct sailings from Boston for Liverpool.

III. That the exports from Boston were at that time so inadequate to load the steamers, that your memorialists were compelled to ballast them with grain, purchased and shipped on memorialists' own account, by which means the steamers were kept upon the line, while the export trade of the port was developing.

IV. The chief articles of export from Boston for Liverpool by these steamers are provisions, and your memorialists furnish, herewith, statistics, showing the progressive increase of these exports during the years 1870, 1871, 1872, and nine months of 1873.

V. Your memorialists call attention, in particular, to the remarkable growth of the exports of Messrs. John P. Squire & Co. during the periods mentioned; the following being a summary of them, namely, —

Year.	Tons.
1870	798
1871	4,586
1872	12,118
1873 (for nine months only)	16,969
Total	34,471

explaining that during the whole of 1870, and the first three months of 1871, your memorialists merely loaded the steamers partially at Boston, and that they completed their cargoes at, and sailed direct from New York for Liverpool.

VI. *The shipments of Messrs. John P. Squire & Co. alone furnish one third of the cargoes of your memorialists' steamers, presently sailing once a week from Boston for Liverpool.*

VII. The rapid growth and remarkable extent of the exports of this single firm, and the simultaneous growth of the export trade of the other pork-packing establishments of Boston, have encouraged your memorialists to comtemplate increasing their steamship service between Boston and Liverpool from one to two steamers per week, on and after the 1st of April, 1874, as per copies of the company's published advertisements in Liverpool and Boston, which are furnished herewith.

VIII. Your memorialists respectfully urge, on commercial grounds, the importance of this proposed increased transatlantic connection to the city of Boston, and the State of Massachusetts, and pray that it may receive due consideration from your honorable Board.

The interruption of the trade of these establishments in Boston would

of course check the enterprise which your memorialists have in view, in proposing to sail two steamers per week from Boston for Liverpool on and after 1st April, 1874.

(Signed) JAMES ALEXANDER,
Agent Cunard Steamship Company.

Relative Documents sent herewith.

I. Abstract of shipments by Messrs. Squire, North, and Boynton, per Cunard steamers from Boston, during year 1870.
II. Abstract of shipment during year 1871.
III. Abstract of shipment during year 1872.
IV. Abstract of shipment during year (nine months of) 1873.
V. Copy of Cunard Company's Liverpool advertisement, —
VI. Copy of Cunard Company's Boston advertisement, —
that early in the spring of 1874 steamers of this line will sail twice a week from Boston.

(Signed) JAMES ALEXANDER.

EVIDENCE OF CHARLES O. WELCH.

To Mr. McIntire. I reside at the corner of Sixth and Cambridge Streets.

Q. (*by Mr. McIntire*). Sixth Street runs down very near to Mr. Squire's factory? *A.* Very near. I am on the south side of the street, and have lived there over five years. I live about four hundred feet from Squire's establishment.

Q. Have you detected any of these various odors that arise from Squire's establishment? *A.* I have.

Q. Can you describe any of them? *A.* I will, to the best of my ability; but it is very hard work. The worst is the rendering smell. It is so bad in summer that we can't have our windows open at all.

Q. How often do you detect that rendering smell that you speak of? *A.* I think within the last two years I have detected it perhaps twenty times.

Q. Do you detect the hog smell? *A.* Yes, sir, very often; pretty nearly all the time.

Q. That is, the smell from the live hogs? *A.* Yes, sir.

Q. Do you detect other smells besides the rendering and hog smells? *A.* Yes, sir.

Q. These rendering smells, when do you detect them most? *A.* At night; after eleven o'clock, mostly.

Q. Has your house been affected? *A.* It has. The outside has been spoiled. Most of it was done on the night of the 31st of July. It discolored the paint on the inside and outside of the house. The side of the house on Sixth Street is spoiled. The original color was a light brown, and after that night it looked blue-black.

Q. Did you detect any smell on that night? *A.* Yes, sir. During the evening I detected it so much that we had to leave the shed on the back part of the house, where we were sitting, and go in. When I got ready to go to bed, it was worse.

Q. Have you been in or near Mr. Squire's establishment? *A.* I have n't been in Mr. Squire's establishment, but have been in some others.

Q. Have you passed by or near it, within a year? *A.* I have, perhaps half a dozen times within a year, passed Mr. Squire's establishment. Three or four times, I am sure, I detected the hog smell in passing.

Q. Which way did you go? *A.* I went down Sixth Street, into Gore Street, toward Somerville. I detected the hog smell each time.

Q. Was there any other smell from that establishment? *A.* Yes, sir.

Q. What other smells did you detect at that time? *A.* I should call it something like boiled lard, or something of that kind.

Q. Were these smells distinct? *A.* Yes, sir; very.

Q. This rendering smell, — has it had any peculiar effect upon you, or do you know of its having any peculiar effect upon any of your neighbors? *A.* It has had a bad effect upon both myself and wife. We felt as if something was pressing very strongly upon the chest and throat, — so much so that we could hardly sleep. We also had soreness of the throat.

Q. In your observations, how far did these discolorations of paint, on the night of the 31st, extend? *A.* I never noticed it to any extent, except on the outside of the houses, before, and it had never affected the inside of the house before.

Q. What distance from the factory did this discoloration extend, if you took notice? *A.* I should hardly like to undertake to answer that question.

Q. What was the farthest discoloration that you saw? *A.* Down on Sixth Street.

Q. Will you point it out on the map, the house you noticed discolored? *A.* Mr. Jones's house and Mr. Riley's, a double house, was discolored as much as any I saw, except some down in the basin. I also noticed some houses discolored on the same side of the street that my house is on. They were discolored most on the same side of the street that my house is on, between Cambridge and Gore Streets and also between Cambridge and Otis Streets.

Q. Did you notice any discolorations before that night? *A.* I did not notice any discolorations on the houses on the night before the 31st, and I did notice them afterward.

Q. Did you notice how far along it extended toward Boston? *A.* Most of it was right along there.

Q. Did you notice which way the wind blew that night? *A.* I did not.

Q. What kind of a night was it? *A.* It was a very pleasant night. The atmosphere was very comfortable; we were all sitting out on the shed on the back part of the house. I had a coat on and found it very comfortable.

Q. You have n't been in Mr. Squire's establishment lately? *A.* I have n't been there for some time.

Q. Do you ever, at your house, detect the smell arising from the basin? *A.* Yes, sir.

Q. It is called the dock smell? *A.* Yes, sir.

Q. Is there any difference between it and the other odors? *A.* Yes, sir; we can distinguish it very easily from the others.

Cross-Examination.

Q. (*by Mr. Muzzey*). At what hour on the 31st of July did you first perceive the bad smells? *A.* I think it was in the vicinity of half past eight.

Q. How long did they continue? *A.* I think almost all the evening, say from half past eight to half past ten.

Q. Did you distinguish them afterward? *A.* I was awakened in the night, — think about half past ten.

Q. Your house is nearly south of Mr. Squire's factory? *A.* Yes, sir.

Q. How late in the night did you notice the smell? *A.* It must have been later than half past ten. I had been sound asleep, and I could n't say exactly. I should judge I kept awake an hour and then fell asleep, after closing the windows. I did n't wake up before morning again that night. In the morning I traced the smell all over the house.

Q. What did you do first, after getting up? *A.* When I got up I filled my house pretty full of tobacco smoke.

Q. Were there any traces of it outside? *A.* There were no traces of it outside.

Q. Was this smell on this particular occasion more offensive than any other you remember? *A.* I think not. At one time afterward I think it affected me more than that.

Q. What time was that, — about the second week in August? *A.* Yes, sir.

Q. Was it an odor at night? *A.* It was.

Q. Were you ever affected by the dock smell? *A.* I have been.

Q. Excepting the occasion on the 31st of July, have you noticed much trouble this last year? *A.* I have, more or less, during the summer.

Q. How has it been, as compared with the summer of 1872? *A.* I think it has increased.

Q. Which particular smell has been the worst? *A.* I mean the rendering smell, late at night.

Q. (*by the Chairman*). How did you say the odor affected you? *A.* I had a bad pressure on the lungs.

Q. (*by Mr. Muzzey*). Did it injure your lungs? *A.* I don't know that it affected them seriously.

Q. (*by the Chairman*). What was the effect upon you the next morning? *A.* In the morning I felt as if I had been up all the night.

Q. (*by Mr. McIntire*). What is your general health? *A.* I generally feel pretty well, unless I get that smell.

Q. How many times do you attribute your bad feelings to these smells? *A.* We have had it at least six times, and I attribute it entirely to those smells.

Q. (*by Mr. Muzzey*). Have you ever had any trouble with your lungs or chest? *A.* No, sir. I have no predisposition to diseases of this kind.

Q. (*by a member of the Board*). Do I understand you to say that you did not trace the putrid smell to the Squire establishment? *A.* No, sir.

Q. Have you at any other time traced it to that establishment? *A.* I have been by there when I have smelt that smell, but not to anything like that great extent.

Q. (*by Mr. Muzzey*). Did you ever trace the rendering smell to Mr. Squire's establishment? *A.* I never smelt the rendering smell while going by there.

Q. Can you describe the odor you refer to? *A.* It is what I call the lard smell, that is very disagreeable. It is a sort of lard smell and smell of hogs. I noticed it as I was going by.

TESTIMONY OF DR. CHARLES HENRY FARNSWORTH.

To Mr. McIntire. I am a practising physician in East Cambridge; have resided there fifteen years last June.

Q. (*by Mr. McIntire*). Are you familiar with the neighborhood about there? *A.* I am well acquainted with the localities there and with Mr. Squire's establishment.

Q. Have you detected any of these smells? *A.* I have detected all the various smells arising from this district.

Q. Will you describe them? *A.* We have the smell coming from the hogs, — the hog-pen smell, — and we have the smell of the rendering and trying of lard; also the dock smell.

Q. Can you distinguish these different odors? *A.* I think I can fully distinguish between these different odors.

Q. You have been by Mr. Squire's establishment; will you please state whether in your opinion the smells come from there? *A.* The nature of my practice carries me by this establishment nearly every day. Some of these odors I detected as arising from the establishment of John P. Squire & Co. I have passed it both in the night and day time, and I have taken pains to trace them to their source. I have traced the smell of the hogs to the archway which goes to Mr. Squire's place. I have taken the smell of the rendering and trying of grease and traced that to the front of the building. I have also taken the dock smell and traced it to the dock at his building.

Q. Have you ever smelt the hog smell on the other side of the basin? *A.* I don't think I have smelt the hog smell on the other side of the basin.

Q. How often did you trace these smells right to this establishment? *A.* I have n't kept any account, but I should think I might have traced them there fifty times in the course of the present summer.

Q. Do you mean Mr. Squire's establishment? *A.* Yes, sir, Mr. Squire's establishment.

Q. Where do you live, Dr. Farnsworth? *A.* On Cambridge Street, between Fifth and Sixth Streets, about two hundred feet from Mr. Welch's, and about six hundred feet from the Squire establishment.

Q. What is the direction of the establishment from your house? *A.* It is about north-northwest from me. I live directly back of the school-house.

Q. How often have you had these smells at your house? *A.* I should think we have had those odors nearly every day during the past season. We have the hog smell very frequently, even during cold weather. In the summer, one Sabbath afternoon, the hog smell was very offensive. Several friends were calling upon me out of this city, and they spoke of the offensive smell which filled the house, and particularly of the hog smell.

Q. Your practice is right about there, and extends from there to Cambridgeport and Somerville. Do you know whether these smells ever affected the health of citizens about there or not? *A.* They do temporarily, but I don't know that they permanently affect the health of the people. While the wind is in the direction to take the smells to the houses, many persons are nauseated by them.

Q. How are they affected? *A.* They complained of soreness of the

throat, and then of being nauseated. I know of one lady who has suffered very considerably until the wind would change and carry the odors in an opposite direction. A lady on Fifth Street was very much nauseated by them; it continued three days. In my own house my wife was frequently nauseated by them. I think that as late as within a fortnight the smell was so strong that it wakened us both, and we closed the windows. In some few cases it has been severe enough to produce vomiting. I would n't recommend a sick person to be within range of those smells for comfort.

Q. Have you noticed any discolorations of the houses? *A.* On the 31st of July I noticed the effect of the gases on the houses. They affected my house considerably, though not so much as some other houses in the vicinity. My house was painted white, and it did n't seem to be affected as much as some others. The worst effect I have seen was near the corner of Sixth and Cambridge Streets.

Q. How far from Mr. Squire's is the farthest house affected on that night? *A.* I did n't take particular notice on the other street, and can't tell how far it extended on Cambridge Street.

Q. Have these gases ever affected your silver-ware? *A.* It has blackened it very much; the silver on the table is blackened.

Q. Have you been into Mr. Squire's establishment lately? *A.* I have not been in there this season. Last season I went over the whole of it. I can't state exactly the time.

Mr. Derby. This inquiry relates to the present time and the present year. We hold that it is incompetent to extend beyond the present year.

Mr. McIntire. It is an argument of the petitioners that there has been a decision against the respondents rendered by the Joint Commission.

Mr. Muzzey. I don't care what the argument is. You asked the Board to suppress us, and they did n't do it. I claim that there is a verdict in our favor, and I submit it to the discretion of the Board.

Mr. McIntire. I wish to put in a copy of the verdict into this case.

Q. (*by the Chairman*). How far can you smell this odor from the establishment?

Witness. I have smelt it two thousand feet I should think. People living there smell it very frequently.

Q. (*by Mr. Derby*). How do you know they smell it? *A.* They tell me so, and I have been there and smelt it myself.

Q. (*by Mr. McIntire*). Do you know of any sick persons being annoyed by the squealing of the hogs when killed? *A.* I visit a lady now who tells me the squealing of the pigs annoys her very much.

Q. What is the number of people coming within range of this odor? *A.* Several thousand, or I should think ten thousand people in all.

Q. Should you think all the people of East Cambridge could detect the odors, and whether it is disagreeable to them at any time? *A.* I don't think all the odors come from Squire's establishment, but I think at certain times the odors which come from there can be detected by all the people of East Cambridge, and that they are disagreeable to them. I think it also affects people on the other side of the basin in Somerville. The smell is very distinct in that direction, but it would be fair to presume that the other establishments contribute to that smell. We smell it up as far as Sacramento Street. The other establishments are in that direction more than Squire's. The others are nearer East Cambridge.

Q. Did you observe the wind on the 31st of July? *A.* There was but very little wind. I took the direction of the wind that evening by holding up my finger.

Q. Did you notice any unusual odor that evening? *A.* Yes, sir; I was out most all of the first part of the night, and had the benefit of all the smells.

Q. What was the greatest distance from the establishment that you could detect the smell? *A.* I did n't get it any farther from the establishment than my house. Above the car stables the smell was hardly perceptible.

Q. You would n't perceive it from the westerly side of the establishment? *A.* I think not. I went by it on Cambridge Street, and not on Gore Street.

Q. You stated that you went in Squire's establishment a year ago, and also last summer. Did you notice any alteration in the method of rendering? *A.* I should think it was about the same. I did n't go in the slaughtering part.

Q. Did you detect any smells there? *A.* I detected only the smell of grease.

Q. Please state whether you have noticed any discolorations previous to the 31st of July. *A.* The buildings last year were discolored, but not on both sides of the basin before this year.

Q. Did you ever before notice any such sudden discoloration as on that night? *A.* No, sir. The discoloration of the buildings is not so important as the discomfort arising from bad odors, and the want of fresh air that we have experienced all through the season. We feel it more upon ourselves than we do upon the buildings. Whenever the wind is blowing the air has been very offensive in our dwellings.

Q. Do I understand you to say that you have seen any unloading of hogs? *A.* I have seen them being unloaded, and driven into the establishment. I have been to where the hogs are changed from the cars into the yard, and I detected the odor of hogs while they were coming out of the cars.

Q. How far did that odor extend? *A.* It extended as far as my house, and I don't know how much farther. It was very offensive.

Q. Did you see any dead hogs in the cars? *A.* I did n't notice whether there were any dead hogs on the cars then, but I have noticed the carcasses on the platform after they had been taken out.

Q. What is done with those dead hogs? *A.* I don't know what disposition is made of them.

Q. I should like to ask if gases passing into water are absorbed into the water? *A.* Theoretically it may be so, but practically it is not. If Miller's River had not been open it might be so, but, Miller's River being open, it is not.

Q. (*by the Chairman*). Have you traced these odors to Mr. Squire's buildings? *A.* I have traced these odors to the street in front of the buildings. On the 31st of July I passed up and down the street. I took the direction of the air by wetting my finger and holding it up.

Cross-Examination.

Q. (*by Mr. Muzzey*). You did n't feel the air blowing against you that night? *A.* I would n't have been able to have told there was any wind, unless by wetting my finger and raising it above me.

Q. (*by Mr. Derby*). With regard to parties being affected in the throat

or lungs, have you had many cases of serious sickness? *A.* I never had any serious cases, and never had any case of loss of life.

Q. This nausea, is it experienced when the wind is blowing from any particular direction? *A.* When the wind is blowing in any other direction than from Mr. Squire's, we don't notice the odors.

Q. How is it in the night, — the effect of the wind? *A.* In the night time, if the wind is blowing strong in that direction and bringing those odors, people are nauseated by them; sometimes they are affected by the changing from one odor to the other.

Q. How many cases of nausea have you known during the past summer? *A.* I can't remember, there are so many. I can count the individuals who have complained to me in a few minutes.

Q. Parties that you have actually known as a physician, or as the father of a family? *A.* Yes, sir.

Q. How many times have you known nausea produced during the past summer? *A.* I should think not less than a hundred times, but I have not been called to treat them; many persons told me how much they were nauseated.

Q. I don't allude to that kind of statement; I mean persons who have actually called upon you to treat them? *A.* After the wind changes or passes away, the nauseating effect leaves. My wife is affected thirty days in some of the months, and thirty-one days in some of the others, and almost every day during the hot weather. It did every day during the summer that those strong odors came across to our dwelling. The wind has done so every day. I don't think the southerly wind is more prevalent in the summer. I think that nearly every day I have had some one affected by this nausea.

Q. Has the health of your family been seriously affected? *A.* My wife is seriously affected by it, but my health is not affected by it.

Q. But how do you know where the smells come from? *A.* Those smells are from the establishment of Mr. Squire, because I have traced them there.

Q. But do you not get the dock smell, also? *A.* I think we can tell that portion of the smell which comes from the basin, and there are times when we can trace the smells directly to Squire's basin.

Q. Can you particularize, — state any given time? *A.* Not exactly, with any certainty, because I have not kept a record of it.

Q. With regard to the changes of paint, do I understand that they took place previous to the present year? *A.* Yes, sir.

Q. I will now ask you whether there has not been a smell of sewage in the drains emptying into the basin? *A.* I don't think I have detected those smells which were the effect of the sewage.

Q. Are these odors that you speak of more disagreeable than what comes from the flats along Cambridge Bridge? *A.* Yes, sir.

Q. (*by Mr. McIntire*). Is n't it something more than the smell of dock mud? *A.* Yes, sir.

Q. (*by Mr. Muzzey*). What do you call the gases that produce the nausea and irritation that you describe? *A.* I don't know. I think it is the hog smell sometimes that makes people sick.

Q. Then you trace the illness of people and nausea to the live animals? *A.* Not always, but sometimes to the live animals. Separately they will produce that nausea, and sometimes collectively combined.

Mr. McIntire objected to the double cross-examination of the witness.

Mr. Muzzey. I only wished to take up one or two topics that had not been touched upon.

The Chairman decided that the questions could be asked.

Q. (*by Mr. Muzzey*). Have you analyzed any of those gases? *A.* No, sir.

Q. What gas do you suspect the presence of in the atmosphere when those effects are produced? *A.* I only suspect the disagreeable odors.

Q. I am asking what chemical agent is it that gives these effects to these persons? *A.* I don't think I can give the chemical agent which produces nausea in an offensive odor of that kind.

Q. What comes into the atmosphere that produces sickness in the stomach? *A.* The nervous constitution of people is so different that what is disagreeable to one person will not produce nausea in another.

Q. What is the source that the suffering comes from, — whether from the river-bed or the rendering? What is the agent that produces these results?

The Chairman. I think such questions would only be taking up the time of the Board unnecessarily.

Mr. Muzzey. There is only one point more.

Q. (*by Mr. Muzzey*). Do not these effects proceed from the action of sulphuretted hydrogen? *A.* In the odors which come from the dock I think it may be; but I don't think it is so in the odors which come from the hogs.

Q. Now, you spoke of being somewhere on the 31st of July, and wetting your finger. Where was that? *A.* I came down Cambridge Street, and did it at 8th Street.

Testimony of Henry S. Hills.

Q. (*by Mr. McIntire*). You live in East Cambridge? *A.* Yes, sir.

Q. How long have you lived there? *A.* For thirty-one years.

Q. You are in business here in Boston? *A.* Yes, sir.

The Chairman. How far from this place do you live? *A.* About three hundred feet from Mr. Slocumb's. I am on Thorndike Street, and he is on Otis Street. I am about two thousand five hundred feet from Mr. Squire's establishment.

Q. (*by Mr. McIntire*). Have you been affected by the smells that arise from this quarter? *A.* We have at our house.

Q. Do you distinguish between the different odors? *A.* The principal odor we have had occurs in the night time, and is very severe. Being in the city during the day, I don't notice the smell at that time; but I have frequently heard my family speak of it.

Mr. Derby. That is not evidence.

Q. What was that smell? *A.* It was the same that has been described by others here. It produces a sort of sickening feeling and nausea.

The Chairman. Does it produce actual vomitings? *A.* No, sir.

Q. (*by Mr. McIntire*). Your wife is an invalid? *A.* Yes, sir; my wife has been an invalid for six or eight months, and has suffered a great deal in consequence of this smell, whenever the windows are open.

Q. Have you traced any of these smells? *A.* Never otherwise than when the wind is in a certain direction we have the smell in our house.

Q. Do you distinguish between the dock smell and the rendering? *A.* I have never smelt any dock smells in Cambridge when I have been there.

Q. (*by Mr. Derby*). Never? *A.* Never, to my knowledge.

Q. (*by Mr. McIntire.*) How do you describe the odor that you smell? *A.* I don't know as I can describe it otherwise than as a very sickening and disagreeable smell which we get that affects the throat.

Q. What does it smell like? *A.* I know when I smell it. It is the same old smell.

Q. Have you ever smelt the live-hog smell? *A.* No, sir, I don't think we have ever smelt anything directly from the live hogs.

Q. You are on the other side? *A.* On the south side.

Q. How often would you get it during the last summer season? *A.* I could hardly say how many times. Quite frequently; almost any time when the wind has been in the right direction.

Q. Whether it affected any one besides your wife? *A.* I have been affected myself more or less.

Q. In what manner? *A.* In this same manner; with a disagreeable feeling in the throat. My wife usually shuts the windows and tries to avoid it as much as possible.

Cross-Examination.

Q. (*by Mr. Muzzey*). Is not this smell worse when the tide is out? *A.* I don't know that I ever noticed any difference whether the tide was in or out. I don't know that we have smelt any different odors.

Q. How long have you smelt this? *A.* For some two years.

Q. Were there any smells before that? *A.* There was some years ago a bone factory on the dike that we used to be troubled about.

Q. Do you remember the putting up of the dam in 1871? *A.* I don't remember anything about it.

Q. You recollect the bad smells began then? *A.* I don't know of any bad smells only those which came from this trouble about two years ago.

Q. It is one and the same smell? *A.* Yes, sir; I don't know that it is any different.

Q. Are you quite as near to Mr. Squire's establishment as Mr. Slocumb? *A.* No, sir, not by three hundred feet.

Mr. McIntire. I would like to put in a copy of the records of the Cambridge Board of Health, showing the result of the hearing before them in regard to this matter.

Mr. Muzzey. I will not object if you will allow the whole matter to go in, including the fact that there was never any action taken whatsoever against Squire & Co. as a result of that hearing.

Mr. McIntire. I will agree that that Board went out doing nothing except passing that order.

Mr. Muzzey. And that no Board has come in that has done anything?

Mr. McIntire. I will agree to that.

The copy was then put in.

Adjourned.

SECOND DAY.

Tuesday, December 2.

Mr. Derby. I suppose that the protest which we offer applies to this day as well as to all.

The Chairman. Certainly.

TESTIMONY OF JONAS WOODARD.

Q. (*by Mr. McIntire*). How long have you lived in Cambridge? *A.* I have lived in East Cambridge nineteen years.

Q. What is your occupation? *A.* Dealer in hay, straw, and charcoal.

Q. How near do you live to the establishment of Mr. Squire? *A.* Within fifteen rods.

Q. On what street? *A.* On Sixth Street, between Cambridge and Gore Streets; about half-way between Cambridge and Gore, on the east side, a little nearer to Gore than to Cambridge. There are two houses between me and Gore Street. I am within two hundred and fifty feet of Mr. Squire's place.

Q. Will you state whether you have been troubled with any of these odors that have been testified to? *A.* I have been.

Q. For how long a time? *A.* Well, for the last four years, more or less, ever since I lived in that place.

Q. What odors do you detect? *A.* I detect the hog smell, the live hog, and another, that of the rendering or trying of meat.

Q. Any more? *A.* I do sometimes smell the smell from the dock, occasionally.

Q. How often do you get these live-hog and rendering and trying smells? *A.* Well, the rendering and trying smell is almost every day; not every day, but two or three times a week. It varies one or two a week along.

Q. At what time do you get it? *A.* We generally get it more in the night time than we do in the day.

Q. Is there any difference in the tide when you get these smells? *A.* No, not in regard to this rendering smell. The tide does not make any difference.

Q. How often do you get the hog smell? *A.* As often as they unload the hogs, or whenever the wind is in a northwesterly direction. Sometimes the wind is not so, but we get it every time.

Q. Do you mean to say that you only get the hog smell when they are unloading the hogs? *A.* We get it more then, but we get it at all times. When we get it worst is when they are unloading.

Q. Do these smells affect you any, or your family? *A.* They do.

Q. How? *A.* On account of this sickening smell from the trying, sometimes we have to close our windows in the night.

Q. Has it affected your family? *A.* It has.

Q. Can you give me any particular instance? *A.* On the night of the 31st of July we were waked up out of sleep by a smell.

The Chairman. What was its effect upon your family when they

woke up? *A.* We perceived a sickening smell, and my wife complained of a smarting in the throat.

Q. Did she vomit? *A.* Not at that time.

Q. At any time did it cause vomiting to you? *A.* It did, some two years ago.

Q. Where were you? *A.* I had been to South Boston to meeting and was going home, something past twelve o'clock. I know I had to walk it.

Mr. Derby. It seems to me that that is rather a long distance to go back.

Mr. McIntire. I wish to show that a similar smell to what made him vomit two years ago, would now.

Mr. Derby. I make the objection. You can proceed.

Mr. McIntire. I will leave it out.

Q. Do you know of any nausea or vomiting caused to yourself by these smells? *A.* I know of being sick, but not so as to vomit.

Q. When? *A.* On the night that I speak of, the night of the 31st of July, I experienced a sickening sensation.

Q. Well, how? Describe it. *A.* It was a sickening smell to myself and also to my wife. We were woke up from sleep by it.

The Chairman. How long did the trouble continue upon yourself and wife? *A.* Perhaps half an hour or so. I got up and went to get a drink of water. The smell lasted for about twenty minutes or half an hour.

Q. Did it produce vomiting? *A.* No, sir, only a nauseated feeling.

Q. Well, at any other time, and how many times during the last summer, has the smell produced nausea? *A.* A good many felt it the same night at about half past two o'clock, the night of the 31st. We had two gusts of it that night. They came and lasted from twenty minutes to half an hour each time.

The Chairman. It had a similar effect? *A.* Yes, sir. That is the night on which the houses were turned.

Q. (*by Mr. McIntire*). Have you ever attempted to trace any of these bad smells? *A.* I did on that night that I spoke of, that I had been out, some two years ago.

Q. Since then have you been by there, or have you traced any of these smells? *A.* I have been up by there in the evening.

Q. When? *A.* In August, soon after we had so much talk in regard to the coloring of the houses.

Q. What did you find? *A.* I found that I smelt this smell from the rendering and trying coming very strong from the doors, as I passed up and down the street.

Q. (*by Mr. Derby*). From what doors? *A.* From the front doors of Mr. Squire's building.

Q. (*by Mr. McIntire*). Did you get the live-hog smell? *A.* Not that night. The worst that I smelt then was what I supposed to come from the rendering.

Q. What day of the week — what particular day, if any — do you smell the hog the worst? *A.* The most I have ever smelt it, and the strongest, was the last Sunday before August. I was down at my barn, near the bridge on Cambridge Street, and smelt it very strong that day, the wind being in the right direction.

Q. You smelt it at your barn. That is where? *A.* At 26 Cambridge Street, near Craigie Bridge.

Q. How far from Mr. Squire's factory? *A.* Half a mile from Mr. Squire's factory I should think.

Q. That was the live-hog smell? *A.* Yes, sir.

Q. What part of the day was that? *A.* I should judge it was from ten to eleven o'clock. It might have been from nine to eleven in the morning.

Q. Do you know what that was caused by? *A.* It was the smell of live hogs unloading from the cars.

Q. Do you know who they were unloaded for? *A.* I went up there and saw them unloading, and they told me that they unloaded forty-five car-loads that day.

Q. That was on Sunday? *A.* Yes, sir. I was told that thirty-five car-loads were for Mr. Squire, and the others for Mr. North.

Q. You found them unloading at that time? *A.* I did. How long it was before they got through I could not say. I left them unloading.

Q. At what time of day? *A.* It was past twelve o'clock, I think. I think it was the last Sunday but one in August.

Q. Did you, when you went up there, detect that scent of the live hog? *A.* I did.

Q. How strong was it? *A.* I don't know as I could describe the strength.

Q. How much did it affect you? *A.* I don't know that it made me sick. It was a disagreeable smell; such as would arise from hogs.

Q. Was there any particular day of the week that you smelt the live-hog smell more than any other? *A.* I think Sundays it comes stronger and more often than on other days. It may be because I am at home more on that day.

Q. Do you know on what days, as a general thing, the hogs are brought in and unloaded? *A.* I do not. I could not testify in regard to that.

Q. Do you know of their being brought in more than once on Sunday? *A.* O yes. I know of their being brought many times.

Q. How many times in the past summer? *A.* A great many. I could not say the number.

Q. Do you know anything with regard to running these works on Sunday? *A.* I do not.

Q. Do you know anything of their running them last Sunday? *A.* I heard the squealing of hogs last Sunday, along some four or five o'clock. I don't know what they were doing with them. I heard them squeal.

Q. Did you see the men about there? *A.* I did not.

Q. Well now, in regard to blackening. You live within three hundred feet of there. How was your house before the 31st day of July last, in regard to being blackened or discolored? *A.* It was discolored some on the outside of the house.

Q. How long had it been so? *A.* For the last year there had been some discoloration on the front side of the house.

Q. Well, on this night of the 31st of July? *A.* There was a great deal more added to it outside, and it was also colored on the inside.

Q. How about other houses in the vicinity? *A.* The houses all through that street and in that vicinity were colored that night; that is, within twenty rods of the establishment.

Q. Well, how was the discoloration of that night as compared with all

other nights previous to that? *A.* I should think there was more on that night than on previous nights.

Q. To how great a degree? *A.* So much more, — I don't know as I can describe it, — so much more that it was the general talk of people the next morning. They gathered about in groups and looked at their houses and complained. It was the cause of the meeting being called to discuss the matter.

Q. You say you have been by there and have detected, coming from the doors, this rendering smell. Did you do it more than once? *A.* I did.

Q. Within the past summer? *A.* Yes, three or four times, I have taken pains to travel by there during the month of August.

Q. With the same result? *A.* It was always strong. Sometimes it was stronger than at others. It depends, I think, upon what they are trying; sometimes it is more nauseating than at others. They try, I suppose, different meats.

Q. Do you know anything about what is called here the dock smell from the basin? *A.* I do. We have that occasionally.

Q. Are you nearer to the dock than you are to Mr. Squire's? *A.* Yes, sir.

Q. That is, the foot of Sixth Street is a part of the Squire basin? *A.* Yes, sir.

Q. Well, how is that smell as compared with what you call the rendering smell, in strength and effect upon your body? *A.* The smell from the dock is a disagreeable smell, and an altogether different one. It is not so sickening to me as the other smell.

Q. How often do you get that dock smell? *A.* I don't know as I could say; we get it quite often. You might say we get it more or less almost every day; every day, perhaps, when the wind will fetch it to us.

Q. You are within about two hundred feet of that establishment? *A.* I should think so.

Q. Did you ever go up on the Somerville road on the other side of the basin, on Bridge Street? *A.* I have.

Q. Did you detect any odors there? *A.* I did.

Q. What? *A.* I detected the dock smell, and also the smell from rendering when the wind was right.

Q. Did you detect the hog smell on that side? *A.* I don't know whether I did or not.

Q. Have you passed between Squire's and North & Merriam's, on the Grand Junction Railroad? *A.* I have passed through there.

Q. Did you notice any particular scent there? *A.* I could smell smells, when they are at work there. The track where they unload their hogs is between Mr. Squire's and North & Merriam's places. When I went up the street, I passed through there by Bridge Street, on the Sunday of which I speak.

Q. (*by a member of the Board*). Was it any worse in that neighborhood than near your barn? *A.* I don't think it was. The wind was west or northwest that day.

Q. Was there any place where that could come from? *A.* I don't know where the smell of live hogs could come from except from that place. I am not allowed to keep hogs in the city.

Q. Whether you know anything about whether Mr. Squire keeps his men at work on Sunday? *A.* I do not.

Cross-Examination.

Q. (*by Mr. Derby*). How often are these hogs landed, sir? *A.* I could not say how often; they come every week.

Q. Oftener than five or six times a week? *A.* I don't suppose they do.

Q. You have n't seen them any oftener than that? *A.* I have not seen them so often.

Q. Do you know the number of cars coming in there daily? *A.* I do not.

Q. Was not this an unusual occurrence on Sunday? Were not the trains detained? *A.* I did not hear anything said in regard to that. I went up there and was told by men there that they had unloaded forty-five car-loads of hogs that day.

Q. How long was the process of unloading that day? *A.* I could n't state how long they were at it. They were unloading in the afternoon.

Q. When you first perceived the smell of the hogs and ascertained that they were unloading, what time of day was that? *A.* About twelve o'clock. I should think it was not far from that time when I was at my barn and smelt it.

Q. At what time did you walk up there? *A.* Soon after that.

Q. When you arrived, were they unloading, or had they finished? *A.* They were unloading.

Q. How soon did they get through? *A.* I could not say. I left them unloading.

Q. Were n't they nearly through? *A.* I could not say.

Q. Your observation was confined to a period between half past ten and one o'clock. At that time there were, as you understood, for you did not count them, some forty-five cars on the track which were being discharged? *A.* I was told thirty-five car-loads were for Mr. Squire and ten for other parties.

Q. Pass to the 31st of July. Did you go out that night? *A.* I did go out on the street.

Q. How far? *A.* I went down on to Gore Street, and passed up by the establishment.

Q. At what time in the night did you go there, sir? *A.* Between eleven and twelve o'clock, when we perceived the first smell.

Q. Did you go out before the half-hour was over? *A.* Yes, sir; but the smell greatly diminished within a half-hour after it came, and the air was nearly as clear as before it came.

Q. When you went out of your door was the air clear then or was the smell continued? *A.* The smell was strong when I first went out.

Q. How long did it last strong after you went out? *A.* Perhaps ten minutes.

Q. From the time you left your door you perceived it, about ten or fifteen minutes. Was it a pungent smell, a smell of rendering? Was it stronger than you had experienced before? *A.* It was.

Q. A more pungent smell was it? *A.* Yes, sir.

Q. This smell of rendering which you smell is not a pungent smell? It

is the ordinary smell that comes from lard? *A.* It is different on different nights. I had supposed that when we had it the strongest and most disagreeable it was because they were trying meat. It was usually the ordinary smell of rendering leaf-lard, — the common every-day smell.

Q. Now pass, if you please, to this night of the 31st. You speak of the smell being very sickening that night, and producing great effect. Did n't it produce more effect upon the houses that night than all the previous smells of the year had done? *A.* I should judge it did, sir. The houses were more discolored than they had been before.

Q. Or afterwards, either? *A.* Yes, more than in any one night.

Q. Well, take the rest of the season. Were they not discolored more on that night than on all the other nights of the season? *A.* I should think as much. I could not say decidedly.

The Chairman. With regard to going into the place and examining meat before it is rendered; have you been into the establishment to find out about that? *A.* No, sir, I have not.

Q. You have no knowledge of what was tried there? *A.* I have never been into the works to examine them. I have been in there.

Q. Well, recently have you been there? *A.* I was in there one afternoon and one night in August or September for a very short time. I went in with some man that came along, and stayed a few minutes with this gentleman, and passed down among the works.

Q. Is there any rendering place between you and North's, where rendering is done in open kettles? *A.* Not that I know of. There is nothing except Mr. Squire's between me and North's.

Q. Do you know where Spellman keeps? *A.* I do not. I have heard such a name.

The Chairman. You say that you went out on the 31st of July. Where did you go? *A.* From my house on Sixth Street down on to Gore Street, in front of Mr. Squire's establishment.

Q. Did you trace the smell to any place yourself? *A.* I did.

Q. To what place? *A.* To Mr. Squire's establishment.

Mr. Derby. How long were you walking to Mr. Squire's? *A.* It was a very little time; less than ten minutes.

Q. Did you walk directly or did you smell about? *A.* I walked directly there. We had that smell again about half past two the same night.

Q. But within the ten minutes you took to walk that distance the smell had been greatly diminished, had n't it? *A.* It was greatly diminished after the time I went out of the door.

Q. (*by a member of the Board*). To what do you attribute the disappearance of the smell in that way, — to the changing of the wind or the cessation of the cause? *A.* To the cessation of the cause. It returned at half past two. I suppose that they were going through the same operation that they were going through before. It was the same smell, but what that was I do not know.

Q. (*by Mr. Derby*). The works were lighted up? *A.* There were lights in the establishment; there are at all times of night.

Q. There were this night in particular, and men at work? *A.* There were lights in the building, but nothing more than common.

Q. Did you see men moving about? *A.* I did see one or two men pass before the windows. I don't know whether they were working.

TESTIMONY OF ASA TYLER.

Q. (*by Mr. McIntire*). You live in East Cambridge? *A.* Yes, sir.

Q. What is your business? *A.* I have been a dealer in boots, shoes, and rubbers in Boston. Now I have n't any particular business.

Q. You have had a store under the Museum, have n't you? *A.* Yes, sir; for twenty-five years.

Q. You have lived on Sixth Street how long? *A.* Nine years next January in the same house.

Q. Of course you are acquainted with this establishment. Will you please tell us if you have been troubled with any of these odors that have been testified to? *A.* Very seriously.

Q. By more than one? *A.* By several of them.

Q. Can you describe them? *A.* Well, there is the dock smell, the live-hog smell, and, as I suppose, the smell of the trying or rendering of lard.

Q. Which of these smells to you seems the most severe? *A.* The rendering smell has affected me and my wife the worst.

Q. How has it affected you? *A.* It has made me sick several times. It has tightened my lungs so as to affect my speech, and I could not speak without coughing or hacking at every word I spoke.

Q. How has it affected your wife? *A.* It has caused her to have a headache and to be sick some time. For nearly one week at once she has been prostrated by it.

The Chairman. Did you vomit? *A.* I have never vomited, but I have been so sick when I came down in the morning that I had no appetite for my breakfast, no desire for it.

Q. You mean that it produced nausea? *A.* Nausea, and this sickness.

Q. How many times during the last summer has it so affected you? *A.* Almost, as a general thing, all through the warm weather.

Q. And your wife? *A.* On the night of the 31st we were both of us made sick by the smell that came into the house. Between the hours of eleven and twelve we were woke up by the smell, the windows of our sleeping-chamber being open. I was so pressed that I could hardly breathe, and I got out of bed to go down and get a drink of water. My house was filled with the gas. I closed the rooms down stairs and up stairs, and came back to my wife and said that I was going out. She could n't hardly catch her breath. Our room appeared to be saturated with the odor that came in that night.

Q. Do you know where that smell came from? *A.* I did not get it then. We did not get it again until somewhere past one o'clock, before I had lain down again. Then somewhere about two o'clock it came again. I put my head out of the window and smelled it, closed the windows, went down stairs and remained an hour or so. I did n't go to bed again that morning. Between four and five I came out on the street. There were quite a number of our neighbors out on the sidewalks, looking at their houses. It was a general question where that stench and odor came from that night.

Q. Do you know where that smell came from? *A.* I did n't go out of doors that night. I did n't go out until morning. I did not trace it.

Q. Have you been by the establishment of Mr. Squire? *A.* I have, sometimes as often as once or twice a week.

Q. In going by it did you detect any of the odors that you speak of? *A.* I have.

Q. Which one? *A.* I have detected what we call the smell of the rendering of hogs, and of the dock. When the wind is strong it brings it right straight into my house.

Q. Do you detect it as coming from the establishment? *A.* I have. I have had the curiosity when coming home on the street in the morning to follow it. I have followed it straight to the building. After I had got past the building a certain distance it would not smell.

Q. (*by Mr. Derby*). How far? *A.* Perhaps five or ten rods; enough to get past the building. That is the rendering smell. I can smell the dock almost any time.

Q. How many times during the past summer have you traced it to the buildings? *A.* I think a dozen times.

Q. The rendering smell? *A.* Yes, sir.

Q. Do you know anything about the unloading of hogs? *A.* I have been there a number of times. I have had the curiosity, particularly when I have smelt the hog smell on Sunday, to investigate its origin.

Q. How many times have you seen them unloading hogs on Sundays? *A.* I recollect some three or four times that I have been up there this present summer or fall.

Q. They unloaded at Cambridge Street, where the crossing is, did they? *A.* Right at the end of the building the cars were run up and they took them out on the platform.

Q. Is there any odor about the cars while they are unloading? *A.* There is.

Q. How far can it be smelled? *A.* I can smell it at my house when the wind is right in the warm weather in the summer. I can smell it every time when the wind is in a northwesterly direction.

Q. Have you been by the establishment often on Sundays this last summer? Do you know anything of the custom there, whether he carries on the work Sundays as well as week-days? *A.* I have heard men in there, and have heard engines, I suppose, running.

Q. You live on Sixth Street, between Cambridge and Otis, about three or four hundred feet from Mr. Woodard's, on the opposite side. How far are you from Mr. Squire's? *A.* About four hundred and fifty feet.

Q. Do you know how far this discoloration extended on the night of the 31st? *A.* That morning I walked around Sixth Street to Gore, down Gore Street to Fifth Street, and then came up Cambridge Street, and I found that around in that square the buildings were very badly discolored.

The Chairman. How large a radius?

Mr. McIntire. The radius would be about three hundred feet, — two hundred north and south, and four hundred east and west.

Q. Did you notice to what extent they were discolored on the morning of the 31st? *A.* Some of them were nearly black; had black, dark brown spots, and brown spots upon them.

Q. Had you noticed any discoloration before that on these houses? *A.* I had n't. Not to any extent.

Q. Did you notice that there were many houses that were discolored on the night of the 31st, that before then had not been discolored? *A.* The majority of houses that I looked at that morning I had never before

noticed as being particularly discolored. I went up Otis Street, and I saw a great many houses right opposite me that were discolored, and in the rear of me they had just been painted, and were not so black as many others.

Q. Was your own house discolored? *A.* I have two houses. One was discolored a great deal more than the other. The inside of the one that I lived in was colored somewhat about the doors, window-sills, and mop-boards. My houses are both painted the same light color. One is nearer the street than the other. The one nearest Mr. Squire is two stories and a half, and the other is larger. I live in the larger. The smaller one was most discolored.

Mr. Derby. Your buildings are a square below Mr. Squire's establishment? *A.* There is a square between us and Mr. Squire's.

Q. In going from Mr. Squire's establishment, how was the discoloration? *A.* It was pretty bad.

Q. Was there any difference between the discoloration on your house and on those on Gore Street? *A.* Some seemed to be affected more than others.

Q. What was the point where they seemed to be most discolored? *A.* Those nearer his place seemed to have a darker discoloration.

Mr. Newhall. You mean by rendering the trying out of leaf-lard?

Mr. McIntire. I call it all rendering.

Mr. Newhall. Does Mr. Tyler know how often they unloaded hogs there? *A.* I have n't usually been at home except Sundays. As a general thing, Sundays I have heard hogs squealing on the cars, and when I have felt like it I have been up to see them unload.

Q. How many hogs are brought? *A.* I have understood from his foreman, that there are somewhere about seventy-five or eighty on a car. One Sunday I saw them take out thirty-five from one tier.

Q. The Grand Junction Railway is not far from you. Can you hear the trains when they come in? *A.* We hear them.

Q. Is it not the habit for them to whistle when they approach the crossing, so that everybody knows the hogs are coming? *A.* It is a matter of remark when we hear the whistle, "Here comes a train of hogs."

Q. How far does this discoloration extend? Beyond Otis Street? *A.* A few on Sixth Street, — two or three houses down below my house, near the school-house.

Q. There is a wooden fence around the school-house. Was there any discoloration on that? *A.* I did not notice any discoloration on that. I went up Fifth Street, as far as Otis. Some houses appeared to be discolored a great deal more than others.

Q. Did n't there seem to be a difference in the colors they were colored with? *A.* Some buildings seemed to be much more affected than others.

Cross-Examination.

Q. (*by Mr. Muzzey*). Did the discoloration go up beyond Cambridge Street? *A.* I went up as far as the Gore stables, and it was on the buildings there, along, up and down, Cambridge Street. I did not go any farther.

Q. What was this smell like on the 31st of July? Was it the rendering smell or the hog smell? *A.* It appeared to be the rendering smell,

but it was very much stronger than usual. It was not from the dock, and not from the live animals.

Q. Your buildings are situated southwesterly of Mr. Squire's establishment, so that when the wind is north it brings it right towards you? *A.* We seldom get the northeast wind, but a north and northwest wind we do. It takes a northwest wind to bring the smells from Mr. Squire's establishment. It is the northwest wind which hits us the hardest.

Q. What is the general condition of your health, Mr. Tyler? *A.* Good. I have never employed a doctor for twenty-five or thirty years.

Q. Has your wife good general health? *A.* Always.

Q. Did she have any physician on this occasion of which you speak? *A.* No, not in particular. She applied to a lady physician.

Q. No physician was called? *A.* No, sir.

Q. Did you notice the smell before you went out that night? *A.* I was up that night until about eleven o'clock, but I did not notice anything more than usual.

Q. Were your windows open? *A.* They were.

Q. Had you got to sleep when you perceived the smell. *A.* I had.

Q. How long had you been abed? *A.* Somewhere about an hour or an hour and a half.

Q. Somewhere about half past eleven or twelve you smelt the smell? *A.* Yes, sir.

Q. Then you closed your windows, did you? *A.* I got up then, and went down and closed the windows in the lower part of the house, and left one window open in the rear.

Q. Well, which one of these houses did you occupy? *A.* The larger; the one farthest from Mr. Squire's establishment.

Q. Now then, you went to bed again with the windows shut, with the exception of one window in the rear. Was it the window toward the east that was open? *A.* Yes, sir; it was the window in the L.

Q. How long was it before you were again awaked? *A.* I don't know that I went to sleep again.

Q. How long did you notice the smell? *A.* It came on again, somewhere in the neighborhood of two or three o'clock.

Q. Previous to your noticing it again, have n't you said that the smell had subsided and you had reopened your window? *A.* I had n't opened any windows.

Q. When did you open them? *A.* When it struck us again, I opened one, and found it coming right down the street, and rushing in at the window. Then I shut the window down.

Q. You left open one window in the rear of your house, opening towards the east. Did you close the door of the room in which that window was? *A.* I did not; I left it open.

Q. Was the house in general open? *A.* The doors were open.

Q. Have you had any trouble with your drain? Has the trap been out of order? *A.* No, sir.

Q. Your drain is connected with the Ninth Street sewer? *A.* Mine is a private drain, that runs into the Otis Street sewer.

Q. Where does the Otis Street sewer discharge? *A.* Into the Ninth Street sewer, and the Ninth Street sewer discharges into the Broad Canal.

Q. In the Ninth Street sewer and in the Otis Street sewer are there openings and cesspools? *A.* I don't know of any.

Q. Were your two houses painted at the same time and with the same color? *A.* Yes, sir.

Q. What color are they painted, buff or slate? *A.* It is more of a buff.

Q. Previous to the 31st of July, had you noticed those buildings that you afterwards saw discolored, to know whether they had been affected at all or not before? *A.* Only those that were almost down to his establishment. In my own neighborhood I had never noticed any particular discoloration before. I had never seen any effect upon my own house.

Q. Did you look at the houses that are on the opposite side of Gore Street from Mr. Squire's, painted white, on this morning? *A.* I did not. I looked at one of Mr. Stickney's, on Sixth Street, that was painted white, between me and Mr. Squire's. It was on the west side of Sixth Street, next to Mr. Woodard's.

Q. Was Mr. Stickney's house discolored? *A.* Very much.

Mr. Newhall. You said that you had not seen any discolorations on the houses in your neighborhood before the 31st of July. Have you in other neighborhoods? and, if so, where? *A.* I have seen them along on the basin, where they have been for years.

Q. Has it been growing from year to year? *A.* It increases in length of time.

Q. You say there has been discoloration for some years there, in the neighborhood of the establishment? *A.* On some of the buildings.

Q. Has the discoloration been growing from year to year? Was it all produced at one time or occasionally? *A.* The buildings have been standing there for many years, and I suppose it has been gathering for some time.

Q. Do you know whether the discoloration is caused by this establishment, or whether it is caused by the filth in the water, or partly by both? *A.* Well, that I can't say.

Q. Can you give to us any very clear or distinct idea of the effect of the exhalations from this place upon the color of the houses? *A.* No, sir.

Mr. Muzzey. Along the north shore of the Squire Basin, on the Somerville side, are not the houses badly blackened? Have n't they been so for years? *A.* There have been some over there that I have noticed.

Mr. Derby. How many years? *A.* I don't know. I should think half a dozen years. I can't say, as I don't have occasion to go over there very often.

Testimony of William S. Soule.

Q. (*by Mr. McIntire*). What is your business, and where do you reside? *A.* On Inman Street, Cambridgeport.

Q. Have you formerly resided in East Cambridge? *A.* Yes, sir.

Q. How recently? *A.* My family lived there in June. I remained at my boarding-place until about the middle of September.

Q. Any particular reason for leaving? Did the odors have anything to do with your leaving? *A.* My family were unwell, my wife and daughter.

Q. What was your number? *A.* Thorndike Street, formerly 55, changed to 73. About fifteen hundred feet from Mr. Squire's.

Q. The rear of your house was in the direction of Mr. Squire's establishment, and faced to the south. *A.* Yes, sir.

Q. Will you state to me what odors you received there? *A.* It appeared to me that there were three. There was the odor at times of the trying or rendering of some fat substance; then there was a smell not noticed so much by myself, which was a smell of live hog; and again it seemed as though the hog had been put in water, and there was not so much of the trying smell. Then there was the smell of the dock. At times there seemed to be two separate smells of the hog.

Q. One was the smell of the hog, and the other was the scalding odor? *A.* Yes, sir; there seemed to be that difference.

Q. How did these odors affect your wife and daughter? *A.* Previous to June, '72, I attributed the cause to these smells, but was not satisfied in my own mind. Previous to September, a year ago, they were troubled more or less by the odors there, and at that time it seemed to trouble them again. My daughter had complained many times about it. She had complained of her throat and stomach feeling badly.

Mr. Derby. Does he go back to '72?

Q. Did it affect your family in the summer of '73? *A.* It affected them in the same way. They were at times complaining when this odor was more disagreeable than at others, or when the wind was in that direction they were complaining of nausea. I could not satisfy myself previous to this time. This last spring they still complained of being unwell, and, at times, of being troubled with this disagreeable odor. I decided in June that I would take them away.

Q. Have they improved by being removed? Permanently? *A.* I don't know.

Q. You mean to say that from the time in '72 until you moved their health was not good? *A.* I won't say in general; but last June they began to improve, since which they have been much better. Previous to that time I could not assign the sickness to that; but since then I feel that perhaps it may have been that.

The Chairman. Your wife and daughter have n't complained of that since? *A.* No, sir.

Q. How long have you resided in Cambridge? *A.* Sixteen years.

Q. Where have you moved? *A.* I have moved to Cambridgeport.

Q. Have they been in Cambridgeport? *A.* No, sir. They were in Plymouth County until the middle of September. Since the 17th of September they have been on Inman Street, Cambridgeport, not quite at the head of Austin and Harvard Streets.

Q. How often did you get the odor at your house? *A.* I could not say.

Q. As near as you could say during the past summer? *A.* I was not there all of the time.

Q. Three or four times a month? *A.* I could n't say. I got it as often as the wind was in that direction and I was there. I was there some weeks each night, and perhaps the next week I was not there more than three nights. I went out into the country sometimes.

Q. Did you notice whether it affected any silver-ware or door-plates? *A.* No, sir, I cannot say that I did.

Q. Did you ever trace any of these odors? *A.* No, sir, I did not. I never traced it any further than once. I cannot say when it was, but some time during last summer. Whether it was the 31st of July or not I cannot say. But I was out one evening and walked up Thorndike Street,

and as I was going over the western slope of the hill there seemed to be this odor come over me. It seemed to me as though I could taste something that was some acid, or something like it. There seemed to be something in the air. I cannot say what night it was, but I should think it was in the month of July.

Q. That night did you go over near the establishment? *A.* No, sir, I did not.

Q. Do you know where that smell came from? *A.* From the northwest, blowing towards the southeast.

Q. Was that a dock smell? *A.* No; it seemed to be more of a trying smell.

Q. Was the odor complex, as though it came from matter which had decomposed, or from something from which acid arose? *A.* There was a sort of acid taste, but I cannot say that it came from Mr. Squire's.

Q. Do you know of its effect upon other persons than your wife and daughter? *A.* No, sir.

Cross-Examination.

Q. (*by Mr. Derby*). Was your wife, sir, ill previous to the summer of '73? *A.* Yes, sir.

Q. She had been confined? *A.* Yes, sir. Her health was delicate that summer.

Q. Your daughter, was she subject to headaches? *A.* No, sir.

Q. Had n't she previously been subject to headaches? *A.* No, sir.

Q. On leaving Cambridge you went down into Plymouth County? *A.* Yes, sir, to the town of Plympton.

Q. Among the pine-trees, I suppose? In that vicinity, to a rural home? There was no extended village there? *A.* Well, it was a small village.

Q. Your wife had the benefit of the country air during the summer? She left this place last June, remained in the country until September, and then returned to live on Inman Street, Cambridgeport, and then her health was improved? *A.* Yes, sir.

Q. You remained part of the time in Cambridge, and part of the time you passed in the country with your family? *A.* Yes, sir.

Q. What proportion of the time were you in Cambridge after June? *A.* I cannot say. I always went away Saturdays and returned Tuesday mornings.

Q. Were you in Cambridge all the remaining time? *A.* Possibly three quarters.

Q. During that time were you in the city during the day? *A.* I was n't in the city. I was in Cambridge only in the evening.

Q. How many times can you remember perceiving this smell? *A.* During the summer perhaps fifty times.

Q. I speak now of the nights between June and September until you finally removed. *A.* I cannot say. Not so many times as that.

Q. Give the largest number you are willing to swear to. Was it more than half a dozen times? *A.* I should not be willing to say. If the wind was in that direction, I should notice it; if the wind was in the other direction, I should not notice it.

Q. In what direction? *A.* I think northwest.

Q. You cannot say distinctly or confidently from which establishment

it came, — whether from large or small ones? *A.* There was at times a dock smell.

Q. How often did you experience the rendering smell there? *A.* Well, I could not say that.

Q. Can you speak confidently of smelling that more than two or three times? *A.* Yes, sir, I think I could; three or four times the recent summer.

Q. One of these times was on the night of the 31st of July? *A.* I don't know that. There was a time when there was some considerable discoloration of the houses, and some newspaper articles appeared in regard to it. I should think it was previous to that. I should think it was some two weeks before. It was some little time before the talk about that night. I think I was there during that night. I heard it spoken of the next morning.

Q. Did you perceive it yourself that night? *A.* I did not notice it so much myself. I slept in a room in the attic, and, being troubled with mosquitoes, I had to close my windows.

Q. You cannot distinctly recollect that you perceived it that night? *A.* I did not notice it, only by hearing people speak of it. I don't think I was situated so as to perceive it.

Q. Are you confident that you never perceived it except when the wind was north or northwest? *A.* It may have been a few points either way when I have perceived it.

Q. But you cannot fix any establishment from whence it came? *A.* No, sir. Only I could discriminate the smell between the rendering of tallow and the rendering of grease. I was at one time connected with the place which was known as the Winchester establishment.

Q. The smell which you now detected was different from the smell of tallow? *A.* Yes, sir. There was more of the hog or lard smell than of the smell of tallow.

Q. Was the smell of that tallow perceptible, sir, in former times? *A.* Well, it was to those who were not accustomed to it.

Q. It created occasionally some criticism or complaint? *A.* No, sir; only by people coming in, they would sometimes speak of the disagreeable smell of the trying of tallow.

Q. You noticed something that was more of a fatty smell? *A.* Yes, sir; more of a lard odor.

Q. But cannot fix the establishment from which it came? *A.* No, sir.

Q. (*by Mr. Muzzey*). Let me ask whether there is not a sugar refinery there that sometimes gives out an offensive odor? *A.* Yes, sir.

Q. Have you ever perceived that? *A.* Yes, sir.

Q. It is on the site of the Winchester estate? At times it is quite offensive, is it not, sir? *A.* Well, I have n't noticed it for several months. Some months ago I noticed it.

Q. Is there not also an oil-cloth establishment between you and the river, on Thorndike Street, that is offensive? *A.* No, sir. I did n't know there was any there. I did not notice any smells from that.

Q. Throughout East Cambridge there is a pretty large number of manufacturing establishments of various kinds? *A.* Yes, sir.

Q. (*by Mr. McIntire*). Have you smelled that sugar refinery since 1872? *A.* I should say not.

Q. Do you know what that scent was that you smelled from the sugar refinery? *A.* I have forgotten it.

Q. Was it not from calcined bones, from the making of bone charcoal? Don't you know they have not done that for over a year? *A.* I do not.

TESTIMONY OF MR. JOSEPH BURDAKIN.

Q. (*by Mr. McIntire*). You live in East Cambridge? *A.* Yes, sir.

Q. On what street? *A.* On Sixth Street, between Cambridge and Gore, near Mr. Woodard's.

Q. How far off from Mr. Squire's works? *A.* About two hundred feet.

Q. How long have you lived there? *A.* About twenty-seven years in the same house.

Q. What is your occupation? *A.* I work at glass-cutting in the Union Glass Company's works.

Q. You were there when Mr. Squire's establishment was started? *A.* Yes, sir.

Q. How long since was that? *A.* Fifteen or sixteen years.

Q. At that time whether there were any other slaughtering establishments on these basins? *A.* None that I recollect.

Q. How was the water in all these basins? Perfectly clear? *A.* Yes, sir.

Q. Were there any fish there? *A.* Yes, sir; I have fished there.

Q. How long after Mr. Squire's factory was established on the basin, if you perceived it at all, did you perceive any difference in the purity of the water? *A.* I could not say.

Q. How long since you know that there has been an impurity in the atmosphere? *A.* As far back as ten years.

Q. Should you want to bathe there now? *A.* I should not.

Q. Whether it is fit for bathing? *A.* No, sir.

Mr. Muzzey. We concede that.

Q. How long has it been so? *A.* I should not fancy bathing there for the last ten or twelve years?

Q. Are there any fish there lately? *A.* I don't recollect of any this side of the Glass Works.

Mr. Muzzey. We concede all that.

Q. Have you detected any of these odors that have been testified to? *A.* I have detected them to my own satisfaction; all of them.

Q. How do you describe the different odors? *A.* There is one I term the rendering smell; another, the stench of the hogs and the filth connected with them, the urine, etc.; and also the dock smell. There was another one that came from the bristles, that I have n't smelled for the last four years.

Q. That was a very sickening odor? *A.* Yes, sir. It was as though the bristles had been thrown out and the odor came from them.

Q. Well, how often did you get the rendering odor at your house, or have you got them the last season? *A.* I could not say how often. I should think I had smelled them, to speak within bounds, a dozen times. I have been away much this last summer, — probably three or four weeks.

Q. Well, now about the hog smell? *A.* That I have very frequently, when the wind is in that direction, but more particularly on Sundays, I think.

Q. Do you know anything with regard to the custom of bringing hogs in on Sundays? *A.* No, sir; not further than on Sunday I am frequently annoyed by the whistling of the engines. I went out one Sunday to see what it was. They were in the act of unloading hogs.

Q. For what establishment? *A.* For Mr. Squire's.

Q. Was that the past season? *A.* It was somewhere in July, — the 6th perhaps; I could not say positively, but it was on Sunday.

Q. Do you know anything of his practice of working his establishment on Sundays? *A.* Nothing further than that as I sat in my window I could hear the puffing of the engines which I supposed were there. Out on Cambridge Street I could not hear it. I heard the exhaust steam.

Q. Does he work Sundays? *A.* I have seen him go by with his working-clothes on. I could not say that he was at work, but I supposed so.

Q. Last Sunday did you note anything about it? *A.* No, sir.

Q. Have you been by the establishment? *A.* Not very often.

Q. How many times the past season? *A.* Not more than half a dozen times in July.

Q. Well, what did you detect, if anything? *A.* When I passed by there I noticed the stench of the hogs when I got past the establishment.

Q. Did you detect any of these rendering smells from the establishment? *A.* I did not.

Q. That was in July. At any other time have you? *A.* No, sir; not the rendering.

Q. Has your house been discolored? *A.* Yes, sir.

Q. What part of it? *A.* On the front and in the yard.

Q. That would be upon which side? *A.* Upon the east, south, and north sides.

Q. Which is the worst? *A.* I think it is worst on the north side.

Q. Was your house badly discolored? *A.* Yes, sir; it was.

Q. Had it been discolored before? *A.* I had never noticed it before.

Cross-Examination.

Q. (*by Mr. Derby*). Do you say it was discolored on the night of the 31st of July? *A.* I don't know that it was.

Q. Explain to us when you first noticed any discolorations upon your house. *A.* I don't know. It was about this time in July that there was all this discoloration of the houses. I noticed it particularly on the 31st of July.

Q. Do you know anything about the discoloration of these buildings before that? *A.* I noticed there was a gradual discoloration going on for some time.

Q. Did you notice where the buildings were mostly discolored by this gradual discoloration? *A.* Well, I think the worst were on Gore Street, opposite Squire's establishment, between Fifth and Sixth Streets, on the south side.

Q. Did you notice that these gases or odors affected your door-plate some time previous? *A.* Yes, sir.

Q. For how long a time? *A.* My door-plate was put on last spring some time, and it has been discolored several times.

Q. Have you noticed particularly your door-plate in the afternoon and then again the next morning? *A.* I have noticed it within a day or two, and it would be very badly discolored.

Q. State what time. *A.* Some time between June and October.

Q. How badly would it be discolored? *A.* Well, as bad as a door-plate would ordinarily be discolored in six months' time; perhaps worse.

Q. (*by a member of the Board*). You live very near the establishment in question. I want to ask you whether the health, comfort, and convenience of your family have been affected by the odors proceeding from the establishment of John P. Squire & Co. *A.* They have, sir. My wife has been injured seriously by it, supposing they come from there. I suppose I could not swear that they come from there or from that vicinity. I could not swear any more than I could to the sound of a bell.

Q. But with equal certainty? *A.* Yes, sir.

Q. You have a decided opinion that it comes from there? *A.* Yes, sir.

Q. Can you describe more particularly the manner in which the health, comfort, and convenience of your family were affected by the odors proceeding from Mr. Squire's establishment? *A.* My wife had a serious affection of the throat which she never complained of before. It lasted something like a week, I think.

Q. Was this during the time when these odors were more pronounced? *A.* It was in July when we had these odors strong that I speak of, — the rendering.

Q (*by Mr. Derby*). The 31st of July? *A.* I could not say. It was about that time.

Q. More than once? *A.* She has had it at different times.

Q. (*by Mr. Newhall, a member of the Board*). You speak of your wife having this difficulty with the throat at various times. Have you been able to trace it to the time when these odors were more marked? *A.* It would be when we had this strong, pungent smell of rendering. It would cause a scraping of the throat. I was waked up myself three or four times on the 1st of September during the night, before daylight, — I know it because I noted it, — two or three times between one and six o'clock in the morning, so that I had to get up and close my windows. Two or three different times it was so strong that I burned cotton-cloth in my house to neutralize it.

Q. How do you describe that particular smell? *A.* It was the rendering smell. It would not last more than fifteen or twenty minutes, or perhaps half an hour. It would permeate the house completely during that time.

Q. Did you attempt to trace those smells at that time? *A.* No, sir. On the 19th of September I closed our windows on account of this smell from the hogs.

Q. In the day or night? *A.* I think half past nine in the evening.

Q. The live hogs? *A.* Yes, sir. I took it to be the live hogs and the filth connected with them.

Q. If I understand it, these establishments are pretty near together, are they not? Do you know that this odor comes from the one or the other, Squire's or North & Merriam's? *A.* Well, I could not swear that it did.

Q. Well, when the wind is in the right direction you would get the smell of somebody's else as well as from Mr. Squire's? *A.* If it is near enough to me.

Q. Well, how far from Mr. Squire's did you ever smell this odor?

A. I have smelled it, I think, down as far as Second Street, and as far as Cambridge Street.

Q. How far is that? *A.* Perhaps six hundred feet, or more.

Q. Well, then, both the establishments are within six hundred feet of your house? *A.* North's is nearer.

Q. Then you can smell this six hundred feet; so that, if it came from the other establishment you could smell it as well as if it came from Mr. Squire's? *A.* I might.

Q. Well, would n't you? Is it not clear that if the other establishment was rendering, and there was a breeze from that direction, that you would smell it just as well from it as from Mr. Squire's? *A.* I should not think it would be strong enough to come that distance.

Q. How much farther off is the next establishment than Mr. Squire's? *A.* Perhaps it may be two hundred feet.

Q. How much farther off is the next one? *A.* Perhaps one hundred and fifty feet farther.

Q. Then what reason, if you have any, is there why you don't smell the odors from the other establishments as well as from Mr. Squire's? How do you trace it, or how do you know that any of these smells come from Mr. Squire's? *A.* Well, in no other way than its being so near me that I judge it is so.

Q. Well, did you ever smell anything that you thought came from any other establishment? *A.* I cannot say that I did.

Q. This odor from Mr. Squire's is strongly perceptible five hundred or six hundred feet from Mr. Squire's? *A.* Sometimes. It might all come from North & Merriam's; I could not say.

Q. They all run about the same number of hours in the twenty-four? *A.* I don't know. I have never ascertained.

Mr. McIntire. The petitioners don't pretend that all the smell comes from Mr. Squire's.

Mr. Muzzey. We are defending Mr. Squire.

Mr. McIntire. We are prosecuting Mr. Squire.

Q. (*by the Chairman*). Your testimony is very important, inasmuch as you live very close to the establishment. Therefore I want you to state with as much exactness as possible your reasons for believing or disbelieving that the odors that have affected the health, comfort, and convenience of your family came from one establishment or another. Can you say whether the direction of the wind on this occasion or on any other occasion has influenced this matter? What has been the direction of the wind when it has affected your family? *A.* Well, when the wind is north there is no other rendering establishment but that of Mr. Squire's that you can smell. I presume I can smell an odor from North & Merriam's.

Cross-Examination.

Q. (*by Mr. Muzzey*). What was the smell you noticed on the 31st of July? *A.* The smell of rendering, I take it.

Q. The next date you gave us was September 1st. Do you mean the night of September 1st? *A.* It was on the morning of the 2d.

Q. What was the smell that you then noticed? Was it the same smell, pretty strong and pungent? *A.* I could not swear that it was exactly the same. It was more intense.

Q. They were alike in kind, but not in degree? *A.* They were similar.

Q. On the 19th of September, what was that? *A.* That was the smell of live hogs and the filth connected with them.

Q. You spoke of the condition of Miller's River seventeen years ago. There were no sewers then? *A.* I could not say.

Q. Will these stains wash off of the building? *A.* They will gradually. I have noticed that they have gradually disappeared. I have tried to wash them off myself.

Q. Are they removed by rains also? *A.* I think the rains have removed some part of it.

Q. Now on this evening of the 31st of July there was a moist atmosphere, was there not? *A.* I could not say.

Q. A gentle breeze? *A.* I could not say. I don't recollect.

Q. Did you notice which way the wind was? *A.* No, sir.

Q. (*by Mr. Derby*). Do you notice this smell very distinctly when there is a strong breeze from that direction or only a slight wind? *A.* It does not seem to make much difference whether it is light or strong. If there is a slight breeze I get it.

TESTIMONY OF GROVE H. LOOMIS.

To Mr. McIntire. I am a photographer in Boston; am in business on Tremont Street, and live in East Cambridge, at 108 Thorndike Street, between Fourth and Fifth Streets. I have n't any particular means of knowing, but I should think it is about two thousand feet from Mr. Squire's place.

Mr. Muzzey measured the distance on the map, and stated to the Board that the house was 1350 feet directly southeast from the factory.

Q. (*by Mr. McIntire*). Have you detected any of these odors, and how often? *A.* I think I have detected some of these odors, and I should suppose two or three times a week during the past season.

Q. Which is the most disagreeable? *A.* The odor that is most disagreeable to me is generally known as the hog odor. During that time that I was in Cambridge there were very few nights that I did n't get it, although some evenings I did n't get it but very little.

Q. What effect did the wind have upon it? *A.* The wind affected it some when it was in another direction, but when it blew directly from the factory we detected it more sensibly.

Q. (*by Mr. Muzzey*). How many times a week do they receive hogs there? *A.* I don't know.

Mr. Muzzey conferred with Mr. Squire, and stated that a single train of about fifteen cars with eighty hogs to a car arrived each day; he kills about 400,000 a year, an average of about 1200 a day.

Q. (*by Mr. McIntire*). What other odors do you distinguish? *A.* At times I distinguish a suffocating odor, or something that seems to partake of the odor of boiling lard, or something of that kind, which makes the air thicker and unendurable.

Q. You have noticed in damp atmosphere whether the stench is different, or more or less intense? *A.* It is more intense.

Q. Which of them seems to be more intense? *A.* As I said before, the hog or pig smells rise above all others to my nostrils.

Q. You think all these are worse in a thick atmosphere than when it is clear? *A.* It is to me.

Q. What has the wind to do with it? *A.* Whenever the wind is favorable, it blows the odors directly to you.

Q. Is there any difference in the effect when there is wind and not? *A.* I don't think they are as sickening or distressing in the wind as in a quiet atmosphere.

Q. Whether you get that stench at your house in a humid atmosphere, when there is no wind? *A.* I do.

Q. At that time it is more suffocating or distressing? *A.* It is.

Q. Did you detect the odors on the 31st of July? *A.* I was not there at that time.

Q. Have you or your family been affected in health by these smells? *A.* I have, very decidedly.

Q. So far as comfort, is it disagreeable? *A.* They are never comfortable. As to the effect upon health, it may not be directly, but it is indirectly, not so much to myself as to my wife; it is being rendered still more so by the constant irritation it creates in the throat, the atmosphere attending the stench creating nausea. My wife, particularly, has been affected with nausea, and I have myself somewhat.

Q. Do you know any one personally who has been affected in like manner? *A.* I have known of but very few but what have.

Q. Have there been any discolorations of your house? *A.* Not a great deal. I painted it about last May, and noticed that there was a discoloration on the front end to some extent, not very serious, nothing perhaps that I should particularly notice unless my attention had been called to it by general report.

Q. How is your house situated? *A.* I am over the hill to some extent, on the slope to the southwest.

Q. Have you in going by there ever detected any odor coming from Squire's establishment? *A.* I have.

Q. How often? *A.* As often as I have passed there, say three or four times in a year.

Q. Is it the same odor that you smelt at your house? *A.* It is.

Q. (*by the Chairman*). The odor at your house you notice in passing the establishment? *A.* Yes, sir; I always notice it in passing the establishment.

Q. (*by Mr. McIntire*). How many times did you pass it during the last season? *A.* Not more than twice, and before those times I have noticed the hog odor, also the stink from the docks.

Q. What was the general condition of things about there? *A.* There was nothing special, unless I refer to the general condition of the atmosphere. There is always the rendering smell in the atmosphere about the place.

Q. Have you passed on Medford Street on the other side of the basin? *A.* Not to my knowledge, except on the cars.

Q. How long since you have been inside the establishment? *A.* I have n't been in the establishment within a year.

Q. Do you know how this humid atmosphere, how the smells, affect silver? *A.* I cannot say, but I know it changes it very soon. My girl often says, What is the use of cleaning the silver?

Q. Is there anything else that I have omitted to ask you in regard to this matter of smells that arise from this establishment? *A.* I don't know that there is anything else, unless you ask me why it is that I am positive that it is the rendering instead of the hogs.

A member of the Board. I should like to have you ask him whether there is any difference in the odor of the hog and the rendering? I did n't suppose they are reducing dead and diseased matter, but from the testimony of this witness there is some odor of rendering in that establishment all the time. Now, is n't there a difference between the odor of trying fresh lard and the rendering of dead and diseased animals? I should like to know what the witness thinks about it.

Q. (*by Mr. McIntire*). Whether you notice any difference in these rendering smells at different times; whether they are more intense; whether, being mingled with the common lard smell, they are more pungent? *A.* All I can say is that at times it is more intense. I am not able to state the component parts.

Q. Is n't it more nasty? *A.* It is just like bad air generally; sometimes it is more nauseous; I could almost feel the air and grasp it in my hand, but I would n't.

Q. (*by the Secretary*). Are you able to connect these odors with the establishment of John P. Squire & Co.? *A.* No, sir, I can't tell whose establishment it is, or whether it is in part from the pigpens of my neighbors. I only know that it is the smell of hog, accumulated hog.

Cross-Examination.

Q. (*by Mr. Muzzey*). Do you say you can't connect the hog smell with either establishment? *A.* I don't know whether it is from one or both, or from three or six. I simply know that it is hog.

Q. (*by Mr. Derby*). How long was your wife affected with sore throat? *A.* Not very long at a time.

Q. What length of time was she affected by it? *A.* Along in August or September, when she was at home, and more particularly in September, she was affected for four or five weeks, sufficiently to call in a physician sometimes. This last summer we were away, and this summer we have not had very much sore throat, though we had some irritation in the throat. We got home the first of September; she was then chiefly free from sore throat, and she had very little of it.

Q. Do you think the sore throat was entirely attributable to the odors? *A.* I don't speak of the sore throat coming from this entirely.

Q. Your wife has a weakness of the throat? *A.* She has a bronchial difficulty which usually affects her about the month of September.

Q. Did it affect her this season? *A.* She had it more extensively after she returned, though not so much this year as previously.

Q. Has she had much more than when away from the place? *A.* No, sir.

Q. Not enough to call medical aid? *A.* No, sir.

Q. Are you subject to that complaint? *A.* No, sir.

Q. Have you ever had it? *A.* Yes, a little; but I have n't suffered from it this season.

Q. With respect to the smell of hogs, in passing a drove of hogs, it affects you uncomfortably? *A.* It does.

Q. Is n't it a very usual thing for persons to be affected by the smell of hogs? *A.* I don't know about the average of mankind, but I am particularly sensitive to the smell of hogs.

TESTIMONY OF CHARLES E. MUNROE.

To Mr. McIntire. I am Instructor of Chemistry at Harvard College, and am Professor of Chemistry at the Boston Dental College. My home is in East Cambridge, though I have a room at Old Cambridge, and have remained there most of the time during the past three years. I am at home pretty regularly on Sundays, and irregularly two or three times a week. My home in East Cambridge is at the corner of Fourth and Cambridge Streets, about 1,400 feet from the rendering place of J. P. Squire & Co. It is a hundred feet farther to the place where the hogs are killed.

Q. (*by Mr. McIntire*). Have you had occasion to make experiments in relation to the odors which arose from Mr. Squire's establishment and their effect, also the gases which arise from the river-bed and their effect? *A.* I have. I went into it particularly, and at the time very carefully, I believe. I examined them in several different ways.

Q. I should like to have you give us the result of your investigations, and the conclusions you came to? *A.* This examination was made a year ago.

Mr. Derby. If he has made his observations since a year ago, perhaps he ought to be confined to that.

Mr. McIntire. He has made examinations both last year and this year, and we desire to go over the whole.

Mr. Derby. I shall not object to the examination.

The Chairman. How far are you going into this examination?

Mr. McIntire. We are going into it to show what are the effects of the gases rising from the river-bed and the establishment. It will show from tests the effect of different states of the atmosphere and wind upon paper; that test-papers placed over kettles and outside of windows are more affected by the atmosphere from this establishment than others at the foulest point. This was in September of last year.

The Chairman. I suppose the Board would be glad to hear the general results at which the chemist has arrived, but I don't think we wish to go into the detail of the chemical experiment.

Mr. McIntire. I would like to have the Board know how he arrived at those results.

Witness. Being a resident of East Cambridge, I knew the state of affairs, — how the paint was discolored, the silver-plate blackened, and people made sick by the odors which arose, — and I endeavored, as a citizen of the place, to try to find out the cause of those odors. At certain times there arose a vapor which gave off a foul and offensive odor, producing irritation of the mucous membrane, and which in a single night badly tarnished silver articles which were exposed, and blackened the paint on buildings. Knowing the foulness of the Miller's River basin, I believed this to be the source of the obnoxious vapors, and so I made an examination of it and its surroundings, with the expectation of proving by experi-

ment that the basin emitted the odors. The first investigations were made in the latter part of September and the first of October, 1872. On making a thorough inspection of the basin, I first noticed that the buildings facing it, on the Bridge Street side, were more discolored than any others; that there was considerable animal matter floating about in the water, and that bubbles of gas were continually rising from all parts of its surface. I examined some of the paint from off the buildings, and found that the discoloration was due to sulphide of lead forming in the paint. I had previously analyzed some water from a well at North, Merriam, & Co.'s, on the border of the basin, and found that it contained a considerable amount of sulphate of lime, and I was aware that in contact with organic matter such as was present in the basin, it would be decomposed, sulphide of calcium being formed, and then sulphide of hydrogen set free. I collected some of the gases from the basin and analyzed them, and found that they contained sulphide of hydrogen, sulphide of ammonium, carbonic acid, and marsh gas. To test the question whether these gases were generated in sufficient quantity to produce the effects described in so short a time, I made a number of experiments. I exposed papers saturated with acetate of lead, and as silver was blackened by these gases, I exposed also photographic plates which were thoroughly cleaned with nitric acid. Six different points were selected at which to make these experiments. Station No. 1 was on the edge of the basin at the foot of Fifth Street; was selected because the largest sewer that empties in the basin enters there. Consequently, I expected the gases to be generated there in greater quantity than in other parts of the basin. No. 2 was on Whittemore's barn, which is situated on the north side of Gore Street, next to the line of houses which front on Fifth Street. All the sewage from these houses is discharged directly into the basin; and as this portion is covered only at high tide, the effluvia, for a greater part of the time, must be very strong. No. 3 was at the corner of Gore and Sixth Streets, on the building used for upholstering furniture; and No. 4 was at Mr. Bradbury's house on Sixth Street, near the corner of Otis Street. These stations were chosen for the reason that when the first tests were made rather a brisk northwest wind was blowing. Sixth Street runs nearly north and south, and is open very nearly to the basin. No. 5 was on Bridge Street, half-way between Merrill's factory and the Grand Junction Railway. The tests were attached to the rail near the water's edge. Here a large extent of flats is exposed for a considerable time. No. 6 was at the sluiceway on Bridge Street. Here there is a dam, and as a good deal of this foul matter has been brought down by the current, it is retained here by the dam, and it makes this a particularly vile place. This dam was built to keep this portion of the basin covered with water at all times of tide. The first tests were fixed at each of the stations about one o'clock on the 4th of October. The lead paper and silver plate were moistened in order that the action might be as rapid as possible. As tide was high about 12.45, the flats were all covered. The test-papers and plates were allowed to remain one hour. At the end of that time none of them were tarnished. As fast as the first test-plates and papers were removed, a new set was put up. These were allowed to remain two hours. During that time also the flats were covered. When the tests were removed no change had taken place. At seven P. M. another set of papers and

plates were put up. The wind was in the same direction. The tide was out, and the flats were all exposed. These were removed at twelve P. M., and although they had been exposed most of the time to whatever gases might arise from the flats, they were unchanged. At twelve P. M. the flats were covered with water, with the tide still coming in. It was full at 1.15. The wind had shifted a little to the east of north. At twelve another set of papers and plates were exposed, and when they were removed at seven A. M., although the flats had been covered the most of the time, these papers were all more or less discolored, and at Stations 3, 5, and 6 the action was so great that the silver had been tarnished. I was very much surprised at the result; for if either of the papers and plates of the last two experiments were to be blackened by the gases from the basin, it should have been those which were exposed while the tide was low and the flats were uncovered. The reverse was the case. Consequently I instituted inquiries as to the condition of the atmosphere that night, and found that during the early part of the evening, while the flats were uncovered and while experiment No. 3 was being carried on, the odor from the basin — or, as the people there put it, the real dock mud — was so strong that the people were obliged to close their windows, yet the test-papers were not blackened. At about twelve o'clock people who were out state that there came up this horrible odor, and although the flats were covered with water, I found at this time that the test-papers were blackened and the silver plates tarnished. This seems to show that the gases or vapors which produce blackening of silver in a single night cannot be produced by the gas arising from Miller's River basin.

The next experiment was made to determine as to whether the discolorations of the paint were due to the gases evolved from the basins. To prove this, I got a number of spokes and suspended them at Stations 1, 4, and 6, in such a way that when the tide came in they would be for several hours partially submerged in water. I knew that the sulphides of hydrogen and ammonium were very soluble in water, and I believed that the water of the basin would be more highly impregnated with the gases than the air about it could be; consequently the action on the paint ought to go on more rapidly in the water than in the atmosphere. The pieces of wood were there for several days suspended in the water, in the way I have stated, when the tide was in, and exposed to the action of the gases emitted by the flats when the tide was out. And yet no discoloration was produced. On the morning of October 5, at the time the plates and papers were discolored, these spokes were immersed in the water. This seems to prove that the blackening of the paint in a single night is not caused by the gases which generate in the Miller's River basin.

The next experiment was upon the effect of these gases upon the system. I inhaled some of the gas which I had collected, but could not discover that it irritated the mucous membrane in the least. Then I stirred up the mud at the bottom of Station 1, and although there was a large quantity of these offensive-smelling gases given off, yet there was not sufficient to nauseate me in the least, nor was the friend who accompanied me, and who is a stranger to the laboratory, affected by them. The conclusions to which I arrived from these facts were, that the gases which are formed by the decomposition of animal matter in Miller's

River basin are not generated in sufficient quantities to produce in a single night the blackening of paint and the discoloration of silver-plate, and to induce nausea and diarrhœa in those who inhaled them ; and that, from the character of the gases, it was not probable that the quantity generated should cause irritation of the mucous membrane. Not finding the cause of the nuisance in the basin, I was obliged to look in some other direction for the source, and as the general belief was that it arose from some of the processes carried on in the slaughtering and rendering establishments, I next examined them. I was led, too, to believe that it might come from them for other reasons. In my examination of the houses about the basin, I was surprised to find that the houses on the opposite side of the stream from the pork-packing establishments were blackened much more on the sides facing the establishments than on the sides away from them, and that with those buildings on the same side with the establishments the same was true. The sides nearest the establishments were blackened the most, and this, too, when they were so exposed that the wind blowing across the basin must strike them on the opposite sides. I got some leaf-lard and tested it to see at what temperature it would melt. I placed a half-dozen small glass tubes, closed at the lower end, in a bath of sulphuric acid, and in the tube put pieces of the lard. I heated the bath up and watched the tubes carefully. I found that the vesicles were ruptured at 112° Centrigade, equal to 234° Fahrenheit. Then I conducted this experiment with a flask. I took some fat, and had a thermometer placed in the fat very near the bottom of the flask. I then applied the heat, and found the vesicles ruptured at 110° Centigrade, equal to 230° Fahrenheit. Then I got a quantity of impure and partially putrid fat of hogs and some lean meat or fresh pork that had become partially putrid. I put portions of this into the flask and heated it once more, and tested the gases again. I found in these gases sulphide of ammonium. There was also another gas which was very irritating to the mucous membrane. At 239° Fahrenheit this odor began to be very intense and quite irritating to the throat, and I believed it might be acroleine, though the amount was very small, and I was only able to judge of it by the effects on the mucous membrane. The fact was that there was a gas irritating to the mucous membrane, and that there were these sulphides. From these experiments, I believed that these gases might be generated by the processes of rendering, and perhaps in sufficient quantities to produce the results described in East Cambridge. I did not at that time examine the establishments, for I knew what they were, because I had been there often.

In order to see whether the petitioners who came before the Cambridge Aldermen knew what the gases were of which they complained, I made a test before that Board. I carried over at that time some gases which I collected from Miller's River, also some putrid fat and entrails obtained from under Mr. Squire's factory. That was on October 7, 1872. These intestines were placed in a flask. I then called upon the Mayor to delegate certain of the petitioners to come forward and smell the different odors that I produced. Several gentlemen declined. Mr. Hastings and Mr. Myers came forward without being aware of the contents of these vessels that I had. They smelt of the bag and flask, and declared that the gas in the bag was Miller's River gas, and the gas in the flask was the odor of which they complained. That was the end of that in-

vestigation. I got the fat at a provision store and allowed it to putrefy.

This year, on the 28th of July, in company with Alderman Brine and a man to row our boat, I visited Miller's River. We wanted especially to look about Squire's establishment. The first thing we noticed in the water about Squire's establishment was, that it was thickly covered with *fæces* of hogs; also pieces of the skins of hogs, and bristles. We scraped them up (*producing them*), and you can judge from their appearance that we had n't much difficulty in getting them up. This was about seven o'clock in the morning. The odor of the scalding-tank was quite perceptible. Under the building everything was quite filthy. The piles were covered with this fæcal matter. The tide was quite low, and we could see the flats exposed all about and covered with black putrid masses. We saw at some points piles resembling those we have been testing. In order to get into this factory, we had to go between the piles.

Q. Was this black mass vegetable or animal matter? *A.* I saw it at a distance as great as across this room. It was impossible to reach it. But it resembled such materials as I had the year before. After that, when the tide was proper for it, I sent a man several times to get this material, but the men in Squire's factory prevented him from going under the place. Everything was in an extremely bad condition, and smelt badly. Under the stable all the liquid matter from the stable was dripping down. We went under the establishment and could see far under it. I could n't say that we saw any blood or liquid matter under the crevices between the boards. Since that time, as a member of the investigating committee, I have made several visits to Mr. Squire's establishment, and went with the committee on August 13, 1873. We made our first visit then. At that time we went through it pretty thoroughly. We found it in quite as clean condition as I have ever seen it, except since the new slaughter-house has been arranged. That was before the new slaughter-house was completed. The new one is a story higher than the old one. I noticed, in the first place, the rendering part, and we found there several open tanks or kettles in which pure lard was being rendered. There were quite a number of these, — I think about five. Then we found the closed tanks in which the gut-lard and impure animal matter is rendered. I could n't state definitely how many closed tanks there were. I judged, from statements previously made, that impure animal matter was there. At a subsequent time Mr. Squire told me that a dead hog was in there. As the result of an experiment with the matter in that tight tank I found this paper was blackened. I was surprised that with the decomposition of pure animal matter we should obtain any such blackening of the paper as I did. This paper was exposed to the gases on the 4th of last September. I exposed it only a very few minutes. The tank was blown off for my convenience. The gases are usually consumed under the furnace, but this time they were blown off for my convenience. We first noticed the open kettles. There was about the factory an intense odor of rendering of pure lard. The odor has been compared to the odor arising from the frying of doughnuts, which nauseates me more than any other odor. This is owing to lard being administered to me in a case of croup. Then we visited the slaughtering establishment. I did not notice any odor from the close tanks, but I noticed an odor from the open kettles. That was more

than the odor of lard; it was an odor of fat intensified. I am not acquainted with the different qualities of lard, and I could not say what state it was in. The odor from the slaughtering-houses was quite perceptible; it was so from the scalding-tank. Especially when we stood over them the hogs having the dirt upon their hides, and while the contents of the intestines were escaping from them, created a bad odor. I found the odor quite disagreeable.

We then went into the gut-room, where they were cleaning the intestines. It was a low, long room, where quite a number of men were at work. The floor was covered with fresh chloride of lime. The odor was quite bad. We passed from that into the place where the live hogs were kept. In those pens which were empty the floor was covered with fine powdered charcoal, and in those pens where charcoal was kept it looked very nicely; but in the pens where the hogs were, the floors were covered with fæcal deposits. The odor was that of the live hog. The odor most noticeable is that of ammonia. At this time I made an experiment with the gas. I tested it with a glazed card. It was affected by the gas, which was blown off at the place just before where they are to be purified. These tanks are made of wrought-iron, in the shape of a common vertical boiler of a steam-engine. (*Card produced, and effect shown.*) At subsequent times I made visits to Squire's establishment, with the view of experimenting with some of the gases, and was especially interested in the gases from the open kettles. On the 4th of September I visited there, and I think it was in the evening that I tested one of the open kettles. I saturated a piece of paper with acetate of lead, and placed it over a kettle in which pure leaf-lard was being rendered. The paper was blackened in a few minutes. I was very much surprised at the result, and repeated the experiment at a different visit. On the 8th of September I again tested one of those open kettles. It seemed to verify the previous results. On the 14th I tested it again; but the blackening was not so great. The lard had got cool. Thinking that, perhaps, the discoloration of the paper might be due to the fat projecting up on this bibulous paper, I afterwards, when I visited this establishment on Wednesday last, November 26, exposed some of this paper, without the acetate of lead, and here you can see portions of the lard have spattered up on the side of the paper. It seems to prove beyond a doubt that some volatile substances are being driven off. Now, I have here a sample of this paper that was moistened with acetate of lead, with which I tested some of the mud taken from the Boynton Basin, where the dock mud is said to smell the worst when it is exposed. I think it is well to compare the action of the sulphides which come from these open kettles with the action of this dock mud taken from in front of Boynton's establishment, stirred up with a stick. We get the same discoloration, but with a difference of intensity, the mud blackening it much less. There is a sewer from Mr. Boynton's establishment at that point. Now, in order to carry the investigations further, there was another point that seemed to be of importance, and that is the pollution of the river. I made some few investigations in that respect. I got samples from Squire's establishment. These were got on the 4th and 8th of September; they were collected under Mr. Squire's direction, and delivered to me. I have here samples from the scalding-tank, and I made an analysis of the solid matter contained in this, in order to find out how

much impurity was thrown into the river from this scalding-tank. I find that in this liquid, collected from the scalding-tank, in 100,000 parts there were $243\frac{3}{10}$ parts of solid matter collected from the vessels in which the hogs were scalded and thrown into the river. These vats are emptied twice in twenty-four hours. I find that on that collection of matter there are emptied out during the week $327\frac{6}{10}$ pounds of this solid matter, which consists in large part of organic matter. Of this solid matter, $203\frac{3}{10}$ pounds in 100,000 was organic, and the remainder inorganic. It was driven off on ignition, and would be about 25 pounds at each emptying. Then I got samples from the refuse-tank, as it is called, which is the liquid poured away from the scraps. They heat the fat in these close tanks, and then allow the materials to fall below and run away. It is termed "soup." It is poured into the dock. I estimated the amount of solid matter, and found it contained $8,886\frac{5}{10}$ parts in 100,000. Then I made an estimate of the whole amount poured out in one week, and the results were arrived at in this way. The three large tanks hold about $2\frac{1}{2}$ hogsheads each, and the one small tank holds about 300 gallons. From that I have calculated the amount of solid matter to be thrown in in a week to be $5\frac{4}{10}$ tons.

Q. (*by Mr. Derby*). That is a very large estimate, is n't it, sir?

A. I have been over it several times, but I will verify it again this evening. In order to show the amount of pollution, I wish to compare this with the sewage of the city of Boston. In the Report of the Massachusetts State Board of Health for 1873 are given the results of the analyses of the sewage of different sewers in the city of Boston. The worst of these is the Broad Street sewer, given in the table on page 65. This contains 2,862 parts of solid matter in 100,000 parts. Of this, 1,360 parts are chlorine, showing that the salt water had backed into the sewer when the sample was taken. If we suppose the total amount to be sewage contamination, still Mr. Squire's soup is nearly four times worse.

This year I again placed some spokes in the basin; they were suspended at Station 1, so that they could rest on the mud; yet you see, although one of them floated up into the Fifth Street sewer, and although they were exposed for 24 hours, they are not blackened as much as paint on wagons and houses in East Cambridge are in a single night.

Adjourned.

THIRD DAY.

December 3, 1873.

Mr. Muzzey. Do I understand that the full number of the Board were present throughout the entire day of yesterday?

Dr. Derby. Substantially, there were seven members present during the session.

Mr. Muzzey. I would like to have that understood. If a juror, sir, should leave the court, and the case go on without him, it would set aside the verdict. We wish to preserve our rights in the same way.

Dr. Derby. Do you want the hour that each member arrives recorded?

Mr. Muzzey. No, sir, I don't require the record to be kept so closely as that; but I want the record substantially right. If our theory is right, that all should be present, then the average should be six instead of seven.

Dr. Derby. I don't know that we can make an average of six and one eighth or six and seven eighths. There were seven here most of the time yesterday.

Mr. Muzzey. I will make this suggestion, that you might add to the record that Messrs. Frothingham and Davis were not present during the entire session.

Mr. Derby. We want it simply as it is. We make no complaint of your attendance, but we wish to preserve our rights.

CONTINUATION OF THE TESTIMONY OF CHARLES E. MUNROE.

Q. (*by Mr. McIntire*). When you left off yesterday, I believe you were speaking of the soup that came from the close tank. Will you take up the subject where you left it? *A.* There was some indefiniteness as to whether that statement was correct. So I afterward consulted Mr. Squire, and he stated it was substantially correct. I found that the soup contained 8,886.5 parts of solid matter in 100,000, and, basing my estimates upon the statements given me by Mr. Squire's workmen, which he says is correct, the result gives 5.4 tons of solid matter thrown into the river from the soup alone, every week, of which five tons are organic.

Q. Repeat what you said of the matter from the scalding-tank. *A.* I found that there were 243.3 parts solid matter in every 100,000. This liquor was drawn for me, as I have stated, by a workman of Mr. Squire, after the tank had cooled.

Q. (*by Mr. Muzzey*). Will you give the number of pounds per week? *A.* 327.6, or about twenty-five pounds at each emptying, reckoning six days per week.

Q. (*by Mr. McIntire*). You may go on. *A.* In regard to the other visits, I have made innumerable visits to Mr. Squire's establishment at all

hours of the day and night, and I have always found this peculiar odor of the lard, which is the most offensive to me, always to prevail. At times when I have visited the establishment, I have noticed the other odors quite strong. I think it was on the 24th of September, this present year, — it was rather a damp, misty evening; about eleven o'clock, I think it was, — that we noticed this odor, perceiving it very strongly; several of us, Mr. Hastings, Mr. Myers, Mr. Sharples, and myself.

Q. (*by Mr. McIntire*). Where did you notice this? *A.* At Mr. Hastings's house, on the corner of Otis and Fourth Streets. We followed the odor down to Cambridge and Sixth Streets, and visited Mr. Squire's establishment.

Q. How far is Mr. Hastings's house from Mr. Squire's establishment? *A.* About twelve hundred feet.

Q. Whether you were holding a meeting at that time? *A.* Yes, sir; of the committee. We were disturbed by the odor at this place, and followed the odor up. It was quite strong. But as we approached nearer the manufactory, when directly under the walls, there was only noticeable this odor I speak of, that of fresh rendering.

Q. (*by a member of the Board*). Was that odor different from that at the corner of Otis and Fourth Streets? *A.* Yes. The odor there was like that coming from the rendering of animal matter mixed with the other odors. It was a sort of a mixture. There was something of the river smell, that is always traceable when the air is moist. Then there are other odors that mix with it. It would be almost impossible to describe the exact odor that we smelt, but it was different from the rendering of the fresh material.

Q. (*by a member of the Board*). When directly under the walls of Mr. Squire's building could you smell the dock smell? *A.* No, sir. The large buildings there warded it off to some extent. When we went inside, we found the processes going on that we have described. They were killing, and we found the odors quite strong; that is, the odors of the different processes we have spoken of, the odor of the scalding-tank and of the rendering of fresh material. Then we went out into the yard or quadrangle, which is surrounded on the north side by a building where the hogs are stored; on the east side by those buildings where the slaughtering and scalding of hogs is carried on, and on the south side by the building where the rendering is carried on. When standing in the yard there it was quite misty, and the odor was extremely bad, and smelt quite like that which I smelled at the corner of Otis and Fourth Streets.

Q. (*by Mr. Derby*). Was there an opening into the dock? *A.* There was no opening there. I think there is one away up at the northwest corner.

Q. (*by Mr. Derby*). The windows were open in the building where the hogs were? *A.* I could not say. Whenever I have noticed the windows they have been open towards the dock. We did not go into the building.

Q. (*by Mr. Derby*). If the windows upon the other side were open and the floors of this building were not tight, would not you have received the dock smell through this piggery? *A.* I don't know that there were any windows on the side next the yard; we did not go into the building. In regard to the visits I made there I will state. On the 31st of July I was not well, and Alderman Brine came for me, and said

that the Aldermen had been invited to go down there to witness the operation of this new machine for destroying gases, and he wished to invite Mr. Magoun and myself. We visited the manufactory, and found it in quite a clean condition. We witnessed the operation of this machine. It was simply a condenser for condensing the vapors as they come off from the close tanks. The gases are passed through a purifier, from that through a tube into a furnace, where they are burned with coal in heating up a boiler. We saw that the gas was mixed with gasoline, and that it burned with considerable flame. I found at the time that I was about the building that the odor of the rendering of the fresh material was the only odor that was strong at that time. It was a warm July night, and so far as I know there was scarcely any wind at all. I was unable to perceive that there was any. I left the establishment about ten o'clock, it might have been a little after, and at that time the air was quite free from any odor except quite near the establishment; that was the odor of fresh matter. I walked home with Alderman Brine, and when I reached my home I commenced to smell the odor of the Miller's River quite perceptibly. I went to bed between half past ten and eleven o'clock; pretty near eleven, I should say. All the windows were open. Just as I was getting into bed the odor came, — the odor of the dock, — reinforced, it seemed to me, by this rendering odor of which we complain. The odor was quite intense. As I said, when I started out in the evening I was sick, and I was unable to go out when the odor came. But I am sure it was the odor of which the people complain, and not the odor that comes from Miller's River, — the dock smell. In regard to the effect of that odor, our house is about one thousand or twelve hundred feet distant from Mr. Squire's establishment. Our dining-room is in the southeast corner of the building. Every night through the summer we are watching for these odors, and when they come up the windows are closed. Whenever we retire for the night, every window in the house is closed, even in the hottest weather, because these odors may come up, and the result is sometimes serious, and causes a great deal of discomfort and annoyance.

Q. (*by the Chairman*). What is the effect? *A.* The effect is the same as that produced by the sulphide of ammonium, though a little more severe. Upon myself personally these odors produce no decided injury, for it only gives me slight discomfort and causes a very little nausea.

Q. (*by Mr. McIntire*). Do you attribute that fact to your frequent use of sulphide of ammonium? *A.* I know that I have become accustomed to the odor, and very likely it is for this reason that they do not seriously affect me.

Q. Have not any of these odors ever had any different effect upon you? *A.* A year ago in July at one time I came home sick, or was not feeling well, smelt these odors, and was quite nauseated. Yet I could not say that it was on account of them. The odor and the nausea came at the same time, but perhaps one was not the cause of the other. But in regard to the effect in the dining-room. The windows were all closed. On the table was a silver ice-pitcher, about which was thrown a piece of flannel in order to protect it, and then a shawl about that. The ice-pitcher had been brightly polished that day. Next morning the pitcher was very badly tarnished, notwithstanding all the protection and the closing of the windows. The next day I examined,

with what time I had, the buildings which were discolored by these gases. I found that they extended as far down Cambridge Street as First Street, and up Cambridge Street as far as the Grand Junction Railroad. I found they were confined more particularly to the houses on that side of Cambridge Street included by this line drawn from First Street up to the Grand Junction Railroad, and that they were blackened on the north and west sides. The house of Mr. Moore, on the corner of Cambridge and Sixth Streets, was blackened on the north and west sides, and that of Mrs. Jones, on the other corner, was blackened on the north, west, and south sides. I found one house blackened on the north and west sides, and not on the front. This blackening took place in blotches. On some houses there would be a surface covered with it as large as a man's hand, and in other cases the blotches would be smaller. They were irregular in size. I found that the most intense effect was produced from Fifth down to Seventh Street, and those from Fifth to Sixth were very badly affected. I went up Gore Street, down Fifth Street to Fourth Street, down Cambridge Street, and I think I went to the bridge, walking about an hour or two, looking at the various houses.

Q. (*by Mr. Derby*). Did it go as far as Winter Street? *A.* I cannot recollect distinctly that I went there. I know the houses there are blackened, but I don't know that I went there that day, the 31st.

Q. (*by Mr. McIntire*). What did you find on Gore Street? *A.* I noticed on Gore Street one house on the corner of Sixth Street that had been somewhat affected, and that the building containing the offices of the furniture establishment was very badly discolored.

Q. Did you notice any buildings opposite Squire's establishment? *A.* I don't recollect any on Gore Street that were discolored; none directly opposite.

Q. (*by Mr. Derby*). There are white buildings there, are there not, sir? *A.* I don't know. I think there used to be one there some years ago, but I believe it has been removed.

Q. You found nothing opposite Mr. Squire's that was affected by it? *A.* No, sir.

Q. (*by Mr. McIntire*). Whether there are not ventilators in the top of Mr. Squire's buildings that allow the steam and odors to arise and escape? *A.* There are ventilators, I believe, directly over the tight tanks. That is my impression. The tight tanks are over the open kettles; on the floor above.

Q. Are there any other ventilators that you noticed? *A.* No, sir, I cannot state definitely that there were.

Q. From what you say, on the evening of the 24th of September, when at Mr. Hastings's house, from what you smelled outside and inside and of the course of the wind, the humidity of the atmosphere, etc., did you come to any conclusion as to the origin of the smell which was smelled at Mr. Hastings's house and which you followed down? *A.* My conviction and belief was, from the result of our visit there, that this odor at that time came from Mr. Squire's establishment. That belief is founded on the investigation which we made at that time, the 24th of September.

Q. From your knowledge of the buildings, of the occupations carried on therein, and from your inquiries and experiences, should you say that

these smells would be as distinct when generated in the building as when experienced some rods away? *A.* I am very well satisfied that it would not be so, for this reason. Most of these odors are generated by processes where heat is applied. We know that heated air rises, that these odors would rise with the heated air, that cold air from outside would rush in and take its place; consequently, as these odors are formed either by the scalding of the hogs in the tanks or by the rendering of the fresh matter in the rendering-tanks, they would be carried up with the heated air, and they would be more likely to be smelled at a distance from the building, by coming down with cold air, than to be noticed in the building where the process has been carried on. That is my general idea of the thing.

Q. Now, in regard to the different kinds of atmosphere. In what atmosphere would it most likely be smelled? *A.* It would more likely be smelled in a moist atmosphere. Many of these gases are soluble in water, and the vapor would probably take them up and carry them on. I don't know the exact way in which these gases are carried along under these conditions, but we often find that these odors are more distinct in a fog than when there is a clear atmosphere. We are pretty sure the heated air would not rise as high when the air is cold and full of moisture as when it is clear.

Q. In this rendering smell do you detect the sulphide of ammonium? *A.* I don't detect it by my nose. In the experiment I made with the impure animal matter, I found sulphide of ammonium. From this fresh animal matter I have not found that any ammonia escapes. It is only a soluble sulphide.

Q. Ammonia is soluble in water? *A.* Yes, sir.

Q. Would it not be taken up by a foggy atmosphere? *A.* I think quite likely.

Q. Whether that ammonia, if it is soluble in water, and taken up by a moist atmosphere or a cold or entirely clear atmosphere, — whether it would remain, or whether by a moist atmosphere it might perhaps be taken up again and be carried against the wind as well as with it? *A.* I should suppose it would be driven with the fog.

Q. Even if there be a breeze blowing it does not dissipate the fog. I ask you whether that ammonia would not be taken up by the whole of the fog, and travel perhaps quite a distance against the wind? *A.* I don't think I am competent to answer that question. That is an action of gases I have not studied. With regard to the effect of these gases upon myself and family, I can say that my mother has been for several years an invalid; she has had, especially, a trouble with the throat and head, — a species of phthisic. When these odors come up she is especially affected by them. It produces an irritation of the throat and a cough. She is able to distinguish, as all the rest of us are, that there is an odor which is entirely separate from the odor of Miller's River, because it produces this effect. We have, on several occasions, had our attention called particularly to this odor of Miller's River when the tide has been out and the flats have been exposed during a thunder-shower. The water falling with considerable force, the drops having considerable size, stirs up the mud exposed, and the gases of the mud are evolved. We have, on several occasions, noticed this odor which has preceded a thunder-shower. The odor is recognized distinctly as the

dock smell, and is entirely different from that of which the people complain, — the rendering smell. Not only that, but we have not noticed that it has produced those effects in the way of blackening buildings.

Q. (*by the Chairman*). When have you noticed this? During the shower? *A.* I have noticed this when the rain first commences to fall. The air will be clear before the shower. The first rain stirs the mud, and then we get this odor, — the odor of Miller's River. It is the same gas I obtained by stirring up the mud. There is another fact in regard to the effect of this rendering odor which shows that it produces something more than the effect of dock mud. My brother, by scarlet fever, has had his sense of smell greatly injured. He is not able to smell very distinctly; but, whenever this rendering odor comes up, he comes in and says that the rendering is going on, because he feels its effect in his nose and throat. I have noticed this several times.

Q. (*by the Chairman*). Does it produce a real cough? *A.* Nothing more than a hacking. I know that he cannot smell, because I have tested him with ammonia. He only knows the effect. It makes his nose smart, but he cannot smell it. He comes in repeatedly and says that he recognizes the effects of the rendering atmosphere.

Q. (*by Mr. McIntire*). On the 31st of July, when you visited the establishment, did you notice that machine for carrying off the gases for the tight tank? and did you make up your mind whether it would thoroughly do away with the gases which come from the tank? *A.* I examined the machine quite thoroughly, as I believe, and made the machinist who put it up explain its operation to me. I told Mr. Squire, or some of his men, that I believed that the gases that pass through the condenser and into the furnace were thoroughly destroyed, — that the fire destroyed the gases. There seems to be one fault with the machine. There is a large amount of steam sent through, and of course it would be expensive to decompose that steam and burn it. So it is condensed in a condensing coil, and this liquid is carried out into the stream. I tried to get at that liquid and examine it. I understood that the pipe was connected with a pipe which was extended out to the bed of the river, and that the end of the pipe was continually under water. I think the machine was not fully competent to do the work, because I believe — although it is a matter of belief — that this liquid which is condensed will hold in solution more or less of these gases. Of course, there being sulphide of ammonium in the gas, there must be more or less held in solution by the liquid. At the time of the hearing before the Aldermen these gases were carried by pipe into the basin and blown off into a tank at low tide, and into the water at high tide, I believe.

Q. At that time it was claimed by Mr. Squire that the water of the basin took up the gases? *A.* I understood it to be so.

Q. Well, these gases that are in the generating pipes and in the condensed steam are the same gases that are generated in the tight tanks? *A.* Yes, sir.

Q. And yet you say that with the machine which is now used, the condensed steam that contains these gases goes off into the river? Can you give the proportion of the gases that are burned? *A.* I don't know that.

Q. Well, the gases are run into the condensing pipe, the steam is condensed, and the gas passes off to the fire? *A.* As I examined the

machine, there is a large tank filled with water, salt water from the river. In this was placed a coil of iron gas-pipe, and the upper end of this was connected with the close tanks. All of the tanks were connected with this one condenser. The gases from the tanks came through this condenser.

Q. The blowing off is through the coil; the water is condensed and the steam and gas is supposed to rise? *A.* And the gas that is in the condensing pipes goes through the purifiers and into the furnace.

Q. Well, it is not the gas itself that arises that is burned, so much as the gasoline that is mixed with it? *A.* That is my belief. The gases coming from the rendering have contained a great deal of carbonic dioxide. I passed a portion of this gas through a bottle of lime-water and through a solution of acetate of lead, and collected the gas and applied fire, and it would not burn.

Q. I understand that the condensed liquid was not at that time carried out into the stream. Do you know where it was carried to then? *A.* I do not. Mr. Squire afterward told me it was carried out to the channel, because some persons thought it would be better.

Q. Well, that extreme odor we got that night, might that not have arisen from the discharge of this condensed steam into the atmosphere from that pipe?

Mr. Derby. Do you put that in as a fact or as a possibility?

Mr. McIntire. As a chemical fact.

Q. (*by Mr. McIntire*). Might not the same effect be produced upon the buildings, upon silver, and upon individuals who live about there from the gases which passed off in that condensing pipe, as were really experienced? *A.* As I have stated, I have been unable to examine the liquid that is condensed, but I am sure that it would be highly saturated with the sulphide of ammonium; that is my opinion.

Mr. Derby. He cannot speak of what he does not know.

Mr. Munroe. It is true that the water there was hot, and that the steam was more or less warm when it passed away. Perhaps it was not thoroughly cooled. The hot water would not hold these gases in solution so thoroughly as cold. Still it was under considerable pressure, and this pressure would cause the water to absorb more of the gases than if it were not under pressure. Simply as an opinion, it seems to me that this liquid, if discharged when the tide was low upon the flats, would cause a considerable odor, and it is possible that it would cause a considerable blackening effect.

Q. (*by a member of the Board*). Do you think this condensed liquid that passes off from the coil would produce this effect? *A.* My opinion is that it would be saturated with sulphide of ammonium, and if it were discharged upon the flats I think there would be a large quantity of the sulphide escape; and my opinion is, that it would be sufficient to produce some blackening effects.

Q. Would it be sufficient to produce the effect that was produced on the 31st of July? *A.* I could not state.

Q. I understand you to say that this is conducted out into the stream? *A.* It is now, sir. It was not then. The pipe now empties into the channel.

Q. (*by Mr. Derby*). Is it your opinion that this little trickling stream would poison the whole atmosphere so as to produce these effects? *A.* I

don't know the size of the stream. I don't know how long it was continued, and I add to that the fact that, if it were poured into the water, it would become diluted and evaporate.

Q. (*by Mr. Derby*). It all turns on the "ifs"? *A.* It all turns on the "ifs." I was unable to obtain the facts I wished to gain.

Q. What are these papers that you wish to show? *A.* They show the effects of the gas of the tight tank when it is blown off. These papers were taken on the 24th of September, at the time we visited and found the odor so strong. These tight tanks were blown off in the upper part of the building, where the tanks were placed, before any of the gas had gone through the condenser. Then we went down stairs, and the stop-cock of the condenser was opened, and the blackening you see was less. Yet there were still some sulphides forced through.

Q. You dealt with the active gas before it reached the furnace? *A.* Yes, sir. This shows that the sulphides have not been entirely removed, and that the liquid which runs from the pipe must be saturated.

Q. (*by a member of the Board*). You believe that all that passed through the condenser and was mixed with the gasoline was thoroughly consumed? *A.* Yes, sir. My belief is that all the gases that come through from the tanks can be thoroughly consumed; that they are decomposed by heat and then burned with a sufficient quantity of air. If the gases are passed through a red-hot iron receptacle they will be decomposed, and can be burned.

Q. Do you know anything of the effect of these superheated coils; whether the atmosphere does not take up the gases? *A.* No, sir. I simply know from the fact that the elements of which these gases are composed, with the exception of sulphur, when they are combined with oxygen, are comparatively harmless.

Q. Did you ever hear of an instance of a chemical factory that had a superheating machine, and that the gases were taken up by a damp atmosphere and carried some distance? *A.* No, sir.

Q. (*by Mr. Newhall*). Did n't you say a little while ago that it was your belief that some of the gases were burned and that some were not? *A.* No, sir. I said that it would not burn of itself, but when passed over red-hot coal it must then be decomposed and then burn. My belief is, though I have made no experiment to prove it, that it would be so decomposed that no odor would be perceptible.

Q. Did you smell of the smoke? *A.* No, sir. The chimney is over a hundred feet high.

Q. (*by Mr. McIntire*). How many times during the past summer have you perceived this rendering odor? *A.* I could not state.

Q. (*by a member of the Board*). The gases that are carried off in solution from this coil, would they be powerful enough to infect the atmosphere to any great extent? *A.* In order to render the material in these close tanks they are obliged to put it under pressure. Consequently, the liquid, being subjected to some pressure, would be supersaturated with the gases that would escape into the atmosphere.

Q. (*by Mr. McIntire*). Is it true that this water, being heated, would be likely to contain this gas? *A.* It may be; I cannot say. I know that the night we were there it was stated that the water was warm. As that thing is likely to occur, some of the liquid might leave the condenser warm. If it were carried on perfectly it would be cold.

Q. Still, being under pressure, it would be saturated with gases? *A.* That is my impression.

Q. How many times since you began to get it have you smelled the rendering smell? *A.* I have been so irregularly at East Cambridge, and part of the time away from Cambridge entirely, that it would be impossible to state approximately.

Q. As many as ten times? *A.* I think I must have smelled it as many as ten times; perhaps I would not overstate it if I said more.

Q. Well, now, from what you saw there, from the work carried on there, and with what tracing you have had of these smells, should you say that such smells could have been generated in this place? I am speaking of all of them. *A.* I think they could. With the machinery, the open kettles, you would get the odor of rendering, which, with the gas of the scalding-tank, would give us this mixture of odors, or this peculiar rendering odor that has been complained of, to some extent. But as the fixture is now arranged, it would not give us that peculiar rendering odor that we got on the 31st of July.

Q. Do you think that the rendering there of the fresh lard when mingled with these other odors — the hog and other odors generated at the establishment — would give out an intensified rendering odor, if you can call it so, that might be smelled at Cambridge Street for a quarter or half a mile? *A.* It would give us an odor on Cambridge Street, certainly, because I have smelled the hogs at my house repeatedly, and I have smelled the scalding-tank distinctly on Bridge Street when I have passed there. I have smelled the hogs in Somerville, as far as Washington at the corner of Franklin.

Q. In regard to the live-hog odor, do you get that? *A.* Yes, sir.

Q. How often? *A.* The difficulty is that we have smelled it so often that we have not taken an account of the number of times. We have come to believe that the odor has got to be a constant odor. Whenever the wind is in the proper direction, that is, about northwest, it brings it to our house. I have noticed it especially in clear days. Once or twice when I have been out and the air has been perfectly clear, the wind would shift to the northwest, and we would get the live-hog odor. I notice it on Sundays, because I am at home more then than at any other time.

Q. You don't mean to say that you smell the hog odor only on Sundays? *A.* I say I am at home then.

Q. Does this hog odor come as well from the pens as from the unloading? *A.* I should judge it did, because we have smelled it Sunday evenings when the hogs were not unloading.

Q. You have been into the hog-pens, have n't you? *A.* Yes, sir.

Q. Do you speak now of the time before or since charcoal was introduced? *A.* I think it is within a week that I have smelled the live-hog odor. North and northwest winds always bring the hog odor to us. I have believed it to be constitutional.

Q. Do you think that there is any way in which twelve hundred hogs can be kept in a locality like that without seriously disturbing or discomforting the people? *A.* My own opinion is that it is impossible. I know that a single hog smells badly. I know that the city of Cambridge recognizes that fact, because they forbid the keeping of a single hog. It

is my opinion that it is impossible to keep twelve hundred times as many without increasing the odor very materially.

Q. Have you happened in other localities besides East Cambridge to smell any of these odors at a distance from the establishment? *A.* I have smelled them, as I stated, at Somerville, at the corner of Washington and Franklin Streets.

Q. This was the odor of live hogs? *A.* I cannot say; I inferred, from the noise of the hogs squealing, that they were killing.

Q. How far off would that be? *A.* About four thousand feet. The most of the way it is low land and open. It belongs to the Asylum, and is used for cultivation. The wind blows directly across it without interruption.

Q. (*by the Chairman*). Do I understand you that this smell comes from Mr. Squire's? *A.* I smelled the odor of the hogs, but I did not localize it. In regard to smelling it at other places, in August I was riding by Riverside Park, in company with Mr. Hastings and his family. When we got opposite the park (which is in Brighton), I complained to him of an odor of hogs which was very intense, and I inquired of him whether there were any hog-slaughtering establishments about there, or whether there were any large piggeries kept there. He told me it was probably the odor of hogs in cars on the railroad upon the other side of the park; that there was a track there where these hogs for the East Cambridge establishments are switched off.

Q. How large a distance was that? *A.* The park is a mile track; the distance would be about a third of a mile.

Q. The wind was blowing towards you? *A.* Yes, sir.

Q. (*by Mr Derby*). The park you speak of is in Allston, near Charles River? *A.* Yes, sir.

Mr. Munroe. I don't know of anything further I have to say.

Cross-Examination.

Q. (*by Mr. Muzzey*). You began to investigate this establishment something over a year ago; have you made yourself familiar with it from that time on? *A.* I have endeavored to do so by repeated visits.

Q. Has there been any considerable period when you have ceased your observations? *A.* During the winter.

Q. But during the past summer you resumed your investigations? *A.* Yes, sir, finding the odors still continuing. The reason I did n't go on through the winter was because of the action of the City Board of Health, which I supposed would abate any such odors.

Q. How lately were you there? *A.* I was there on Wednesday last.

Q. Well, now, take the present condition of the establishment and contrast it with what it was one year ago when you were investigating, and what do you say about it? *A.* I say there has been a very considerable improvement, especially since the last of August, 1873. There has been an improvement, especially in the department of slaughtering. The only other improvement I know of is that put in on the 31st of July, for destroying gases.

Q. The old slaughtering-place has been abandoned, and the new slaughtering-place, lately constructed, has perfectly tight hard-pine floors, and arrangements have been made for carrying away the blood. These are two important changes that have been made? *A.* I find the estab-

lishment has been so constructed that twice the number of hogs can be killed now as formerly, and twice as much business done.

Q. Let me ask you if where the slaughtering and cleansing of the animals now takes place, there is not a tight floor, so that nothing can get through to the flats underneath? *A.* There is, and I regard it as a great improvement.

Q. Nothing can reach the river-bed now from that part of the establishment? *A.* I don't know the direction of any drain that may be there. Nothing can be dropped through.

Q. Well, now, let us begin with the hog-houses, where the live animals are kept. Do you not think that the sprinkling of charcoal upon the floor is a great improvement in that part of the establishment? *A.* I know theoretically that the sprinkling of charcoal will remedy the evil there very materially, but practically that in East Cambridge the odors are just as intense as before. I found this was true, on a visit to these hog-houses; that those pens where there were no hogs were nicely cleaned out, and charcoal was sprinkled upon the floor, and there was no odor; as I stood in the centre of the pens I smelled no odor from these pens. But in the pens where the hogs were there was an odor which permeated the whole building.

Q. Were these pens side by side in the same building and on the same floor, and you standing in one pen could not perceive any odor from that? *A.* It was a matter of quantity, of course. I noticed this odor permeated the whole building, and that it was more strong in the pens where the hogs were than where they were not. These pens I should state are quite large, — larger than this room. The building is something like three hundred feet long. The difference of the length of one or two of these pens would give, of course, an opportunity to notice the difference between those which had hogs and those which had none.

Q. Was the charcoal in the pens the hogs occupied? *A.* My impression is that it was.

Q. As I understood you, you said that in the pens that were unoccupied you did n't perceive any odor? *A.* Not so; I perceived the odor from the other pens.

Q. It was perceptibly lessened? *A.* Yes, sir.

Q. Could you tell, standing in the middle of the pen which was free from hogs, whether the odor you perceived came from the pen that you were in or from the adjoining pen? *A.* It was a question of degree. The pens I saw were very clean, and the windows about the one in which I stood were open so that it might be ventilated. These pens were considerable distance from those occupied. There was a difference, and the difference was in favor of the establishment.

Q. These pens were all in one room? *A.* It is all one room, partitioned off.

Q. You were in a room which was partitioned off, with low partitions, into pens for hogs. How far off from the pens that were occupied by the hogs did you stand when in the unoccupied pens? *A.* I should say about one third of the building.

Q. That distance would be about one hundred feet? *A.* Yes, sir.

Q. The smell of the animals, from the spot where they were stationed, was diminished so much in reaching you in the place where you stood, as to make a very sensible difference to your organs of smell whether you

were in one spot or the other? *A.* There was a very decided difference between the odor which I smelled when I stood where the hogs were (in point of strength) than there was when I stood where the hogs were not.

Q. Now, you were one hundred feet off from the live animals, in an enclosed room with them. The windows were open all along the sides. If the smell had diminished so sensibly at a distance of one hundred feet from the hogs, do you think that that smell could have been perceived at your house on Fourth Street, a distance of twelve hundred feet off? *A.* I think that a great deal would depend upon the direction of the wind through the building. I could not say what it was at the time. I want to state that although the odor was diminished, the odor from the other pens was distinctly perceptible. I realized there was a difference, but I can hardly describe it.

Q. If the odor was so diminished in one hundred feet within the building, what do you say about its probably reaching your house at a distance of twelve hundred feet? *A.* I don't know how to make the comparison, because a great deal depends upon the direction of the draught through the building.

Q. Consider the contemplated improvements, inside and outside the slaughter-house; suppose the river basin to be filled, as the legislative act requires; suppose the sewers to be constructed as is required; then suppose Mr. Squire to have put in, what he already has had constructed, — close tanks, — so that all fresh matter which is now tried in open kettles shall be tried in close tanks (these have been ready for months, and he has only been waiting to get the establishment reorganized so as to put them up), — suppose that to be the case; and suppose that, instead of discharging anything from the condenser into Miller's River basin, we carry it off by taking the advantage the sewer will give us; take the fact that we have now tight floors in place of open floors, and that we cart away the blood — By the way, let me ask you whether you think this a better mode of disposing of the blood than by the blood-drying machine? *A.* If the drying machine is managed in a proper way, I don't know any objection to it. If the blood is carried away in perfectly tight tanks and clean vessels, so that no decomposition could take place, that is a good way.

Q. Is there any choice between the method pursued at Brighton and at North & Merriam's, and carrying it off, — supposing both processes to be equally well performed? *A.* I think, with intelligent men to conduct both processes, there would perhaps be but little preference.

Q. Now take the sewer, the made land, and nothing put into the stream, — the sewer giving us a service we have not before had, — and these improvements in the interior of the building, don't you think that building would be one in which the business of slaughtering could be carried on in as unobjectionable a way as any hog-slaughtering house operations can be conducted? *A.* I have no hesitancy in answering that I think it could be carried on as unobjectionably as in any hog-slaughtering establishment; but then, to do myself justice, I wish to state that I don't know of any way in which this live-hog odor can be got rid of. I would state, too, with regard to the sewer, that if these materials, such as I have spoken of, were emptied into the sewer, I think the results would be as injurious as they are from the basin; that it would be simply carrying these matters a greater distance, and they not

only would decompose, but the people would be affected through the sewers to their dwellings, and injured in that way.

Mr. Muzzey. There is this difference: whatever is put into the basin goes to the bottom. If it is discharged into an ocean current by a sewer, it would be carried off.

Mr. Munroe. So well as I can learn with regard to the direction of this sewer, it is to be discharged into a current which in its passage to the sea comes in contact with numerous pile-bridges, and it is likely that this material would gather upon the piles and become offensive.

Q. Still it is very much better than to discharge into the basin? *A.* Yes, sir, for the people in the immediate vicinity of the establishment.

Q. Now we will take it for granted that the slaughter-house is to exist; that although it is an objectionable thing, the community require it, and must have it; and that it must exist in a populous community.

Mr. Munroe. I don't accept that last clause.

Q. Now I wish to ask you whether you know of any locality in the immediate vicinity of Boston, near tide-water and near railroads, where this business could better reside than in this place? *A.* In answering that I will say I have thought the matter over to some extent. My conclusion has been that there always will be about every slaughtering establishment, and especially about a hog-slaughtering establishment, more or less inconvenience and discomfort to persons residing about it. It seems to me positively unfair to force those inconveniences and discomforts upon persons who have no connection with the business. That people, who live in Cambridge, should not be subjected to any such odors as we have there. I have endeavored to find a place that would be proper for the carrying on of such business, and Point Shirley at Winthrop has been suggested to me as perhaps the most eligible place.

Mr. Muzzey. Why, sir, do you not know that there is a project on foot for rendering that section one of the most ornamental sites near Boston? That is a place we cannot get. Do you think of any other? *A.* My knowledge of places around Boston perhaps is not so complete as you may expect. I hardly think it comes within my province to suggest locations.

Q. Then no site occurs to you except that we cannot get? *A.* Not to me.

Q. You told me that one hog smelled badly, and that twelve hundred must of course smell as many times more offensively. You spoke of a hog in a sty. If three thousand hogs slaughtered by all these establishments, instead of twelve hundred, slaughtered in a day by Mr. Squire, were crowded together under one roof, do you think the evil would be increased? *A.* I think it would in proportion, as far as the smell they create is concerned.

Q. Well, then, it comes down, after all, to this: whether a slaughtering-house should exist in a populous community? *A.* It comes down to the point that the citizens of Cambridge don't want it.

Q. You think the whole question is whether a slaughter-house, no matter how conducted, should exist at all in a populous community. You don't think people who are not related to the business or connected with it should be obliged to endure the inconvenience? *A.* No, sir. I don't think those who are situated near one of these establishments should be subjected to the live-hog smell.

Q. In East Cambridge, besides this hog smell, have n't you noticed the smells coming from the sewers on the flats. The one from the Jail, for instance? *A.* Yes, sir. I know there has been a sewer which empties from the Jail, or House of Correction, which has produced something of a nuisance there, and there has been some complaint about it by the people in that locality. The only person I know of personally who complained of it is one living in a house about one hundred feet from it.

Q. Well, now, about the sewer openings. You say you understand some change has been made. In passing along the streets have n't you noticed that the sewer openings were offensive in East Cambridge? *A.* Not in East Cambridge. In walking from East Cambridge to Old Cambridge I have noticed that some of the cesspools at Summer and Baldwin Streets in hot weather would become empty of liquid, and then the gases would escape into the street. I smelt them because I was looking for them.

Q. You have no doubt but that they do give off a bad odor? *A.* No, sir. It is a question of quantity.

Q. You have made a pretty good investigation, I take it, into the causes of trouble in Cambridge that are above ground and don't belong to the basin? *A.* I have endeavored to do as much as my time would allow.

Q. I don't know whether you have sent in a petition against Barry's bone-boiling establishment?

Mr. McIntire. Yes, there is one here.

Q. Well, don't you hold, and have n't you expressed the opinion, that the most of the trouble in East Cambridge is created by that place? *A.* I have said that I believed that the most offensive odors came from those establishments where they render in open kettles by fire.

Q. Will you inform the Board what places of that character exist in our neighborhood? *A.* There are four of them. There are Garrett Barry's, Terrence Shevlin's, Terrence Spelman's, and Charles O'Neil's, all in Somerville. The nearest of them is four or five hundred feet from Mr. Squire's, and that farthest away is about two thousand feet off.

Q. Are any of these establishments also soap-making places? *A.* I noticed that two of them were making soap. I cannot say about the others. About the bone-boiling I cannot state. They were not boiling bones at the time I saw them. I saw some soap-grease with a few bones in it; but they were not especially boiling bones.

Q. Do you know the process of soap-making with this grease? *A.* Not exactly. I suppose they mix it with potash or soda.

Q. It is heated in open kettles? *A.* Yes, sir.

Q. Now as to acroleine. You stated that you thought it might be produced at what temperature? *A.* I stated that the temperature at which I had produced the irritating gas, which I thought might be acroleine, was 239° Fahrenheit.

Q. Do you know the amount of pressure that Mr. Squire uses? *A.* No, sir.

Q. Take it at sixty pounds. That would be four atmospheres, and the temperature would be 291.2°. Don't the books on destructive distillation place the temperature at which acroleine can be produced as high as 500° or 600°? *A.* Yes, sir.

Q. Sixty pounds is the pressure we use in our establishment, and

our temperature is 291.2°. It is not 500° or 600°. Well, now, acroleine is much more easily produced, of course, from the kettles, fire being used under them, for there you can get that temperature? *A.* It is quite likely to be.

Q. I suppose it is produced when the fat burns? For a familiar illustration, it is obtained when you snuff out a candle? *A.* Yes, sir. It is also obtained by the simple distillation of glycerine.

Q. Supposing that anything which is irritating in the atmosphere of East Cambridge is really acroleine, would it not be fairer to say, and more sensible to think, that it is these open kettles where fire is used which produce it, and not the steam-rendering kettles? In regard to acroleine, — suppose it to be there, — the books are against it, but suppose it to be there, — would it not be more reasonably attributed to the open kettles where fire is used, and where they can get a temperature of 500° or 600°, rather than to a steam establishment where the temperature does not rise above 292°? *A.* Certainly.

Mr. Muzzey. There is nothing in Mr. Squire's establishment except steam heat, — that is true, is it, — in open as well as close rendering? *A.* I think it is so.

Q. Another thing. Is it possible to reach 400° even, with the pressure that any steam-engine will bear? *A.* That I could not tell. It would be a pressure of seventeen atmospheres.

Q. Did you ever know of a locomotive-engine, even, being operated with that amount of pressure? *A.* I never knew of one.

Q. In your investigation into this establishment your visits have been as frequent as you pleased, and every facility for its progress has been afforded you by Mr. Squire? *A.* Mr. Squire has afforded me every facility.

Q. You have presented these discolored papers to show the effect of the liquor from the scalding-tank and the "soup." Have you made any analysis of the mud of Miller's River to know how much sulphuretted hydrogen it contains? *A.* No, sir; I thought that Professor Thompson's work was sufficient.

Q. Do you think he was right about the amount of the blood? I would like to have you look it up and see if he did n't fall into one error. So you took it for granted that he was correct, and made no experiment with the mud? *A.* I made no experiment.

Q. Have not you made a comparison between the solid matter in a sewer and the solid matter of this liquid? *A.* Yes, sir. The comparison I speak of was of the matter of a sewer in the city of Boston, taken from the corner of Broad and Federal Streets. I took the analysis which was made by Professor Nichols, which you will find in the State Board of Health Report for 1873, page 65. I compared it with this liquid, — the soup, — which, when it was given me, was in solution. I was very particular when I measured it off to see that there was no suspended solid matter in it.

Q. What I mean is this: When you are comparing sewage with anything you should take the sewage as it is when it enters the sewer. In its passage along the sewer the solid matter drops into cesspools, so that if you take sewage from the mouth of the sewer you have not a fair sample of it as it comes to the sewer.

Mr. McIntire. I think you labor under a mistake. I don't remember

that Mr. Munroe has made any experiment with the water from the sewer. He has taken the figures of the State Board of Health with regard to that matter.

Mr. Muzzey. The question is, whether this was a fair average of sewage?

Mr. McIntire. I doubt whether this witness is competent for that.

Q. (*by Mr. Muzzey*). In making an analysis of this scalding-tub liquid, was the water taken after the sediment had been deposited in the bottom of the tub? How long had it been allowed to settle? *A.* Mr. Squire's man gave it to me. The liquid had been allowed to cool so that a bottle could be put into it to get a sample of the liquid. Of course the larger part of the sediment had settled to the bottom. Now, in making that comparison, it seemed to me fair to compare the clear sewage with this clear liquid which is poured into the basin.

Q. Is this water poured off before it is cool, or are chemicals applied to it before it is poured off? *A.* I understand that the water of the scalding-tub at present is cleared by the application of blood, since this experiment was made.

Q. In what way is it cleared? *A.* I understand that they take fresh blood, as they collect it from the slaughtering-room, and after the water has cooled down they pour in a quantity of it; the liquid is heated to the boiling-point, the blood coagulates, the grease and solid matter are precipitated with it, and the water is so purified that it may be used over and over again.

Q. That you regard as a great improvement? *A.* I regard it as being an improvement which diminishes the amount of solid matter, especially the organic matter, thrown into the basin.

Dr. Derby. It is a simple entanglement of the settlings? *A.* Yes, sir.

Q. How many times can the water be used? *A.* I don't know how many times. It does not restore it to its original purity.

Q. Does it deodorize it?

Mr. Derby. We shall have a witness upon that, sir.

Q. The soup you have brought in has undergone considerable change? *A.* It is much more offensive. I remember at that time it was not very offensive. When it comes from the dead-hog tanks, of course the odor is more offensive.

Dr. Derby. You stated that the decomposition of fat requires a temperature which is not reached in the close tanks, but a temperature readily reached in open kettles. Do we understand that 500° is needed to decompose pure fat? *A.* No, sir, I don't say that. I said that the production of acroleine required a temperature of 500° or 600°. But the rendering of fat does not require any such high temperature.

Q. Do we understand you that decomposition of fat can take place under a temperature of 500°? *A.* Yes, sir.

Q. You speak of this as if it were pure fat? *A.* Yes, sir.

Q. Whether this very high temperature is necessary to the production of offensive nauseous productions of the materials that are in the tanks? *A.* No, sir.

Q. (*by Mr. Muzzey*). Then we should take out of the case these 327.6 pounds of solid matter in the scalding-tub? *A.* I understand this is removed; that is, the larger part of it. The water is sufficiently pure for

the scalding of hogs. It is renewed occasionally, I understand. It is continually reduced by evaporation.

Q. Let us return to the soup. You calculate 5.4 tons of solid matter per week from the close tanks, five tons being organic matter. How much of this is soluble in water? *A.* I should say in all likelihood it was entirely so. The soup is principally a solution of gelatine, or ordinary glue.

Q. (*by the Committee*). Is it clear when it comes from the tank? *A.* It has an amber color. There was no solid matter in suspension in the solution. It was opaque.

Q. Is that always the case? *A.* In my experience they let down the scrap and soup together, and allow the soup to filter off through the scrap.

Q. (*by Mr. Muzzey*). Now, as I understand you, the only fault you find with the machine for burning the gases is that some of the gases may be held in the water which remains in the pipe, and that, discharged into the river-bed, may produce a smell; well, we can discharge that into the sewer when it is built, can't we? There is no objection to that? *A.* I don't believe in discharging any such thing into the sewers.

Q. But you know it is done? *A.* Yes, sir.

Q. May you not be in error in supposing that there can be any gases that will escape into the atmosphere from this tight tank through the condenser? *A.* The statement I made was that if this liquid were run off on to the flats when they were not covered by the water, it might produce the effect produced at that time; but if this liquid were run out, as it is at present, into the water, I thought that effect would not be nearly as likely to result. It is evident that the sulphide of ammonium is decomposed by dilution. It is a fact, too, that if the gases were let out into the water in the night time, and the sun shone upon the water the next day, there is quite a probability of the gases being liberated then.

Q. Taking into consideration the enormous quantity of water which dilutes the gases there, do you consider this a perfectly reliable test? *A.* Well, the water is much less in volume than the enormous quantity of air. That was the data upon which I founded my experiment.

Q. Now as to the test-papers. Why did n't it occur to you to station test-papers on the buildings exactly opposite the Squire establishment on Gore Street? *A.* Because that there we never smell the odors. It is a well-known fact that it is rarely that you can smell the odors right there under the eaves of the building. It is a matter of distance.

Q. As I understand your testimony, about the 24th of September you were at Mr. Hastings's house, and were disturbed by the odor, which on reaching Mr. Squire's establishment, you did n't find? *A.* We found it in the quadrangle in his yard. We found the separate odors there, each odor distinct, but not so distinct as outside the building.

Q. The windows were open towards the dock? *A.* That is Mr. Squire's statement. I don't remember it.

Q. When you came near the basin, did n't the odors from the basin and the odors of those soap-boiling places mingle there in one common smell? I never was up there when those establishments were rendering; but I know that this odor that is complained of there is entirely separate and distinct from the odor that comes from the basin.

Q. Do you remember a dam being put up in the summer of 1871 at Bridge Street? *A.* I recollect there was a dam there, but I don't remember the exact date.

Q. Don't you recollect that it occasioned a very great increase of the nuisance? *A.* I know that the odor has increased every year, from 1871 till now.

Q. Did n't you connect a certain increase of trouble with the making of this dam, in 1871? *A.* I have n't attributed it to that.

Q. After about three weeks it was taken away. Was any opinion expressed against it? *A.* Public opinion was that it increased the nuisance. It was also thought so by the city authorities.

Q. Suppose that the gases that blackened the houses on the 31st of July came from Mr. Squire's establishment, how would you account for the fact that the buildings directly opposite his establishment, on Gore Street, were unharmed? *A.* Because they were protected by the establishment.

Q. The atmosphere was heavy and the gases descending? *A.* That is very true; but the gases are warded off by high buildings or deflected by them. There is one instance on Otis Street where the air struck a high building and was deflected backward and blackened a lower house beside it.

Q. Suppose sulphuretted hydrogen to come from the basin, his buildings would protect those houses opposite from its influence? *A.* Just the same.

Q. Don't you think that what irritated your throat was sulphuretted hydrogen? *A.* If sulphide of ammonium were present in very large quantities it would have an irritating effect. I don't know that sulphuretted hydrogen irritates the mucous membrane. I cannot be considered an expert upon those questions.

Q. If it were sulphide of ammonium, would you not be surprised to find it present in sufficient quantity to irritate the mucous membrane? It is very improbable that this gas is generated on this whole territory, so as to be present in the atmosphere in sufficient quantity to produce this irritating influence? *A.* It would be improbable.

Q. Then it comes from sulphuretted hydrogen, or the possible presence of acroleine? *A.* The gas which I produced was formed at a lower temperature than acroleine is formed. But I conceived the idea that impure animal matter would produce it at a lower temperature than pure matter. Whatever it was, it was some irritating organic gas.

Q. There are two possible causes left, — the hydrogen, and the gas which you got, which you are not prepared exactly to classify? *A.* That is it exactly.

Q. (*by the Chairman*). Do you mean to say that there are no other gases than those which you have mentioned? Can you put in chemical form the various products that would come from pure or impure animal matter? *A.* No, sir; I think it would be impossible for any man to do that.

Q. Well, you thought it was possible that it might be acroleine from the fact that impure matter had been rendered? *A.* I got the gas, and it affected me as acroleine has before affected me.

Q. (*by Mr. Muzzey*). Mr. Munroe, you listened to the testimony of Dr. Jackson before the Cambridge Board of Health. I won't go into the details, but will ask you whether he did n't acquit Mr. Squire's establishment of producing anything injurious to the health of the people of the community? *A.* As the result of his direct testimony he did; but in his cross-examination he did n't prove so conclusively that Mr. Squire was guiltless.

Q. Did n't he say that his tests did n't result in finding sulphuretted hydrogen as coming from Mr. Squire's? *A.* He stated so.

Q. What did he say about ammonia? *A.* He said he found no sulphide of ammonium in the gas coming from Miller's River basin.

Q. What did he say about the rendering establishment? *A.* I don't think I recollect Dr. Jackson's testimony well enough to speak of it. I took no notes.

Q. You speak of the ventilators. Do you think it would be better to use them than to make the windows answer the purpose? *A.* I think it would.

Mr. Muzzey (*to the Board*). Now, our position is just this: we see that the houses are blackened; we know that people suffer from nausea; we know there is some sore throat; we know that all these things exist, and we are striving to find the cause. This gentleman has made investigations and produced results, and we think he has n't got the secret of it. We have our theory and shall present it. We are doing the best we can upon scientific methods. We contend that it is sulphide of hydrogen from the dock, and this will be fully explained in the testimony of Professor Horsford. We believe that sulphide of hydrogen is there in sufficient quantities to produce these results.

Witness resumed testimony.

Re-direct Examination.

Q. (*by Mr. McIntire*). One word in regard to these ventilators. I suppose that to have them there is better for the convenience of the workmen? *A.* A ventilator is always more convenient for the people inside than for those outside.

Q. There is a certain amount of stench in the gut-room that must be taken care of. Did you see anything done to dissipate it? *A.* Nothing but the disinfectants they have upon the floor, — that is to say, the odor of chloride of lime can easily be distinguished.

Q. In that gut-room the process is to take the intestines and clean them into a barrel. Is there any odor from that? *A.* There is a very disgusting odor.

Q. Do you know what is done with the matter in those barrels? *A.* No, sir.

Q. You were asked something in regard to Dr. Jackson's testimony. Do you remember that he stated that there was sulphide of ammonium in the water or mud of the basin? *A.* Yes, sir.

Q. Do you remember that in his cross-examination Dr. Jackson said that if there had been any animal matter in the mud of the basin there would necessarily be ammonia, and did n't he state that there was no animal matter in the mud? *A.* I understood him to say that if there was animal matter decomposed in the mud, sulphide of ammonium would be formed.

Q. And that he said there was no animal matter found? *A.* He stated so.

Q. In regard to the hog-pens. You say there were windows open? *A.* I am certain that one was, because we looked across to see the improvements that were going on.

Q. Now, in regard to the improved machinery, if it was made, and the sewer completed, and this condensed water should run off, and the sewer filled, as it must be, by these several gases, would not people who live along that sewer be affected by those gases in the houses? *A.* I have made an investigation of this in Cincinnati, where hogs have been slaughtered; and where the slaughtering-houses are connected directly with the sewer, the result has been that people were obliged to trap the sewer in order to prevent smelling the gases which frequently rise from the sewer. Even when the sewer is connected with deep water, unless extreme precaution is taken, the smell will come from the sewer.

Q. Now, on the bare supposition that this condensed water should flow through the sewer, would not those gases arising from that water affect the inhabitants along the line of the sewer whose drains entered it? *A.* I should think it would be preferable not to have the drains empty into the sewer for that reason. It would be dangerous.

Q. The question was asked whether the hogs there are not kept cleaner than they usually are in pens. Should you say that the hogs are cleaner or dirtier than the hogs in an ordinary pen? I mean hogs which are generally carried many miles over a railroad, can they be cleaner than hogs in an ordinary pen? *A.* As I saw them in the pen they were surrounded with the ordinary material in a pen. I have never examined a hog, individually, to see how clean it is.

Q. The question is, Whether they would be as clean bodily as hogs kept in a pen.

Mr. Muzzey. Do you wish to put in the fact that a hog never drops anything in the cars while travelling? That is a fact.

Mr. McIntire. That may be a fact, but it is not in evidence.

The Chairman. Is that so?

Mr. Muzzey. There is no water, even, dropped in the cars, during the passage.

Mr. McIntire. I only know we can see that the cars are very dirty.

Q. If hogs are crowded together in a car in hot weather, with, say, eighty hogs to a car, would they be dirtier than hogs in an ordinary pen? *A.* I know nothing from my own knowledge, but I should expect that they would be dirtier.

Q. Does n't the scent of ammonia rise from the hog? *A.* I never made any investigation of that.

Q. Have you ever been down to look at the jail sewer in East Cambridge, and noticed any discolorations there? *A.* Have n't been there for at least six months, or more. When I was there I never noticed any discolorations on the buildings near the sewer emptying near the jail. The building of Pettingill and Sawyer is not very far from there, I believe, but I have not seen any discolorations upon it.

Q. I don't know whether you answered the question in regard to your opinion whether an establishment of this magnitude, and conducting this kind of a business, where they have to keep and slaughter live hogs, — can it be rendered so that it will not be inconvenient to citizens living near or passing by? *A.* I answered that I thought it could not be conducted so that it will be free from offence. My experience covers almost as many

years as Mr. Squire has been there, and I take into consideration all the new appliances that might be used.

Q. There is one thing that you answered in reply to a question in regard to hogs. I don't know that I understand you. I want to ask you the question again. Do you think that two hogs in one pen smell as badly as two hogs in two pens? that is, do you think it is as great an inconvenience to people to have two hogs in one pen or with one in each of two pens, — if people are affected by the smell at all? *A.* A hog is always surrounded by this material of which I speak, and with two pens to receive it separately the smell might be less perceptible and inconvenient. I thought it would be better, if there were several thousand hogs, to separate them, and put them in different localities, than to have them all in one pen. I meant it would be better for the comfort of the people to have one hog remain in East Cambridge, and the others distributed in different parts of the United States.

Q. Mr. Muzzey meant in other places in that locality. Would it be better to have them in one locality? *A.* My opinion is, that as the slaughtering-houses are situated at present, to have them separated — one portion at Squire's and another at North's — would be more objectionable than to have them stored in one place.

Re-cross-Examination.

Q. (*by Mr. Muzzey*). If you are ten feet away from what is called the gut-room, you can't point it out by the smell, can you? — there is no odor perceptible? *A.* The place is closed, and I have never been on the opposite side where the window is.

Q. Have you ever detected anything worse than the smell of a close privy? It is a little room, is n't it? *A.* Yes, I should think it might be half as wide as this room, and as long.

Q. Did you ever detect the location of that gut-room by the sense of smell, when you were ten feet away from it? *A.* No, from the fact that when I have approached it it has been closed.

Q. You never, by the organ of smell, would have known it was there when you were ten feet away from it? *A.* It is surrounded by the hog-pens. I never knew by the organ of smell where it was located till I approached within ten feet of it.

Q. Now, as to the gases that might be discharged from the sewer. Take the little, insignificant amount of gas which might escape, and compare it with the gases from the water-closets and the sinks which are found there every day. If you make a proper connection with the sewer by putting a proper trap in, what amount of gas do you think would escape? *A.* I can't say what amount there is. I know there are several large tanks, and their contents are emptied.

Q. Could n't you obtain from any privy in town a stronger action than by this liberating of the gases? *A.* I never tested one.

Q. What do you think of it? *A.* My idea is that the gases coming through would be saturated with the sulphide of ammonium. If I had the sulphide and tried it with this paper, it would be jet black without having passed through the condenser. If it is condensed, we get even a stronger solution.

Q. My point of inquiry is this: Would these gases — supposing the sewer filled with the gases that get into it in that way — not be avoided

by a trap like that by which we avoid the escape of all gases into houses? *A.* I said the danger would be very much lessened.

Q. Take Cincinnati, where they pour blood into the sewer, — have n't the people there secured their houses from invasion of the gases by using traps? *A.* I understood that parties there have complained of them a great deal. Where a trap is in perfect order it may work all right, but there is the liability of its getting out of order.

Q. Were the traps put in in consequence of complaints? *A.* I have a letter here from a gentleman in Cincinnati —

Mr. McIntire. We will file the letter in this case, perhaps.

Mr. Muzzey. We will look at it first. I don't know that we should object, but the witness is undergoing cross-examination, and it is not a proper time to file such a document.

Q. (*by Mr. Muzzey*). If you could have a slaughtering-house established where you think one should be, — take Mr. Squire's, for instance, — you would wish it fixed upon a spot not less than a mile from where there is a dwelling-house? *A.* I can say that if an establishment is carried on in the way you describe, with all the appliances for getting rid of the vapors from the rendering and scalding tanks, and carrying away the refuse material and for the utilization of the soup, so that the odors which would remain would be a general greasy odor and the odors of the hog, those odors would not contribute to the comfort of the people who live about there, and they are objectionable on the score of health, but I don't say that they injure the health decidedly. If men desired to live there to get employment in carrying on the business, I don't know that there is any reason why they should n't. Chemistry can't tell which of the odors are more dangerous to health.

Q. (*by Mr. McIntire*). Am I right in supposing that you would n't allow a slaughtering-house to be situated within half a mile of anybody not interested in having it carried on? *A.* That is my desire.

Q. (*by Mr. Webster, a member of the Board*). You spoke in your direct testimony yesterday of having gone up the river near and under the works of Mr. Squire, — you are familiar with the character and general body of the river, — is there any considerable body of water floating there? *A.* There is no stream connected with the river that I know of. It has only one small brook. The flow of water into it is the flow of the tide, the tendency of which is to float matter up stream and down stream.

Q. You estimated the quantity of matter discharged from the establishment. Did you estimate the power of the stream to carry off this matter? *A.* No, sir; I have no idea of what it is.

Q. What is your opinion? *A.* I really could n't make an estimate.

Q. I want to know if there has been any accumulation of matter in the river? *A.* I have noticed that an accumulation has been going on. We used to catch minnows in the stream; they disappeared; then we caught eels, and now there are no eels there. Awhile ago I noticed the workmen driving piles and sticks down into the North Basin. I saw that they drove down to the depth of two feet, and when they drew it up they had just struck solid ground. It was all black.

Q. You have discriminated between the odors of the dock and the basin smell. The animal matter carried into the river must be diffused into the basin, — must not a part of the dock smell come from the animal matter so deposited? *A.* I think it must come from the animal matter.

Q. The pieces of hair and bristles which were taken up floating in the water, — were they or not in a greater degree of accumulation? *A.* The water is rarely seen covered in the way that it was that morning. These must have accumulated within a few hours that morning.

Q. I suppose that the gases from which the dock smell rises must come either from the mud or through the water. *A.* Water will give it off to some extent. They must be more diffused and less concentrated in the air than in the water, and that would account for the more violent action.

Q. Was this spoke that you exhibited found in the mud? *A.* This spoke is an exhibition of what has been done by the gases on wagons. This was in a shed, exposed only to the air. It is proper to say that this was exposed for several years, and this blackening is quite intense. Houses have been blackened more intensely than this by the gases in a single night.

Q. (*by Mr. Muzzey*). What was the extent that you saw covered with these bristles? *A.* As I was passing up the river, — I took the boat at Fifth Street, — I don't think I met any of these until we got near the building. They were not very numerous under the building. Then we rowed back up stream, very near to the hog-pens, and found them very thick about there. They were out in the flowing water, beyond the piles. The area was at least a hundred feet in diameter.

Q. There was nothing to fix certainly the suspicion that these bristles came from Mr. Squire's establishment? *A.* I had examined the system of strainers that they used at North's and Boynton's, and the pieces of bristle and skin that I showed you could n't have got through those strainers. The tide was coming down, bringing everything to us.

Q. (*by Mr. Frothingham, a member of the Board*). I think you stated that the most offensive odor that is carried by the winds from these establishments is that generated by the rendering process, creating nausea and sickness. Have you ever made an estimate of the extent of the territory the people of which are thus affected by nausea and sickness consequent upon this odor? *A.* The extent of territory varies. I know that the whole of East Cambridge is affected at times, and the side of the hill facing these establishments is affected quite often. But the people on the side of the hill away from them are affected but rarely. I have known, on some occasions, that this odor has extended as far as Charlestown. And in Somerville, some distance beyond the point I have pointed out, I know of parties on Franklin Street and on Prospect Hill who have complained of it. Parties in Boston have also complained of it at times. But I have n't examined persons and made careful investigations into the area over which it extends.

Q. (*by Mr. Muzzey*). Do I understand you to say that this odor, which created the nausea, has been observed in Charlestown? *A.* I have never been to the extreme limit of it myself, and I only know of it from hearsay. In Somerville I have never smelt the rendering odor, but I have smelt the odor from the hogs when alive.

Testimony of Stephen P. Sharples.

To Mr. McIntire. I am an analytical and consulting chemist and State Assayer, at 114 State Street, Boston. I reside at Old Cambridge, and am one of the committee of citizens in this matter. As such I have visited

the establishment of J. P. Squire & Co. at various times. I have been in the habit of going into Boston on the Fitchburg Railroad for two years at least, and have been very much annoyed by the odors, as the cars always stop opposite the establishment, on the other side of the basin, at the "Know-Nothing" Crossing, at the Grand Junction Railroad. As I distinguished them there, they were mainly the dock smell, but occasionally there was the live-hog smell. The rendering smell is distinguishable at times up as far as the Prospect Street Station and down below the Lowell Railroad Bridge. Prospect Street Station is just above the basin. The dock smell has been the worst from the upper basin, — called Boynton's Basin. The rendering smell is experienced just as we pass the Grand Junction Railway, and continues from there down to just behind what is known as the Pickle Factory. That large building will shut off the smell. We get these smells very often. We never pass there when the tide is up without getting the dock smell. It is very much complained of on the trains, and passengers are very much annoyed by it. We don't get the other smells so often. Could not say how often we get the hog smell; I don't always notice it, but I have often taken pains to look out for it. As a member of the committee I went to visit Mr. Squire's establishment and looked over it. I have been over the building at various times with members of the committee. We were given every facility by Mr. Squire. I don't know exactly the date of the first visit we made, as a committee, but I think it was about the middle of August. We found the building, on that visit, in comparatively good order in all parts. But on approaching the building we noticed the rendering smell from trying out fresh lard. This odor became more intense as we approached the building, and was most intense in the rendering-room. There were four or five open tanks where they were rendering lard, and in some of them was fresh leaf-lard; in another, scrap; and one was devoted to the rendering of lard from the intestines. They were all in open kettles, and all simmering. In an adjoining room there were several large iron close tanks, one of which had just been discharged — I think at that visit — into a large tank situated directly under these tanks. The residuum was being discharged. These rendering-tanks are made nearly in a cigar shape; the lower end is tapering and the upper end is nearly flat. In the upper end are apertures for the introduction of steam and apertures through which the materials are introduced. These tanks are closed up perfectly tight, and then the steam is applied and they are thoroughly heated, — I believe generally from six to ten hours, according to circumstances. The steam is about fifty pounds' pressure. The effect of this is the thorough disintegration of all the flesh and bone, — the bone being more like chalk. The first effect of the water is to extract the gelatine from the bone, and being subjected to the pressure for a long time its power of gelatinizing is destroyed, and we have it in the form of a soup which will not gelatinize with tannin. It is thoroughly disorganized. It is far more liable to putrefy than glue produced directly with less pressure and less heat.

Q. Did I understand you to say that the whole contents produced soup? *A.* No, sir. The way of removing melted lard varies in different establishments. It may be pumped directly from the tank, or the whole contents let fall into a large tank below and then the grease skimmed off. But the after effect is the same. After the grease is removed there is left

a large amount of this soup and a great deal of fine scrap, which is a mixture of disintegrated bone and fibre of the meat and from the fat. The soup is strained off through iron strainers and allowed to run into the stream. It runs off clear, but a great deal is apt to be dark colored. That soup, as it is generally run off, contains from eight to ten per cent of this disorganized gelatine. I think water is generally put into the tank. Some heat them with steam conducted around the outside; some by forcing hot steam into the mass, — in that case a considerable amount of the steam condenses and goes to the formation of the soup. But I have been told that it is n't necessary to add water to that. In this establishment the steam is introduced into the heat. The soup will not be clarified, but you can dispose of it in other ways. There are one or two patents for disposing of it. One is by a Mr. Wilson of Providence, who makes it into manure; but it must be done in the establishment where the manure is produced. When the soup is transported, — that is, in hot weather, — in the course of five hours it will decompose so as to burst any barrel in which it may be placed. From the tank-room we passed, on that day, into the slaughtering-houses.

Q. (*by Mr. Derby*). What proportion of the contents of the tank runs off in this liquid shape? *A.* I could n't give you the proportions, but from inquiries made, I think it is about a quart and a half for each hog killed; that is a very low estimate, I think. I alluded to the close tanks. I gathered that from a general inquiry into the methods of rendering at this and other establishments. On my own judgment I should state that there was more than that, — not less than two quarts, — that is, when steam is introduced. The parts of the hog that go into the close tanks are the bones, chine, parts of the head and feet, and trimmings. From the rendering-room we went into the slaughter-house, where operations were going on quite actively, and we got the odors from the scalding-tub, — which are rather offensive, — and the odors when the animals are opened. The gases that escape from the interior of a hog are always more or less offensive. That odor is very distinct about the middle of the slaughter-house. We then passed on into the hog-houses where the live hogs are kept. These had been recently covered with charcoal. In the pens where there were no hogs charcoal had apparently been put. The hog odor was quite distinct in the whole building. From there we came back and inspected the apparatus which was in use for blowing off the tanks. We made inquiries in regard to that apparatus when we first went into the building, and were told that it would be put in use and we could see how it worked. This was on the 13th of August. We then came back and went into the cellar under the lard-room, where the apparatus for condensing is situated. This apparatus is one patented by a man named Turner, of Chicago, about last May, and consists of a large iron coil made an inch and a half or two inches in diameter, passing in around the tank. This coil is kept continually surrounded by cold water, the effect of which is to condense all the steam from the tanks. It is claimed that three or four tanks can be blown off into this coil at once and that the water will condense all the steam from them. The gases rising from this tank are then passed through a purifier by which most of the sulphuretted hydrogen is removed and the sulphide of ammonium is removed; but it would not remove certain other compound gases. After passing through this condenser they are passed over a fiery furnace, where the

benzine takes fire. At our request some of the gases which had been passed through the condenser, but not through the purifier, was blown off into the air. We smelt it, but had no very good means of testing for sulphide of hydrogen and ammonium, although they showed some signs of blackening on a card. The smell of these gases from the rendering-tank is a very peculiar one. It resembles the odor of mercaptan. A person who has smelt it once will always recognize it. One smell is sufficient. I speak of the gases from the closed tanks. This was not blowing out usually, but was let out on this occasion for our benefit. It goes under the fires when the apparatus is in good order, and is consumed. I should judge that the hundred-thousandth part of a grain would diffuse so that you could n't stay near it; an extremely small amount would make this room intolerable. I recognized the smell, because I experimented on mercaptan several years ago and became familiar with the smell. I see no reason why it should not be destroyed by passing through the fire. We tried these gases on a silver dollar furnished by Mr. Squire, but failed to get any reaction on it, as they were not in sufficient quantity. We then went through the pork-packing rooms and found them in good order. I should judge there was no offensive odor arising from them. The smell of meat is offensive to a great many persons, and we had to endure it there; but I don't think any smell escaped from that building. On the 18th of September, in company with several other members of the committee, I visited a number of these establishments. After visiting two or three of them, we came to Squire's establishment, entering through the door which opens on the Grand Junction Railway, and passed on through the place where the hogs are carried. I visited it this time to satisfy myself on a single point. We found the rendering smell strong as usual in the lower room; and on the bridge, between the old slaughter-house and the main building, there was a very disagreeable odor resembling putrid animal matter. Where it came from, I don't know. It was on the bridge between the slaughter-house and the main building. My object was to see if in the rendering of lard there was any amount of sulphuretted hydrogen given out. For that purpose I went into the room in which are the heads of these upright tanks. I opened the cock of one of the tanks and allowed it to blow upon some paper. The paper was saturated with acetate of lead. That was the effect of it (*producing paper*). It shows that if that was blown into the open air it would blacken the lead on anything that it came into contact with. Sulphuretted hydrogen was given off, and it was not from dead-hog matter. I noticed a smell while I was on the bridge. I do not know that there is any water flowing under the bridge. The smell resembled that of putrid animal matter. I may say here that I have observed that smell at that point several times. I don't think it was the tank smell. It was a strong smell at that time.

Adjourned.

FOURTH DAY.

December 4, 1873.

Mr. Derby renewed the protest of the respondents against any proceedings being had except before the full Board.

TESTIMONY OF S. P. SHARPLES.

Q. (*by Mr. McIntire*). You said, I believe, yesterday, that the smell on the bridge was not the tank smell? *A.* I did. The smell resembled more the dock smell. It was between the end of the slaughter-house and the rendering-works. There is a bridge across the roadway there. The smell was that of putrid animal matter, and I should judge it was from the dock. This was on September 17th. I have since observed that smell at the same place on September 24th, and again yesterday, December 3d.

Q. (*by a member of the Board*). Is this bridge in the establishment? *A.* It is over the roadway. It is in the enclosure, and is over a private driveway between the houses. It connects the slaughter-house and the rendering-house. It is in the open air. At the time of this visit I went into the head-room, where the tanks are filled. It is warm and close there; the windows were open, and the smell was not very offensive. This was on September 17, — the same day I was talking about yesterday. Every time I have been into the works and crossed that bridge, I have noticed that smell. I have been in the place six or eight times. I think this smell I perceived on the bridge is the dock smell. It is a bad smell from decaying matter, — worse than the dock smell in the city, and is such a dock smell as is found along the shores of these basins. On September 24 the committee held a meeting at the house of Mr. Hastings, and during that meeting they perceived the odor of hog, the sewer, and the bad odors generally that they have down there. After the meeting was over, some of us concluded to trace the smell out. This was the same meeting that Mr. Munroe testified in regard to. It was every smell that you could put together. This was about eleven o'clock at night. There was very little wind that evening, but what there was was blowing from Hastings's house towards Squire's, — a very gentle breeze, hardly perceptible. I don't recollect whether or not it was clear, but I think it was very damp. I noticed the direction of the wind particularly, because I was surprised to get the smell at that time. We passed on down towards Squire's, and the smell kept getting stronger and stronger, but changing its character somewhat and becoming more distinct. We observed the smell of rendering fresh lard, or what they call fresh lard. At that time there was none of the tank smell mingled with it. The tank smell is an entirely distinct smell. I am not familiar with the locality, and I did n't particularly observe which way we went.

Q. (*by Mr. McIntire*). Mr. Hastings's house is at the corner of Fourth and Otis Streets. Don't you remember that we went down through Third and Fourth Streets, and that we stood at the corner of Fourth and Cam-

bridge Streets? *A.* I think we stopped and talked awhile, but I would n't be positive about the locality, for I am not acquainted with the locality. I only know that we were continually approaching the works as we went down Gore Street. When we went into the works the smell was stronger than it was immediately outside, where it was sufficiently strong to be recognized. I think it was a little stronger from fifty to one hundred feet away than it was just outside of the building. We went in at the office door on Gore Street in front, and about the middle of the building. It opened into the room next to the rendering-room. In the large rendering-room one steam-kettle containing scrap-lard and one containing gut-lard were in full blast. I believe there were two in operation that night. I wish to make a correction here in regard to the number of kettles. I stated yesterday that there were five kettles in that room. There are nine, — three large oblong ones being in the middle of the room, and three on each side. These two that were in operation that night were the large ones. I should judge they were five feet by ten, perhaps a little larger or smaller. As it has been denied that gut-lard would give off sulphuretted hydrogen when being rendered, I took occasion to test it at that time. I found that there was a continual emission of sulphide of ammonia. (*Exhibited papers of different discolorations.*) That one was exposed about one minute. No chemist would have any difficulty in recognizing that color. It is a faint discoloration. That piece was over scrap-lard at the same time. I think it is probable, from all that I can judge, that it is sulphide of ammonia. We then went up into the head-room, where the heads of the closed tanks are. There the odor was the most vile that I ever got into. The heads of the tanks are on one floor, and they open on the lower floor. The reason of that odor, as I think, was that the steam was ascending directly from these open kettles, and, it cooling somewhat before it got up there, it had time to develop its full aroma. I think this bad smell came from the open tanks below. The closed tanks did not appear to be leaking at the time.

Q. (*by a member of the Board*). Is it your opinion that this smell grows worse after it becomes cool? *A.* After it becomes cool it is decidedly worse. All the windows were open, and this stench was passing directly out into the atmosphere. We then left the building and went into the slaughter-house. The odors from the hogs being opened and from the scalding-tanks were quite strong. The odor from the hog is as disagreeable to me as any other. They generally work all night there, stopping about six o'clock in the morning. They kill hogs all night. We then went into the yard, in a little quadrangle between the engine-house and slaughter-house.

Q. (*by a member of the Board*). Is this the odor that you say was perceptible at Hastings's house? *A.* The odor at Hastings's house was hardly open to description; it was a little of everything. The odors are pretty hard to separate when they are together.

Q. (*by Mr. Derby*). Did it differ from what you experienced below? *A.* At the works you can separate and recognize them at the time. When they are mingled it is difficult to separate them. Sometimes you will get only one, and may recognize it without trouble.

Q. (*by Mr. McIntire*). Is n't there sometimes a prevailing odor? *A.* Sometimes there is; but that evening we could n't distinguish any particular odor, except, as we approached the works, the rendering odor

became more distinct, and finally became the predominant odor. We stood in the quadrangle between the engine-house and slaughter-house some four or five minutes while a lantern was being procured that we might go under the building. At that point we got the full benefit of the odors in the place. We had the smell from the rendering-tank and the opening of the hogs and the scalding-tub, and a little of the dock smell besides, — something like what we got up to Hastings's, but very much stronger and more concentrated. I never before smelt it as bad as it was that night. When the light was brought we tested the gas from the condenser and found that it smelt as usual, — being that mercaptan smell. As the Board may not be familiar with that smell, I have some here which I have prepared (*producing small vial*).

Dr. Derby (*of the Board*). I would n't open that now; if you do it will make the room intolerable. Wait until the close of the hearing.

Q. (*by Mr. Derby*). That did not come from Mr. Squire's. You prepared it? *A.* I prepared it myself. When we got to the apparatus that was just turned on, it was let out from the condenser, in order that we might get the smell. This article is manufactured to give the exact smell. The smell from the rendering-tanks was not in the air that night. We did n't get the mercaptan smell until we opened the pipe. This was a different smell from that we experienced in the quadrangle. This smell at that time made me very sick, and I did n't stay any longer than was necessary.

Q. (*by Mr. Derby*). In comparing the smells you found them different outside? *A.* Yes, sir.

Q. (*by a member of the Board*). Did I understand you to say that some of the smell gets out into the street? *A.* I did n't perceive it in the street that night. The close-tank smell is one of the most vile odors that was ever let loose. I recognized all the smells outside that night except the close-tank smell. The close tank was opened for our benefit, and then we got it.

Q. How often does it escape into the atmosphere? *A.* I don't know how often they are opened.

Q. Did you ever observe it in the open atmosphere? *A.* I have. I have never been in the works since the 24th of September till yesterday morning. I then went there and passed through to see the new slaughtering-place, which had been entirely changed since I was there before. I went in there, but had not time to make a full examination; but, in passing through the yard on the opposite side of the slaughtering-house, on the former visit, I got that close-tank smell unmistakably. Yesterday morning was rather damp and foggy. I was in the yard on the opposite side of the slaughtering-house from which we stood that evening. That smell was n't noticeable but very little in the street, but a little kettle-smell was noticeable in the street. This smell I got yesterday was the mercaptan smell. I went through there first and thought there was none of the smell in the place; but, as I was going away, I got this smell. It came from that establishment, I know, because I had just come from Mr. North's, and there was n't any there. If there was any wind it was from Gore Street, over the building. I experienced it only a few seconds while I was there. I passed through and beyond and did n't

stop to examine it, for I was in a hurry coming into town, as I was late. In the afternoon, yesterday, I went again to the works, in order to fully examine the new slaughtering-place. I found that the slaughtering arrangements had been entirely changed from what they were when I was there before. They are now up stairs, and the capacity has been doubled. They have put in two scraping-benches and two sticking-apparatus, so that two gangs of men can work at the same time. There were none of the tanks or kettles running, so that there was no odor of rendering at that time except the stale rendering odor, which is always about the place. Again this morning, coming to town on the Fitchburg Railroad, after we had passed North's building, there was a very strong smell just after passing the Grand Junction Railroad. The wind was blowing strongly from Squire's place, and the smell of fresh lard rendering was quite strong, — that is, the ordinary smell that comes from those kettles. There has been some question as to the gases which fresh meats give off while they are being cooked. Our authorities are very scanty on the subject, but I have found one or two which will give a little information. In Watts's Dictionary of Chemistry, Vol. II. page 667, under the head of "Broth," he says: "When meat is boiled with water, sulphydrate of ammonium is evolved, together with odoriferous compounds, and an acid resembling acetic acid." The point I wish to bring out here is, that sulphydrate of ammonium is recognized as being evolved from fresh boiling meat, and that it is evolved in much greater quantities from meat that is slightly tainted. Pure fat has nothing of the kind in it, I suppose, but in the trimmings and everything of that kind there is more or less of meat or muscle; there is also considerable skin, which is notorious for its sulphur compounds. If the temperature is high when the animal is killed, decay may set in almost immediately. In the intestines it does set in almost immediately. It may be put down almost as a medical or chemical axiom, that almost as soon as life is out of the body decay commences.

Q. (*by Mr. McIntire*). Take it where the hog is killed or trampled to death in the cars, how long should you state it would be before it would be extremely offensive? *A.* I should judge it would n't be more than ten or twelve hours. It might be a shorter time. In case the hog is killed amid great excitement and the blood is left in the body, decay will commence very soon.

Q. (*by Mr. Derby*). You are one of the citizens' committee? *A.* I have acted with the committee, though I have n't been to all the meetings.

Q. (*by Mr. McIntire*). Is there anything else which you wish to add? *A.* The only thing I wish to say is in regard to the report of Professor Thompson to the Joint Commission of the Harbor Commissioners and the Board of Health. He ascribes the scents in Miller's River to the blood in the matter. I think he is mistaken. I think it is as much from the soup; for as much, if not more, soup runs in there, and more of that sulphide comes from soup than from blood. Blood is continually running in there from Squire's and all the other establishments, notwithstanding the care they take, — all the washings of the houses, and the drippings from the hogs where they are hung to cool, go into the sewer, and contain a considerable amount of blood. The only difference between Squire's new and old system is that now the soup is conducted into the gutters which open into the drain. Formerly it went through the floor. The sewer is the river. The soup is emptied into the same place and

will go into the drain. I have had occasion several times to analyze this soup, and found that it contains from six to ten per cent of solid matter. It has lost its power of gelatinizing, and they don't clarify it. It is strained, but not clarified. The solid matter cannot be all taken out by any process now known. It can be purified and dried and made into an inferior quality of glue, and the matter separated from it can be easily dried. The soup cannot be dried, as it gums up the apparatus. I believe they have had a full experience with that at the Abattoir.

Q. (*by Mr. McIntire*). Mr. Munroe made a comparison between common sewage and this matter which runs into the scalding-tank, and some question was made whether he took a fair test of sewage to make a comparison with. Have you seen the table of the State Board of Health Report, 1873, p. 65, and if so, state whether you think it is a fair test to make? *A.* I should think it is an entirely fair test to make, except for one thing, — that sewage taken there is not such as very largely runs into the ordinary sewers, because it has more salt water in it than sewage generally. He took a case extremely favorable to the establishment. I would like to make a little comparison here myself. This sewage from Broad Street contains albuminoid ammonia $\frac{34}{100}$ of one part in a hundred thousand. The soup that we examined averages about one per cent of albuminoid ammonia, which must be all albuminoid ammonia, — that is, albuminoids capable of yielding ammonia. While the worst sewage in this table contains $\frac{85}{100}$ of one part of albuminoid ammonia, this soup contains a thousand parts. There is little difference in the strength, — that would make that soup more than a thousand times as bad to run into a drain as ordinary sewage is.

Q. (*by Mr. Derby*). That is to say, a thousand times more ammonia? *A.* A thousand times more ammonia.

Q. (*by a member of the Board*). Did you speak of the water or the mud? *A.* I spoke of the worst sewage in this table as compared with the soup. The soup which has putrefied on the flats has a peculiar odor entirely distinct from the odor of ordinary sewage, — it has a kind of cooked smell, if I may be allowed to use the term. There is undoubtedly sulphuretted hydrogen in it.

Q. (*by Mr. McIntire*). What do you think would be the effect of these gases on the sewer? Would they be dangerous? *A.* When the sewer is backed up by the tide it would be kept filled with this matter from the slaughter-houses, the mouth of the sewer would be sealed up tight, and the gases from it would be apt to pass into the houses, and would affect everything along the line. The trap would not totally prevent it. The gases must have some vent when the tide backs up, else they will burst the sewer. If the sewer was perfectly tight, the tide backing up would cause the gases to keep continually generating and expanding, and the tide backing up would tend to force the gases out. It is a different problem from that of a sewer running into an ordinary river.

Q. (*by Mr. McIntire*). Do you understand the process of purifying the scalding water carried on there? *A.* I do.

Q. Tell us, if you please, about how the matter is precipitated into the bottom of the scalding-tank, and how they used to pour it off before? *A.* As I understand it, they stirred it all up and run it into the river. I don't know how much they stirred it up. I asked several persons, who said there never was much of anything left in the tank. This process

depends mainly on the coagulating power of blood. It might be supposed that in bleeding hogs into the tanks, this blood would precipitate the matter in the tank; but if you will think a moment you will see that this blood is immediately coagulated as it falls into the tank. The scalding temperature is 140°. The blood forms a considerable part of this sediment. If they are in a hurry to purify the tank, they cool it down by putting in a quantity of ice. The serum is then run in. A small quantity of charcoal is previously sprinkled over the top of the tank, then the serum of the blood is run in, about one half to three fourths of a barrel. The tank is gradually raised to a boiling heat, and the serum, being thoroughly mixed through the tank, entangles the solid matter in it, and it all rises to the surface. It is then skimmed off. It will then average from two to three barrels. I am speaking merely of the method of purifying that tank. It is generally purified after a thousand hogs are killed. Some purify once or twice a day, some oftener. This process is now in use at Boynton's, North's, and Squire's.

Q. Do you understand that this method removes all the insoluble organic matter from the water? *A.* I think it does.

Q. How many barrels have they used? *A.* From one to three.

Q. What is done with this matter? *A.* At North's it goes into the drier, and at Boynton's it goes into the drier. What is done with it at Squire's I don't know.

Mr. Muzzey. It is sent away to the manure-heap.

Member of the Board. There is from a half to three quarters of a barrel of blood put in. Is that contracted by the scalding process, so that it would measure out less than it measures in? *A.* The coagulum is only eight or ten per cent. I speak now of the coagulated matter in the serum.

Q. (*by Mr. Derby*). What per cent of water is there in the serum? *A.* I think it is between eighty and ninety per cent of water.

Mr. Derby (*to the Board*). Gentlemen will understand that eighty per cent of this is water.

Witness. The blood is defibrinated in the usual way. It is stirred until it is defibrinated. If the scalding-tank is alkaline, they add a little acid.

Q. (*by Mr. McIntire*). Have you seen the samples taken by Mr. Munroe from the scalding-tub, and if you have, state whether you think they are fair samples? *A.* I should judge so from the color, but I should not judge they were fair samples of what is run off into the basins, because they were taken before it was settled; in other words, it would give now a far more favorable sample.

Cross-Examination.

Q. (*by Mr. Derby*). If the water is taken out, and the soup used three or four times over, is n't the water materially diminished? If the soup is purified three or four times, would n't the water be much less? *A.* I think you are mistaken in regard to what you call the soup. I don't understand what you mean by purifying soup. Is n't it the scalding water that you speak of? [*Mr. Derby.* It is.] If the scalding water is treated by this process, it would not be much worse than the ordinary sewage.

Q. I wish to know if the water is used three or four times, whether the nuisance is diminished? *A.* It is. I regard this process as a very great improvement.

Q. You know of no process by which the soup can be clarified? *A.* I do not. I should be very glad to find out some such process.

Q. When you met at Mr. Hastings's house on the 24th of September, you went down to the works? *A.* Yes, sir.

Q. As I understand you, you walked some distance down the street. Was the wind going with you? *A.* It was.

Q. And you perceived a very strong smell at the house from which you started? *A.* We perceived a pretty strong smell.

Q. Describe it? *A.* It would be very difficult to describe it. The smell seemed to be a compound of various things.

Q. Like sulphide of hydrogen? *A.* It was more like the rendering smell, in which sulphide of hydrogen is not distinguishable.

Q. As you walked down street did the smell grow stronger? *A.* It grew stronger as we got nearer the works.

Q. You were no very great distance from the works? *A.* Yes, sir.

Q. As you approached the works, on the outside you found very little smell? *A.* Very little. I think we got some of the rendering.

Q. As you passed along in front of the building, the smell gradually diminished? *A.* That I have usually found to be the case.

Q. As you passed into the building the smell you distinguished was that of rendering? *A.* It was.

Q. Was it the same as that you perceived to-day? *A.* It is the ordinary smell of rendering lard.

Q. A little sickening, is it? *A.* It is very sickening. I should think it very disgusting if I had to live there all the time.

Q. Is n't it like the smell of boiling beef or cabbage? *A.* It is a more vile smell, — not like boiling beef or cabbage.

Q. As you walked on into the quadrangle you were out in the open air? *A.* Yes, sir.

Q. The air would find some admission from the basin? *A.* Yes, sir.

Q. Might there not be some admission of air through the windows into the yard? *A.* There might be.

Q. Might not the dock smell come in there? *A.* I distinctly perceived it.

Q. Is it not possible that the aggregate of smells in the building was increased by the dock smell? *A.* I don't deny that it might have been increased. It is increased according to your location.

Q. Is the dock smell more perceptible in the moist atmosphere? *A.* I think it is.

Q. When a storm is approaching, is n't it the case that the dock smell is more apparent? *A.* I have never observed the state of the barometer.

Q. Will not the excrements carried down in a sewer furnish sulphur? *A.* They do.

Q. This is due to the excrements and not to the blood? *A.* Yes. It can be distinctly seen in the docks here in Boston. There are vessels painted white which are badly blackened.

Q. Is there not a considerable amount of animal matter carried off into these sewers? *A.* I don't know. I can't speak for the families of others. It is not in mine.

Q. You have observed that families, on account of carelessness of housemaids, find it necessary to have a strainer in the sink? *A.* I have

noticed that many times in Cambridge they have cesspools in which this water goes.

Q. Is there not a great deal of matter turned into the sewer from distilleries ; for instance, is n't the discharge from Sortwell's distillery equal to 50,000 gallons a day ? *A.* I should judge there was a very large amount run down from it.

Q. Is there a very large amount drained into the sewer and the Miller's River basin from Cambridge ? *A.* I should judge there was a very large amount drained into the basin.

Q. Do you know the extent of the water-shed there ? *A.* Nothing but from the report of the members of the Commission. The worst sewage drained into the basin is, I should judge, from the bleachery in East Cambridge. That would tend to set free the sulphide of hydrogen.

Q. Is not the effect of that collision to tend to generate sulphide of hydrogen and ammonium ? *A.* It is. I have made experiments, and was astonished at the effect.

Q. It was tremendous, was n't it ? *A.* I expected a very strong reaction at once, whereas I got a very slight reaction.

Q. Have you the results of that experiment ? *A.* That paper was held over it some time. I held that over the mud for about a minute. By strongly stirring it I could get a very strong reaction.

Q. You are familiar with Robert A. Smith's work on Disinfectants ? *A.* I should judge it is as good authority as any. Some of his statements have been disputed and others are admitted.

Q. I will call your attention to the 92d page of it : —

"I remember going with Mr. Ellerman to try his fluid, which was at that time chloride of iron only. It was poured on some very disagreeable substances in a town's yard in Manchester ; but at the moment the disinfectant touched them, the smell became overpowering. Mr. Ellerman was much disconcerted. The secret is, that strong acid substances must not be used. Sulphite of soda turns out well until this sulphurous acid begins to decompose. A similar thing occurs with all sulphates and sulphites, as well as McDougall's powder."

Witness. I think he is perfectly correct. Any sulphide or sulphate coming in contact with decomposing animal matter is in its turn decomposed. Sulphides coming into contact with any acid, sulphydric acid is set free.

Q. You were very much surprised at the results of that investigation ? *A.* I was surprised, because I thought that most of the smell came from the basin.

Q. Will you explain how it is that on one side of the quadrangle there should be so strong a smell, and on the front side, on Gore Street, there should be no smell at all ? *A.* It is owing to various things. It may be that the windows are not open. The windows in the head-room do not open on to Gore Street. The head-room of which I speak occupies only half the width of the building.

Q. Will you state whether or not a greater amount of these gases might have come from the basin and been blown through the passages into the yard, and been mainly warded off by the building ? *A.* I think not. Gases will diffuse against the wind. They will not be blown against the wind, and will not work as fast against the wind as with the wind ; but they will diffuse in every direction. This diffusing faculty is

entirely independent of the wind. Diffusion may take place in spite of the wind.

Q. When you walked along Gore Street, you perceived a very strong smell, and when along the front of the building, you perceived little or no smell? *A.* I said it was considerably diminished in front of the building. I said it was very weak just at the door. The door at the back of the building was closed. It would be protected from the basin also.

Q. But when you came into the yard where there was access from the basin and building, you found the smell that you perceived before? *A.* Yes, sir.

Q. You perceived it at Mr. Hastings's house, and under the shelter of the building you did n't; and when under the quadrangle you perceived it again? *A.* Yes, sir.

Q. Do you know whether there is not a great deal of manganese in Miller's River? *A.* I don't know.

Q. I think manganese is mostly imported? *A.* Do you not mean chloride of lime? [*Mr. Derby.* Yes, sir.] Chlorine is made by treating black oxide of manganese with hydrochloric acid; this is passed over quicklime, which is so converted into chloride of lime.

Q. What would be the effect of chloride of lime getting into contact with sulphuretted compounds? *A.* It immediately destroys the smell. It makes one of the most thorough and complete disinfectants.

Q. If chloride of manganese was run off strongly acid, it might have a different effect than if you ran off chloride of lime? *A.* Yes, but they don't calculate to run off chloride of lime.

Q. Which would be the most expensive? *A.* Chlorine would be the most expensive in this country; but I do not know which is used most. The process of bleaching is to decompose a solution of chloride of lime with sulphuric acid.

Q. Where is it that you reside? *A.* On Shepard Street, a short distance below Porter's Station. This is about 7,600 feet from Squire's factory.

Q. Have you observed this odor at your house? *A.* At one time particularly, last summer, I observed that smell at that place. It was the same hog smell. I spoke of it next morning, and observed it again about six o'clock in the evening. I think I have also recognized the rendering smell there. The dock smell I have got several times.

Q. I understood that you smelt the dock smell at Boynton's? *A.* It is very offensive, and we get it at any of those places. I have noticed the dock smell at Squire's less than the others.

Q. Did you notice whether you got any of these odors on the 31st of July at your house? *A.* I noticed nothing on that day. It is only under particularly favorable conditions of the wind that I get the smell at my house.

Q. Have you ever noticed any smell from Charles River? *A.* Not from the river, but I have from the gas-house, which is almost directly south from Porter's Station, on Charles River.

Q. What direction is the Brighton Abattoir from your house? *A.* It is, I think, almost directly south.

Q. Have you perceived any smell from the Abattoir? *A.* Never perceived that smell at my house.

Q. Do you know anything of the soup made there? *A.* Yes, sir.

Q. What is done with the soup there? *A.* It used to be run into the river. I have been told by one of the directors that it is barrelled up and sent away. When I last saw it it was run into the river. I have spoken against the practice at that place several times.

Q. How lately have you noticed it? *A.* I have n't been there for a month and a half or two months. It was then being run into the river.

Q. Have n't you heard complaints in Cambridge of the smells from the Abattoir? *A.* I have heard complaints of smells that they said were from the Abattoir; I examined into them and found that people could n't distinguish whether they came from the Abattoir or from the bone-boiling establishment of George Upton.

Q. Where is Upton's establishment? *A.* It is at the end of the Brighton Bridge, just above Riverside.

Q. Did you trace these smells distinctly to the bone-boiling establishment? *A.* I only mention this because we could n't establish it as being from the Abattoir; I was led to suspect this from the fact that a friend told me he was down there and they were not using the condenser, but were giving out bad odors.

Q. Have you visited any of the bone-boiling establishments in Somerville? *A.* I have visited four establishments in Somerville and found them very dirty. There is one in Cambridge, — Reardon's, — which is just on the line.

Q. Have you seen any putrid meat and grease there, and does n't it contribute to the bad odor in the air? *A.* I think it does.

Q. Would n't a small amount of putrid meats contribute very largely to the bad odors in the atmosphere? *A.* I should think they might.

Q. The gases which they evolve go directly into the atmosphere? *A.* At Reardon's the gases evolved go into the atmosphere. Lately he has made an unsuccessful attempt to burn them.

Q. Are you familiar with O'Neil's business? *A.* He was trying to make arrangements to burn the gases, but the city government would not allow him to do so, and he is now going on with his old business and making a nuisance.

Q. How is it with Barry's establishment? *A.* It is as dirty a place as I ever was in. It is just back of Lincoln & Chamberlain's. He does not slaughter, but tries out matter, some of which must be putrid.

Q. Do you know any places in Boston for trying out grease? *A.* None except Ward & Co., whose particular business is to take off the dead horses and collect the bones from the markets.

Q. Is n't the boiling of bones very largely done? *A.* I think we could find none who would acknowledge boiling out more than once a week, except Reardon.

Q. If their materials are taken out there and remain a week before boiling, would n't it add very much to the badness of the atmosphere? *A.* The scraps putrefy very rapidly, and if it had been kept in the city several weeks it would be worse.

Q. Would not the proportion of gases be greatly in excess of those from fresh lard? *A.* It would be.

Q. In what proportion? *A.* I can't give the exact proportion. There is considerable difference. I should call it a large one.

Q. You spoke of animals dying in the city and being carried to Ward's establishment; do you know the number? *A.* Only so far as

has been stated before this Board. It has been stated here that upwards of two thousand horses a year have died from natural and unnatural causes. Some are killed and some die from disease.

Q. Were you aware of the fact that in the city of London there are 1680 slaughter-houses in the thick part of the city? *A.* I am not aware of that fact, but I am aware of the fact that there is great complaint of the slaughter-houses in London.

Mr. Derby (to the Board). We have a Report of the Board of Public Works of London to that effect, which we received by the steamer "Marathon," and will file it in the case at the proper time.

Q. (by Mr. Derby). Do you find any alcohol in the soup? *A.* I do not, but from investigations of other chemists it has been rendered slightly probable that there is a slight amount in the flesh. There is acetic acid, which is an analogous, being formed by the oxidation of alcohol.

Q. Did you find any of this matter by analysis that contained more than three per cent of solid matter? *A.* I never found any less than seven per cent. I have n't seen any that contained as little as three per cent.

Q. State whether in the great cities — London, for instance — you did not find that the sewers are not protected by traps, and that such articles as this soup are permitted to go through them, and if they are not thus protected? *A.* I suppose they are. The houses are protected by charcoal filters, but I know there has been a great deal of complaint from the backing up of the tide and other causes. You can't pick up a scientific journal from London without there is something in it about the pollution of the river.

Q. You have exhibited some of the papers that have been tried; suppose you tried the experiment in your kitchen, would n't you get some discoloration? *A.* I should think, from what I have read at this investigation, that it might. Fresh meat will give off sulphides of ammonium and hydrogen.

Q. Take roast beef, for instance? *A.* I should suppose that sulphide of ammonium would be given off from roast beef, because the meat is partially boiled. It is steamed inside, not roasted, which is about the same as being boiled.

Q. (by a member of the Board). How much solid matter did you estimate was in the soup? *A.* There are 3,600 pints a day, or 450 gallons, the weight of which is 10 pounds the gallon, and, ten per cent being solid, would make the solid matter 450 pounds.

Q. (by a member of the Board). How much matter did you say there was from each hog? *A.* The only estimate I made was that there were three pints from each animal slaughtered. The soup weighs nearly ten pounds to the gallon, and is from eight to ten per cent solid matter.

Q. (by Dr. Derby). Did you state in your direct examination in regard to the quantity of soup to each hog? *A.* I did, and gave it at about three pints to each hog.

Q. You spoke of the gluey portion; can it be separated by any chemical process? *A.* I have made a great many experiments, but so far they are almost all complete failures. The glue can be manufactured into a very good article if not allowed to decompose.

Q. If it could be severed by chemical experiments, it can be made a valuable article of commerce? *A.* I think it can.

Q. (*by Dr. Derby*). You don't agree with the testimony of Mr. Munroe? You think his estimate a little large? What is your estimate of the amount of solid matter? *A.* About 450 pounds per day, or 2,700 pounds per week of six days. I think that estimate is very low for this establishment.

Q. (*by Mr. Webster*). What would be the effect of the manner in which this is poured out, — whether it would be in a position to undergo an organic change and diffuse itself in the atmosphere more decidedly than if it was poured out more in a mass? *A.* In Smith on Disinfectants, which has been referred to, he says that the amount of water has a large influence in inducing decay. I had always thought it was the opposite.

Q. (*by Mr. Derby*). Organic matter when greatly diluted is more prone to decay than when concentrated. If I understand you, this soup has a greater specific gravity than water. In that case would not the soup go to the bottom? *A.* Yes, sir. It would go to the bottom and be exposed on the flats. I have seen soup there upon the flats that I could recognize. It is very rarely thoroughly skimmed, and you can see the grease floating upon it.

Q. (*by Mr. Derby*). Don't the chemical books inform us that water is an important agent in disinfecting substances of this kind? *A.* They do to some extent, but you will find also that they say that water tends to induce decay in many cases. In Smith on Disinfectants you will find: —

"Water, as a principal agent in disinfection, was highly appreciated by the ancients, and the most violent exertions of these late years have only put us on a level with the provincial towns of the Roman Empire."

Then he goes on to say: —

"The fine observer on the Mediterranean had connected the departure of disease with the warm and cheering influence of the sun, although it was always observed that the warmth and moisture of the south-wind tended to corruption, which was reversed by the invigorating north-wind."

Mr. Derby. I have done with your witness.

Mr. Sharples subsequently asked leave to make a statement as follows: The question was asked me by one of the members of the Board as to what was the influence produced by diluting this soup. I recalled at the time that there was something in Smith on the subject, which I have since found. It is on page 123 of Smith on Disinfectants, published in 1869. It is as follows: —

"Although, therefore, water is a wonderful agent of purification, it is also an agent for the contrary, because it causes a very rapid effervescing decomposition of organic matter, and, if in enormous quantities, it sends out impure, as well as pure, gases into the atmosphere. It is for that reason, apparently, that stagnant pools are always dreaded; and for the same reason the engineers of the Board of Health long ago determined to remove the water of the water-closets out of town as quickly as possible, in order to prevent decomposition," etc.

Q. Is it not stated that it is only when the water becomes thoroughly saturated with these gases that it gives them out?

Witness. The same authority also says: —

"It seems impossible to produce absolute purity of surface in most gases. When it is saturated, however, it begins to give off vapors into the atmosphere, and as water may be said to be equal to a porous body having an unlimited surface, its activity is great. It absorbs oxygen rapidly, helps it to oxidize organic matter, sends forth carbonic acid, and along with it many vapors, into the atmosphere, and intensifies the operation to such an extent that bodies which would have lain in the mass for years undecomposed are, when mixed with air in a moving stream, completely rendered invisible in a few days."

Q. But it must be first saturated. Would it not take some time to saturate the whole tide that flows into the basin, some fifteen million tons of water? *A.* It takes but very little of some of these compounds to saturate water and produce an offensive smell.

Q. (*by the Committee*). Do you give any distinct effect of light on the nauseous vapors that float through the air? The rendering smell, for instance; it has been testified here by all that this smell is worse in the night, and yet the work goes on through the day. *A.* I think I could give a very good reason why the smell is worse in the night. The general habit is to fill these tanks about six o'clock in the evening. Then the rendering goes on continuously through the night. In the morning they commence to empty them. Sometimes they work night and day; but generally you will find the tanks empty during the day.

Q. (*by Mr. Muzzey*). If the tanks are emptied in the morning, would not that be the time for the most intense smell? *A.* No, sir. It is most intense about eleven o'clock, when the tanks get thoroughly heated and then blow off, which they do in some cases. I have known the tight tanks to have very loose safety-valves.

Q. But you have not noticed it about the open kettles at Mr. Squire's? *A.* I have heard of it.

Mr. Derby. That is not evidence.

Q. (*by Mr. Muzzey*). Are you aware that they have taken the stop-cocks off? *A.* I know they have taken them off; so there is nothing to blow off.

Mr. Muzzey. They were removed for that reason.

Q. Well, is it your impression that this rendering odor would not now exist? *A.* I found that smell yesterday — that from the rendering-tanks — from the close tanks. It is entirely distinct.

Q. (*by a member of the Board*). What would be your impression, taking the present methods of doing this business, as to this smell which is found at a distance? Would that now exist? *A.* I should not think it would now exist if the water from the Turner apparatus were discharged into tide-water, where it would be diluted immediately with a large body of water.

Q. Do you know how often the water is discharged from this Turner apparatus? *A.* I should suppose it was constantly flowing. The water is very offensive. I have had occasion to manufacture a similar article myself in trying some experiments; and I find that if it is diluted with ten times its volume of pure water, the mixture is very offensive.

Q. Did you ever happen to know of one of the close tanks being blown off into the atmosphere? *A.* No, sir.

Q. Don't you know that they are not? *A.* No, sir.

Q. What are the contents of these tanks? *A.* I cannot estimate.

Q. How much waste matter would one of them produce in a day? How many gallons? A. I cannot say.

TESTIMONY OF DR. SAMUEL L. ABBOT.

Q. (*by Mr. McIntire*). You are a practising physician in Boston? A. Yes, sir. I reside at 90 Mount Vernon Street. I have practised since 1841, and have had my office there about twenty years.

Q. I would ask you whether at your house on Mount Vernon Street you have distinguished any of those odors that have been testified to by the witnesses here, if you have heard them testify, or any odors, the past season? A. Yes, sir; within the past two seasons of 1872 and 1873.

Q. Did you distinguish the nature of these odors? A. The odors which I distinguished seemed to me to come from the cooking of putrid meat. That is as near as I can describe it. They were not always equally offensive. Sometimes they were excessively nauseous, and always very disagreeable.

Q. Do you know anything concerning how these odors have affected individuals, your patients, family, or yourself? A. The way in which it has affected my family has been to wake them up summer nights, and prevent sleep till the windows were shut.

Q. It has had the same effect upon yourself? A. Yes, sir. It would wake me frequently; almost always after midnight, between that and daylight.

Q. (*by the Chairman*). Will you describe the effect upon yourself? A. I would like the opportunity of giving a history of it. I will say that in the summer of 1872 I first began to experience this odor, and as I have already said, the bad smell almost always came after midnight. As I sleep *on the south side of my house*, I used to go to the front of the house when the windows were open, to see if the scent came from that direction, and always found that it came from the *northwesterly direction or northerly*. I soon came to the conclusion that East Cambridge was the source of this bad smell, and made up my mind that it was a smell produced by what is called the rendering process. But not knowing precisely the nature of what was going on there, I made inquiry and found that there was the rendering process carried on in those great establishments in East Cambridge. Night after night during the hot weather of the summer of 1872 my sleep was disturbed in that way. More than once, going to bed with the thermometer in my chamber at 80°, I have waked up and been obliged to close all the windows, front and back, because of this foul stench. It was impossible to sleep with the windows open. I have had the same experience the present season. It was not confined to myself; other members of the family have perceived the same odor. I think that on the first occasion this year I was woke up at about two o'clock in the morning, and was awake most of the time until nearly six. The smell was unquestionably, as far as one can judge of a smell, one of bad meat, more or less decomposed, which was undergoing some process analogous to cooking. This summer I have had occasion very frequently to drive over to East Cambridge on professional business, and I have passed the establishment of Mr. Squire I should certainly say forty times during the months of August and September, and I recognized, when I came near it, the same smell that had disturbed me at night, but not so

strong, nor was it generally so offensive. It was mixed with other odors in the vicinity, which I could separate, I think, distinctly from this one. When the tide was out, and the bed of the Miller's River basin was uncovered, of course that powerful stench was very noticeable that proceeds from that. But when the tide was up, and the mud was covered, I could distinguish the old smell without the admixture of the dock smell. Then again I would sometimes simply get the smell of hogs. It was not so prominent as the other odors, but it was quite strong. I am satisfied that the smell which I noticed in driving by Mr. Squire's establishment was the same in character as that which has disturbed me at night, and I took particular pains in driving by to notice the direction of the wind, to see if I was at the leeward of Mr. Squire's establishment. I found that when we had noticed it the wind was in the direction to bring any ill odor that might be about the establishment towards me. If the wind was in the other direction I did n't notice it. I am satisfied in my own mind that Mr. Squire's establishment is one of those, at any rate, that produced this odor. I don't pretend to say he is alone. Generally at Medford Street, as I drive toward Medford, I do not notice it particularly. I have heard complaints from my neighbors of these gases. I remember last year a gentleman who lives in Louisburg Square asked me if I had noticed a horrid smell the night before, and if I could imagine what it was. He said it smelled like cooking meat. I asked him if he had never noticed it before. He said he had not. I said that I had noticed it a great many times. I saw a gentleman who lives on Chestnut Street who told me he had frequently been obliged to shut his windows at night on account of the nauseating smell, which he described as very much like the cooking of offensive meat. In the latter part of the summer, one morning, I was passing a house at the foot of Mount Vernon Street, between Charles and Brimmer, where I had a patient whom I had been attending several days, and whom I had left the day before, well as I thought. As I passed the house he was sitting at an open window of the lower story. I asked him how he did, and his mother came and told me that he had been quite sick, vomiting. I asked what he had eaten, and his mother replied, "Nothing but the most simple food," and I was satisfied that nothing that he had eaten could have occasioned this nausea and vomiting. She then said that it was during the night that he vomited, and added that she was also affected in the same way. I then asked her if she were well when she retired, and she replied, "Yes." I could not discover any cause for the complaint, and she could not tell of any. Said I, "Did you smell anything bad in the night?" "O doctor," said she, "yes, an awful smell came into my windows. I don't know what it could have been." That was the night I had been waked up by this stench from East Cambridge.

Q. (*by Mr. Derby*). Did you have the date in your mind? *A.* I think I could determine it by looking at my book of charges for professional attendance at that house.

Q. If you have it we would like to have it. *A.* I am not sure that it was the very next day after I ceased my attendance to this house or the day after; but it was within a day or two. I had my own opinion as to the cause of this nausea. I know that the nuisance is an intolerable one.

The Chairman. Did you ask her in regard to the time when this nausea came on in the night? *A.* I don't remember that I did. I should say that generally this bad smell has come about midnight or after.

Q. (*by Mr. McIntire*). Did you satisfy yourself whether this nausea was the consequence of the smell by the time that it happened? *A.* No, sir, I did not. I think I could determine that, though. I did n't know I was to testify until this morning.

Q. (*by Dr. Derby*). Was this the same night you had experienced it at your own house? *A.* Yes, sir. I know that a delicate person would be more annoyed than I would be. I know ladies of my family were distressed with it. As I say, I have been obliged always, when woke up by this odor, to shut up the windows and keep them closed until morning. Then, again, I would say in passing, that I am one of the physicians of the Massachusetts General Hospital. The superintendent of the Hospital told me that he had to close the windows of the wards of the institution in the night to keep out the stench that came from East Cambridge. This particular smell he had noticed very badly. The superintendent I refer to resigned last year.

Q. (*by Mr. Muzzey*). You refer to Doctor Shaw? *A.* Yes, sir. I should say that once this summer I perceived it quite strong in the evening. I have often complained to a member of the Board of Health of this nuisance, and he says it is of no use unless I specify some individual as being responsible. On this occasion I noticed the smell in the evening, and I went down at nine o'clock on Cambridge Bridge and stood for some time, the tide being up so that the flats were covered. It was unmistakable that the smell came from East Cambridge. In driving over to East Cambridge I had no personal feeling against Mr. Squire.

Q. Which of the bridges did you stand upon? *A.* West Boston Bridge. I took particular pains to drive around the large establishment which I suspected to be Mr. Squire's as I saw his name on the door. I satisfied myself that this establishment produced a smell identical in character with the one which disturbed me that night, and that that establishment was the one that produced the trouble.

Q. You did n't go over to it that evening? *A.* No, sir. In driving over Cambridge Bridge during the day, I remember noticing a very intense odor from that direction when the tide was up and covered the flats. I don't know that I have any other facts to communicate except that I can refer to two other persons, one living on Mount Vernon Street and the other on Charles Street, who told me they had some trouble, and had to shut their windows repeatedly on account of this very bad odor. Most of the people in my neighborhood are away in the summer season, but I am in town most of the summer, so that at the time when this is most disagreeable and obnoxious the people who would be exposed are absent.

Q. (*by Mr. McIntire*). Do you remember the streets you passed in going to Medford? *A.* In going to Medford I follow the track of the Somerville Horse Railroad. It goes to the right of the basin, and I turn off at Medford Street.

Q. To the north of the basin? *A.* Yes, sir; the establishment is toward the south.

Q. Have you always been that way? *A.* Always, with the exception of this time when I went on the other side of the basin to see about this establishment.

Q. When you passed on the other side you distinguished that smell? *A.* It was not very noticeable that day; my object in going around in

that direction was for the purpose of determining the source of the smell that day, to determine whose establishment it was. I knew the direction from which it came, but I was not sure it was from Mr. Squire's.

Q. You say the tide has been up in these basins, and that you have smelled the odors at that time? *A.* Yes; but nothing like as strong as it is at night. I distinguish perfectly between the dock and the rendering smell.

Q. You think it was not the dock that furnished that smell? *A.* Yes, sir.

Q. Were there any other symptoms than the disagreeable feeling mentioned by other people? *A.* No, sir. People have said if it were allowed to go on they would be sick. It is almost as much of a nuisance as if you had a dead cat in the house.

Q. Does not the loss of sleep affect the physical system? *A.* Well, of course it affects the system very seriously, and if not prevented it would produce very serious depression of course.

Cross-Examination.

Q. (*by Mr. Derby*). How many times, sir, during the past summer, have you been disturbed in the night by this offensive odor? *A.* I don't know. Perhaps six or eight times.

Q. When you passed by Squire's establishment, you passed, as I understand, on the opposite side of the basin; a distance of five or six hundred feet from the establishment? *A.* I should think so.

Q. You passed along the shore of the basin? *A.* Yes, sir; where they are filling in.

Q. Did you notice any bone-boiling establishments, or any odor from them as you passed along? *A.* The whole neighborhood is so offensive that I did n't undertake to analyze all the ill odors in that vicinity. I was particularly anxious to determine the source from which this one smell that troubled me came. There is only one smell that I perceive on Mount Vernon Street, and that smell I invariably noticed, when I did notice it at all, in the manner that I have stated.

Q. Well, did n't you find, when the tide was up, that this rendering smell was very much milder or very much less, not so pungent, so acrid and disagreeable, as at low water? *A.* Yes, I have said that it affected me more in the night than in the day.

Q. Was it something like the simmering of meat over the fire? *A.* It was like the boiling of meat and cabbage in a house, only intensified and aggravated. It suggested to me the idea of boiling meat that was putrid. It was different at different times.

Q. It was an acrid smell in Boston, but over there it was a mild smell? *A.* Yes, but it was of the same character.

Q. So mild as not to be materially offensive? *A.* It was positively offensive. I would not like to live in such a smell.

Q. But it was very decidedly less than what you experienced in the night? *A.* Yes, sir. Decidedly less.

Q. Are you able to say, sir, that it came from that establishment? You are aware that there is another establishment within one hundred and fifty feet? *A.* I know there are others in the vicinity. I can only say I experienced it on the opposite side. I have spoken repeatedly to a member of the Board of Health on the subject, and always received the

reply that it was of no use to say anything unless I could give a specific complaint. I was very particular to notice the direction of the wind, and satisfied myself that I was directly in the line of Mr. Squire's establishment when I perceived this odor. I noticed at other times that when the wind was towards the establishment I did n't perceive it.

Q. Well, how often was the wind blowing from this establishment when you passed it? *A.* I cannot say, sir. It was quite frequently, more often than now.

Q. But you did taste a putrid smell, sir, while on the other side? Something that came from putrid meat? *A.* I did n't say that. I said it was a cooking smell, more or less offensive; but being so much milder in character, it had n't that intolerable smell that the night odor had.

Q. As I understand you, you state in your direct testimony that the smell you experienced on the northerly side was the same as would come from the boiling of putrid meat? *A.* I said it was similar to the smell which I perceived at night; but being so much milder, that particular element was not so noticeable.

Q. Was it at all perceptible, sir? *A.* I cannot be sure that I remember that the putrid element was marked. I don't think I can.

Q. Well, when was it in your direct testimony that you said you experienced the putrid smell? *A.* At my house; not always, but sometimes.

Q. Of the six or seven times, how many times? *A.* I cannot say. I should say that this summer I don't think I have had so much of the putrid smell as the other.

Q. Then I understand you experienced it six or seven times, this smell, and it was only a few of these times that you experienced the putrid or pungent smell? *A.* Yes; but at all times it was nauseous and disagreeable, and the degree of disagreeability was variable.

Q. Was it at all like the smells from offensive sewers? *A.* No, sir. It was entirely different.

Q. Was that mingled with it? *A.* No, sir.

Q. You thought it was an entirely different smell that you experienced? *A.* Yes, sir.

Q. How many times would you venture to say that you experienced this very bad smell this summer? *A.* I cannot say.

Q. Half the time? *A.* Well, I cannot say definitely. Perhaps half the time.

Q. Now, can you fix the night for these disagreeable smells? Can you recollect any one night? *A.* No, sir.

Q. Was it in July, August, or September? *A.* In August and September I perceived it the most. I probably can fix the day two or three times.

Q. Was it the 1st of August that you experienced one of them? *A.* I don't pretend to say.

Q. Will you have the kindness to bring us the dates as soon as you can? *A.* I will. I may be able to fix the day for two or three times.

Q. (*by a member of the Board*). You said that you had sometimes had the dock smell. You distinguished the putrid from the dock smell? *A.* Yes, sir, distinctly.

Q. (*by Mr. Derby*). Do you recollect that at the time there was a disturbance? In the newspapers there were notices of it? *A.* Yes, sir. I wrote the first article myself.

Q. Which of the journals did you favor, sir? *A.* I wrote my communication to the *Transcript.*

Q. That was the day after. The next day, I think, two other communications were sent in? *A.* Yes, sir. One was signed "Chestnut Street," and another was signed "Charlestown."

Q. Did you write any other article on that occasion? My impression is that I wrote an article for the *Daily Advertiser*, and took it there; but it was not printed for some reason or other.

Q. You can give the dates of these articles. Was it on the 31st of July? *A.* I think it was after that; but I don't distinctly remember.

Q. Let me ask you whether it had any effect upon your door-plate? *A.* No, sir. My door-plate is a glass one. I saw no blackening of any plates the morning afterward.

Q. How recently, sir, was the last smell you detected? *A.* Well, sir, since we have begun to shut up our windows at night on the north side of the house, I should say we had not noticed it for six or eight weeks. I wish to say, in explanation of the fact, that I perceived this odor on the leeward side of the house, where I sleep. The door from my chamber opens directly into a chamber on the other side; and therefore I have been in the habit of keeping the windows open upon the front side of the house, in order to have the air.

Q. Have you ever experienced any bad smells, sir, from Charles River flats and sewers? *A.* I think I have.

Q. How often? *A.* Not so often as these others. The wind was in a different direction, and the smell entirely different.

Q. But you have perceived it several times the past summer? *A.* Yes, sir. That was almost always connected with the time of the tide.

Q. When the flats are bare, or nearly bare, then on that side where the drains come in you perceive the smells? *A.* Sometimes, but not so often as this.

Q. I would ask whether any one has been made seriously sick, the cause of whose illness you could confidently ascribe to these smells? *A.* Not that I know of except those I have mentioned. I did n't prescribe professionally to them.

At the close of the hearing on Friday, December 6, Dr. Derby read the following communication: —

December 5, 1873.

GENTLEMEN OF THE STATE BOARD OF HEALTH: —

I find, on consulting my memoranda, that the first occasion on which I was seriously annoyed by the East Cambridge "rendering" smell during the present year was on the early morning of June 12. It was on that day I saw the lady and child whom I mentioned yesterday as having been effected with nausea and vomiting during the preceding night. I learn to-day from the lady in question that for three consecutive nights, namely, on the 9th, 10th, and 11th, she and her husband had been nauseated by the smells complained of, having been awakened by it. Not knowing the source of it, they had not closed their windows to escape it. Afterwards they avoided the sickness by shutting their windows, but with very great discomfort to themselves on account of the intense heat. The vomiting occurred while the house was filled by the smell, and I

have no doubt was caused by it. In my evidence I stated that in the morning in question I was kept awake from two until six A. M. I find from my memoranda that I should have said from two until four A. M., with restless sleep afterwards.

Very respectfully, your obedient servant, S. L. ABBOT.

90 MT. VERNON STREET.

P. S. I am unable to furnish any special dates of the occasions on which I suffered from the nuisance complained of, except that given above. S. L. A.

TESTIMONY OF MISS JENNIE ARMS.

Q. (*by Mr. McIntire*). Where do you reside? *A.* At Greenfield.

Q. Where are you at present? *A.* I am boarding with Mr. Slocumb, on Otis Street, between Fourth and Fifth.

Q. How long have you been there? *A.* Since the 30th of September.

Q. You attend school in Boston? *A.* Yes, sir.

Q. I will ask you whether you have distinguished or been affected by any odors while at Mr. Slocumb's house? *A.* I have.

Q. When? *A.* One night between the 20th and the 25th of October. I cannot tell what night.

Q. Will you please state the effect, and describe the odor? *A.* I distinctly remember the odor; it was the odor which arises from the rendering of lard, and it was almost insufferable. The room I occupied had an east window which was open, and opened into another room where there was a north window, and that was open. I don't know exactly what time of night it was, but I should think it was about two or half past.

Q. Was this odor strong? *A.* It was very strong indeed.

Q. How did it affect you? *A.* When I woke up I was sick, had nausea, and did n't sleep any more that night. In the morning I was quite sick.

Q. Did it make you vomit? *A.* Yes, sir.

Q. You had n't become acclimated to it? *A.* No, sir.

Q. Did it cause much vomiting during the night? *A.* I did n't vomit during the night, but in the morning.

Q. Before breakfast? *A.* Yes, sir.

Q. Have you been affected since that time? *A.* Not so much. I have not vomited since, nor have I been affected with nausea.

Q. Have you smelled any of these odors since that time? *A.* Yes, sir, I have smelled them, but not so strongly.

Q. How often? *A.* I remember one night when I smelled it quite strongly, and shut the window down.

Q. (*by the Chairman*). Were you able to go to school the same day? *A.* Yes, sir.

Q. (*by Dr. Derby*). Do you know where the bad odors came from that you perceived that night? *A.* No, sir, I do not.

Q. You had no means of knowing whence they came? *A.* I could judge by the smell.

Q. Where do you suppose it came from? *A.* From any place where hogs were killed and fats rendered.

Cross-Examination.

Q. (*by Mr. Derby*). Can you fix the date? *A.* No nearer than between the 20th and the 25th of October.

Q. Do you recollect what day of the week it was? *A.* No, sir.

Q. You went to school the next morning afterward? *A.* Yes, sir.

Q. It was not Saturday? *A.* No, sir.

Q. Nor Sunday? *A.* It was some one of the first four or five days of the week.

Q. Do you know which way the wind was? *A.* I did n't rise to see which way the wind was.

Q. You are unable to tell whether it was northwest, south, or west? Whether the wind blew in at your window? *A.* I could not tell.

Q. All you know is that you experienced the odor.

Q. (*by a member of the Board*). Was this open window on the north side of the house next to the Squire establishment? *A.* It was an east window in my room, and a north window in the adjoining room; both were open.

Q. Through which did the smell come in? *A.* I don't know whether it came from the east or north.

TESTIMONY OF JAMES HUNTER.

Q. (*by Mr. McIntire*). On what street in Cambridge do you live? *A.* On Winter Street, nine hundred feet from the rendering establishment.

Q. How long have you lived there? *A.* Sixteen years in the same house.

Q. Do you know anything of these odors? *A.* Yes, sir; a great deal about them.

Q. What odors do you distinguish? *A.* I smell the odor from the tanks and also the odor from the hogs.

Q. During the past season how many times have you smelled the tanks and hogs? *A.* In the latter part of July I smelled it very strongly. It was very warm, and I left my windows open on the southerly side, and the odors came in very strong. I woke up about two o'clock, and felt very sick in bed. Likewise my daughter up stairs. I felt very sick, vomited; had a very heavy discharge in other respects, and my daughter was affected in the same way.

Q. (*by the Chairman*). Did you have looseness of the bowels? *A.* Yes, sir.

Q. You vomited as soon as you awoke? *A.* Yes, sir; and my daughter was affected in the same way.

Q. How long did that attack last? *A.* About three hours.

Q. At any other time was your family affected? *A.* Yes, sir.

Q. That night what was the smell you distinguished? *A.* I think it was principally from the flats.

Q. Did you distinguish any other odor that night? *A.* I did n't that night, sir. In the latter part of August, one Saturday evening I was going along home about five o'clock, I distinguished a peculiar odor. The tide was up and the flats were bare, with the exception of the old channel, where there was a current running pretty strong. I perceived a small current under the piles, and it had the color of milk, and the surface was covered with scum. I supposed that was the origin of the

odor. That came from under Mr. Squire's, and I thought it was the emptying of the scalding-tanks.

Q. Has your family been affected by the rendering odor? *A.* Yes, sir. They have had sore throats, but I don't know as they have had anything else.

Q. How often? *A.* Three or four times, to my knowledge.

Q. Where you live is very near the basin, is it not? *A.* It is within one hundred and fifty feet of the basin.

Q. And when the wind is right you get the basin odor as strongly as anybody? The basin is between you and Mr. Squire? *A.* Yes, sir.

Q. Did you ever send your daughter into the country? *A.* Yes, sir; because of the effects of July last.

Q. Do you get the hog smell at your house? *A.* Yes, sir.

Q. How often? *A.* Very often, indeed. Almost every Sunday morning.

Q. Do you know from where you live whether the operatives are at work on Sunday or not? *A.* It has been the practice to work there Sundays.

Q. (*by the Chairman*). How do you know? *A.* I have heard them killing hogs, and have seen steam come from the boilers.

Q. You speak of the squealing of the hogs? Does that annoy you? *A.* Yes, sir; but not so much as it used to.

Q. Can you hear distinctly the squealing of the hogs when they are slaughtering? *A.* Yes, sir.

Q. What do you mean by not noticing it so much as you used to? *A.* I hear it as often, but not so loud.

Q. But every Sunday? *A.* Yes, sir.

Q. (*by the Chairman*). You were sick one night? Whether there was anything eaten in the family that should have caused it? Had you taken impure food or engaged in any business that would have caused sickness? *A.* No, sir; followed my usual habits.

Cross-Examination.

Q. (*by Mr. Muzzey*). You testified at the hearing at Cambridge a year ago? *A.* Yes, sir.

Q. Then, you remember, you attributed to the dock the worst smells you experienced? Do you still hold that opinion? *A.* Yes, sir. The dock has not been so bad since it has been filled as previously.

Q. You never had in your family any vomiting from the rendering smell, did you? You trace the effects to the dock smell? *A.* I attribute it to the dock and rendering smells together.

Q. The night your family were sick, did n't the smell come from the dock? *A.* I have no reason to say that it came through the open windows. My windows were open.

Q. And the wind came from a northeasterly direction, from the basin? Could not you tell by the wind coming into the windows from which direction it came? Where were your windows? On the front side of the house, facing the dock, were they not? *A.* Yes, sir.

Q. And the wind came through these windows? *A.* Yes, sir.

Q. Well, you spoke of seeing in the latter part of August a milky stream coming from under the Squire establishment? Would that come

from the rendering-tank? Would it be what is called soup? Was it like anything in these bottles? *A.* No, sir.

Mr. Munroe. I have understood that when it comes in contact with the air and water, the soup-liquor becomes milky.

Mr. Hunter. I think it was the same thing, like the settling in the bottom of the soup, or the white scrap at the bottom of the scalding-tank.

Testimony of Charles E. Meyer.

Q. (*by Mr. McIntire*). What is your occupation? *A.* I am an importer and manufacturer, — an importer of plate-glass, and a manufacturer of frames and mouldings.

Q. Where do you reside? *A.* On Third Street, opposite the Gore House.

Q. You are a member of the committee of citizens, are you? *A.* Yes, sir.

Q. Whether any of your family have been troubled at your house with these odors? *A.* My wife and my daughter, also the servant-girls in the house, have been troubled with it.

Q. Which of the smells? *A.* The rendering smell.

Q. How often during the past season? *A.* It has been very frequent, so that I have not deemed it necessary to take an account of it.

Q. How did it affect them? *A.* Sometimes it produced irritation of the throat, and very often, as far as my wife and daughter are concerned, it has made them almost vomit, so that they would rather have vomited than remained in the condition in which they were. And one of the servant-girls, I believe, has been affected once or twice in the same way in consequence of these odors.

Q. What part of the day do you get the smell from the rendering? *A.* As far as I have been able to observe, the smell commenced at six or seven o'clock in the evening, and lasted until about any time during the night. I could not tell how long or how far into the night, because we sleep always with closed windows, because it is unsafe to keep them open. We have kept them open formerly, but during the last two or three years it has been impossible to keep them open nights, because we might have these odors.

Q. Whether you have directly traced these smells to any source; and, if so, when, where, and under what circumstances? *A.* After having visited a number, or almost all the other establishments with Mr. Sharples, Mr. Magoun, and another gentleman, we went one evening about six o'clock into Mr. Squire's establishment from the Grand Junction Railroad, and there experienced that very nauseating and sickening odor which we are subjected to so often in East Cambridge, and which has been described by Mr. Sharples.

Q. Did you recognize it as what you got at your house? *A.* It was precisely the same odor I got at my house, which I have experienced at the corner of Newbury and Dartmouth Streets and Charles Street at twelve o'clock, and which I have experienced at almost all points of the compass in the vicinity of East Cambridge, and Charles Street, Boston. I visited at a house at Dartmouth and Newbury Streets in June last with my wife, and there was quite a numerous party. They closed the win-

dows there, and I recognized the smell as exactly the same. I experienced the same smell in going through Charles Street at twelve o'clock at night. I have recognized it numerous times in going over the bridge in the evening at any time. Also when going over West Boston Bridge I have there recognized it at night. The odor the evening Mr. Sharples, Mr. Magoun, and myself went into Mr. Squire's establishment was so excessively strong, and so positively the effect of putrid matter in the state of boiling or trying out, that Mr. Sharples and myself made it a point to search and learn whether they were blowing any of the tanks into the open water. There was some steam coming out of the side of the building through a small tube, but we had no means of reaching it with test-papers. Whether they were blowing off or not I cannot say. We both thought at the time that some blowing off must be done; if it had n't, the tanks could not have been closed so tightly without any of these noxious fumes escaping.

Q. Do you ever get the smell of hogs at your house? *A.* Very frequently. We get it especially in East Cambridge. You cannot leave East Cambridge by Cambridge Street without hearing the squealing of hogs being unloaded into Mr. Squire's pens, and getting the pungent, noisome odor of the excrement of the hogs. They are plainly perceptible on Sunday. We have noticed them in the afternoon as well as in the morning. The whole neighborhood has heard them and smelled the odor. We have even heard them as far as my house, which is two thousand feet from the slaughtering-house. So much has been said that I must speak of some of the testimony that has been adduced. Mr. Sharples has spoken of the time when one evening the committee was assembled at Mr. Hastings's house; the windows being open, we experienced a pretty strong smell coming into the room and filling it entirely. We immediately recognized the smell, and went into Mr. Squire's establishment. We came there, but were not so pleasantly received as in the day-time, when Mr. Squire is there himself. We went through the establishment as far as we could in the dark. They were killing, I believe, and the fumes of the hogs when they were opened and the gases from the scalding-tank were escaping. We went also to a place in which the coil is kept, described by Mr. Sharples as being the apparatus by which the gases are condensed. We had been there on a former visit, and found one of the vats in a condition that we opened it and tried the effect of what escaped. This time we found them closed, and the superintendent, who was with us, did n't allow us to open the pipe at that time. There was such an awful stench in the place that it made me so very sick that I had to leave in an instant. I could not stand there more than a minute at the longest. I then took my position in the middle of the yard, between the killing and the rendering rooms, and there we perceived the same smell that we perceived at Mr. Hastings's house. There was no dock smell at all that evening. As Mr. Sharples testified, the wind was against it; that is the way we perceived the smell. We all spoke of it that evening.

Q. (*by Mr. Derby*). The wind was against you; in what way? was it moving from the factory? *A.* The wind was with us, I should say; it was blowing toward the establishment. I have noticed we get the odors from the rendering establishment in the greatest degree when there is little air, — when it is hardly possible to say which way the wind is

blowing from. When the air is charged with moisture to a large degree so as to keep these gases, not allow them freely to separate, the odors are so strong that there is no escape from them in any way whatever. Even the closing of the windows will not prevent them from getting into the house.

Q. (*by the Commission*). When you first left the house you say the wind was blowing in the direction from Mr. Hastings's house to Mr. Squire's establishment? *A.* Yes, sir. And Mr. Sharples testified that the gases would work against the wind, and they plainly did it that evening.

Q. I would ask you whether you noticed that the outside of these open kettles were perfectly clean or not? *A.* They were in the condition which such apparatus is naturally expected to be in. They were neither clean nor dirty. I could say, for the appearance of the whole establishment, that it is conducted in as good a manner as it is possible for such an establishment to be conducted.

Q. Yes; but whether there was any grease on the outside of the kettles? *A.* Yes, sir. And some of it had been burned.

Q. Those kettles are not polished on the outside, I understand? They are of wrought-iron, I believe? *A.* There is a certain degree of brightness around the edge of them, but I have not looked at the side of them.

Q. Did you put your nose over the kettles at all? *A.* I did.

Q. Well, what kind of an odor arose? *A.* The same odor that we received at the house, or in whatever position we may be when they are rendering.

Q. Is that an agreeable odor? *A.* It is that of which we complain. It is noisome and disagreeable.

Q. Do you know of any one else who is affected by these odors? *A.* I have been told by Mr. Boardman —

Mr. Derby. That is not evidence.

Q (*by Mr. McIntire*). From your own knowledge? *A.* I can only speak with reference to my own house. I can corroborate the testimony of Mr. Sharples and the general testimony given here. I should add, that for the last three years these smells have increased in volume and intensity, and also in frequency; commensurate, I should say, with the proportions that the business has gradually assumed on the basin. Formerly, when the business was smaller, we did have these smells, but we had them less frequently, and less intense. Consequently, the people were more willing to put up with them. But since the business has assumed such vast proportions as it now has, — having doubled almost from year to year, — it is decidedly impossible for anybody to live there if he have habits of cleanliness, dress, and home. Not only that, but the people suffer physically from the effects of these gases and odors. To a larger extent they suffer also morally. I have been injured to a great extent by moving my family from there, which I was unable to do. I know there are many of my poor neighbors who cannot live here without being, in a moral point of view, greatly affected by dissatisfaction with their situation, because they are forced to stay in such a place under such circumstances. There is no family, I should say, that pretends to habits of cleanliness, that has not been more or less, in a physical and moral point of view, affected by these awful odors.

Q. (*by Mr. Newhall*). Within what radius, to your knowledge? *A.* There is not a family of my acquaintance in the whole place who don't substantially express the same opinion which I now express.

Cross-Examination.

Q. (*by Mr. Muzzey*). What was the date of your visit in the neighborhood of Dartmouth Street? *A.* It was in the latter part of June, sir. I cannot fix the date, but I should add, that the Friday afterwards we noticed exactly the same smell at home.

Q. Now you are quite certain that it was the same smell? *A.* I am positively sure about it.

Q. That was the opinion of your wife, also? *A.* Yes, sir; of my wife, sister, and brother-in-law, that were there.

Q. At whose house was this? *A.* At the house of my brother-in-law, Mr. Gustavus A. Jasper.

Q. On which corner was this house? *A.* On the left corner, near Boylston Street; the last house.

Q. You say you noticed the same odor on Charles Street, Boston? *A.* Yes, sir.

Q. When? *A.* If I am not mistaken, it was that very 31st of July that has been so much complained of. I have noticed it on Charles Street very frequently.

Q. You recognized it as the smell you have described as coming from Mr. Squire's? *A.* Yes, sir, positively. It was only less in degree.

Q. Well, it was not so intense at the house in the neighborhood of Dartmouth Street after you had closed the windows? *A.* It was so severe that it was disagreeable after that.

Q. How did it compare in intensity with what you experienced at your own house? *A.* Well, you can hardly compute that by considering the distance from my own house to Mr. Squire's establishment. If you will furnish me with the language I will give you the degree.

Q. Was it as bad on Newbury Street as at your house? *A.* No, sir; decidedly not.

Q. Was it half as bad? *A.* What is half with regard to a smell? I could not tell. It was so bad that we thought best to close the windows.

Q. How long did it continue? *A.* We closed the windows.

Q. When you left the house you found it outside? *A.* Yes, sir.

Q. How far along did you smell it? Until you got home? You started from a house that is nearly out to Boylston Street; was the wind in your face or against you that night? *A.* The wind was against us.

Q. As you were going home the wind was blowing in your face? *A.* I did n't perceive it exactly, because we were seated in the carriage.

Q. It was like the other occasion when you went to Mr. Hastings's house? *A.* No, sir. The wind was not against us at that time.

Q. At what time? *A.* This time the wind was blowing towards me. I noticed the wind come in my face, but I did not know the direction.

Q. Can you give the date any more correctly? *A.* I can only tell you that it was the latter part of June, and on the Friday succeeding we had again the same smell at my house.

Q. Did you fix it by any written invitation which you preserved? *A.* No, sir. I don't think I received a written invitation from my sister at that time.

Q. Can you give any other date? *A.* I think the Charlestown Street odor was on the 31st of July.

Q. Any other date? *A.* No, sir; because it was so frequent that we became so familiar with it that we did n't put down the dates.

Q. Well, do you agree with Mr. Sharples that the smell was worse at Mr. Hastings's house than at the establishment? *A.* Undoubtedly I do.

Q. You say you are annoyed by the smell from the hogs at your house? *A.* Not so often. Very seldom.

Q. At the time of the hearing at Cambridge, you did n't say you were annoyed with the smell of the hogs while alive? *A.* No, sir; nor do I now. But I have said that you cannot leave Cambridge by Cambridge Street without hearing the noise and smelling the stink.

Q. But at your house you are not annoyed? *A.* I cannot say that I am. My family is. I am sometimes suffering with catarrh, and do not notice it.

Adjourned to Friday, December 5.

FIFTH DAY.

Friday Morning, December 5.

Mr. Derby. We desire to renew our protest before proceeding.

The Chairman. We understand that that applies to every day and to all days.

TESTIMONY OF WILLIAM G. RUSSELL.

Q. (*by Mr. McIntire*). Where do you reside? *A.* At 18 West Cedar Street, corner of Mt. Vernon.

Q. What is your occupation? *A.* I am a lawyer.

Q. At your house in West Cedar Street, do you ever distinguish any odors when the wind is blowing in a northwesterly direction? *A.* When the wind is in a northwesterly direction, following the line of Charles Street or West Cedar Street, a little more to the west, we have at times experienced a peculiar odor.

Q. During the past season? *A.* I should say more especially summer before last, but at several times during the past summer. I have left town each year about the 1st of July.

Q. Can you describe this odor? *A.* My chief annoyance has been during the months of May and June, because I have not been there during the months of July, August, and September.

Q. Can you describe that odor, Mr. Russell? *A.* It is an odor which has been perceptible in the evening or during the night, and has been noticed by me only at intervals; sometimes, perhaps, for two or three evenings, and then, perhaps, I would not notice it again for a week or ten days. But when the wind was north this odor would come during the evening or during the night.

Q. Describe it. *A.* The odor is a close, steamy, greasy odor.

Q. Is it anything like the trying of fat, or the rendering of oil? *A.* I have never smelled the rendering of oil. I should say there was a de-

cidedly fatty, greasy, oily element in it. It gave me the impression of a close, smothered smell.

Q. How did it affect you? *A.* I would say that it was distinct from the smell we are more frequently favored with, coming from the flats of Charles River with a westerly wind when the tide is low. That is one that I think the residents of that section are very familiar with. This was an entirely distinct odor from that; so that, waking up in the night, I could tell whether the wind was north or west by the kind of odor that prevailed as well as by looking at the vane.

Q. Did that smell affect you? *A.* I cannot say that any member of my family was made sick by it.

Q. You never traced it? *A.* No, sir.

Cross-Examination.

Q. (*by Mr. Muzzey*). Have you perceived this smell excepting with a northerly wind? *A.* No, sir. I have frequently looked to see that the wind was north when I experienced it.

Q. You say it was less frequent last summer than before? *A.* Yes, sir.

Q. When first did you notice this odor? *A.* I should say summer before last, — we had it before that and noticed it less; we were not so well informed as to the source of it.

Q. You leave the city in July? *A.* Yes, sir, always.

Q. When do you return? *A.* The first of October. I don't sleep in the city more than three times during that time.

Q. Have you noticed that odor since your return the present autumn, sir? *A.* No, sir, I have not.

Q. How do you determine that it is only experienced on a north wind? *A.* I never go through the day without looking to see which way the wind is half a dozen times.

Q. Is there a weathercock near your residence? *A.* Charles Street Church has a vane upon it, and I notice that.

Testimony of Mr. Joseph Magoun.

Q. (*by Mr. McIntire*). You are a resident of East Cambridge? How long have you lived there? *A.* Forty-one years.

Q. What is your occupation? *A.* I am a machinist by trade. I was formerly master-machinist at the New England Glass Works.

Q. Now you are not employed? *A.* No, sir.

Q. You are a member of the committee? *A.* Yes, sir.

A. Will you please tell us, without going over the testimony that has been given before, if you can corroborate it? *A.* I would like to commence with my entrance at the Glass Works, and give you a history of what I know of Miller's River, and what I know about it at the present time.

Q. How long since you went into the Glass Works? *A.* Forty years. Mr. Muzzey asked some questions about the drainage of that basin, which I would like to say something about. At the time when I went to the Glass Works, forty years ago, the New England Crown Glass Works were in operation at what is now a part of Blanchard's Wharf. There was a sewer emptying into that dock at East Street. There were two blocks,

one known as the "Glass House Block" and the other belonged to the New England Flint Glass Company.

Q. That sewer was there when you first went there? *A.* Yes, sir. At that time the sewerage was taken care of in the same way as it is now taken care of in many similar districts. Pretty much all the filth was thrown into the gutters. There was a large grate which took most of the sewage from these buildings and ran it into the dock there. Our vessels laid in there to discharge, and I was frequently brought in contact with this sewer. It was a common sewer; there was nothing very objectionable about it, and it is about the same to-day. That is all I know about the sewage going into that part of the dock. There was a dock smell there. While living in that connection with the Glass House, I have always been of the opinion to keep the atmosphere as pure as God has given, and therefore, ten years ago, I advocated the building of the tall chimney.

The Chairman. Will you please speak only with reference to the subject before us?

Q. Well, beginning at that time, what was the state of the dock? *A.* It was a common salt dock, not differing from any other.

Q. No filth went into it? *A.* No, sir. There was a little from Mr. Winchester's.

Q. (*by a member of the Board*). We understand that. From time to time there have been systems by which the drainage of this establishment has gone into this dock, and from time to time it has become more or less corrupt. Now, if you will come down to a comparatively recent period, and state to us, so far as you can, with fair brevity, what the effect of this establishment, particularly, has been upon the dock and upon the atmosphere, I think we shall get to a proper understanding. *A.* Well, my testimony will be something like this.

Q. You agree with the members of the committee on what has been put in? *A.* Yes, sir, I do, with what they said generally.

Mr. Newhall. We don't expect you to follow the chemists in their testimony.

Q. (*by Mr. McIntire*). I will ask you within what period has this basin of Mr. Squire's become foul? *A.* I should think somewhere about seventeen or eighteen years since it became so foul that people did not care to bathe in it.

Q. Are you certain in regard to that? *A.* I should think it was about that time that it became so contaminated that people did not care to go in and bathe. It was n't as it is now.

Q. What do you think contaminated it then? *A.* There was a portion of this filth going in there from the time they commenced these works and the drainage increased.

Q. Suppose Mr. Squire did not start fifteen years ago? *A.* I don't mean to go beyond his concern. I did not wish to put it beyond the time when he commenced business there. Then there was a gulch that passed in by the Grand Junction Railroad. That was rather a filthy place, and always has been.

Q. Will you please tell us what you know, that the other members of the committee did not testify to? *A.* I have been familiar with the stream clear up to the bleachery. There were originally trout in the stream, between that old farm-house and where the tube-works are. I could n't tell at what time, but it was soon after the bleachery was started

that there was a time when a black substance came into that brook, and destroyed all the fish.

Q. (*by Mr. Derby*). That came from above, that black stuff that killed the fish? *A.* Yes, sir.

Q. I presume it was the tannery? *A.* Yes, sir.

Q. You live on Otis Street? *A.* Yes, sir.

Q. How far from Mr. Squire's establishment? *A.* Eighteen hundred or nineteen hundred feet.

Q. You distinguished these different odors? *A.* Yes, sir.

Q. Do you ever get them at your house? *A.* I do, frequently.

Q. Which one? The rendering smell, or what has been termed the dock smell? *A.* I don't consider it a proper dock smell. It is a combination of smells — I don't think any chemist could tell what it is — and the hog smell. I wish to distinguish the dock smell from the common salt-marsh dock smell.

Q. Do any of these smells affect you, or any member of your family? *A.* My folks have been woke up frequently.

Q. By which of these smells? *A.* That is a pretty hard question to answer. I should think by a combination of the whole.

Q. Could you never distinguish? *A.* Yes; but it comes so strong that there is a little of everything. I should judge that it was the hog, rendering, and dock smells, all combined.

Q. How did it affect you? *A.* It caused me to have a headache on the 31st of July, when we were at Mr. Squire's establishment to see the experiment of the closed tanks. I went from his works at eleven o'clock. I did not sleep a great deal. The house was full of something.

Q. Were you there with the Aldermen? *A.* Yes, sir.

Q. Did you see the method of doing away with these gases with the close tanks? *A.* Yes, sir.

Q. You are a practical machinist, are you? What do you think of the apparatus? *A.* I think it is not as good as the apparatus he previously used.

Q. How is that? *A.* If I understand right, he had close tanks that were only blown off when he had cooked his batch.

Mr. Derby. The distinction is between its being blown off occasionally or all at once?

Mr. McIntire. His former apparatus was a pipe carried into the water, and then it was blown off into the water. He had a tank underneath the water, which received it when it was not high tide. (*To witness.*) Do you think that was better? *A.* I think it was better to throw it all off at once.

Q. Did you watch the operation? *A.* Yes. I had the description of the machine by Mr. Kendall.

Q. Did you notice how it worked? Whether there was any escape of gas that night? *A.* It smelled very strong there. It was probably on account of constantly turning the valve in the conducting-pipe.

Q. You don't think, then, that it was with the apparatus simply? You think that it was on account of turning the gas on? *A.* The jet was about an inch in diameter by fourteen inches high. Mr. Turner, the inventor of the apparatus, was there.

Q. Do you know where this pipe led to that night, that carried off the condensed steam? *A.* It went under the fire, I understood. I did not go in to see.

Q. You did n't get any of that condensed water? *A.* I had no reason at all. The smell was what every one present must have smelled. Not understanding the thing, it was not properly managed. Of course it was new, and if Mr. Turner did not have the management of it, it would not work. There was gas enough to burn. There was some disarrangement about it. It did not work for some spell.

Q. Did they tell you what the tanks contained that night? *A.* I don't know that they did.

Q. Have you ever traced any of these several smells to Mr. Squire's establishment? *A.* Yes, sir.

Q. When? *A.* I could n't tell the day.

Q. Was it last summer? *A.* I think it was in June.

Q. Describe how you came to do it. *A.* I was at Mr. Hastings's house, and Mr. Slocumb, Mr. Hastings, and myself, having noticed the odor, followed it to the street, and went down Gore Street, and as we went down Gore Street we got out of the smell. Going from Mr. Hastings's house, we went down into Gore Street. We passed up Fourth Street until we came to Ellis's manufactory, and we began to smell it a little stronger before we got there.

Q. How far was that? *A.* Three or four hundred feet. We passed along up by Widow Searle's place, and it smelled very strongly there. At the corner of Gore and Sixth Streets, as we came in sight of the ventilators of the building, the steam was coming out of the building. It came out near the office, a strong rendering smell. It appeared to be rancid; but I could not say that, it would not be proper. The fat that comes from the inwards has a smell that I don't think anybody could detect from rancid fat, so to speak. It has a disagreeable smell. Which it was I cannot say.

Q. Did you go in? *A.* I believe I did.

Q. Did you smell anything inside? *A.* Well, we smelled what we naturally smell in hot water at that time. I asked some questions, and the Mayor, and they answered me.

Q. Have you ever been into those pens? *A.* Yes, sir, on the 31st. Mr. Squire invited me to see them after the other gentlemen had gone out. I don't know that anybody else was invited to stop. Mr. Sawin, I believe, was invited at the same time. I went into the pens, and some one there had scattered charcoal on the moist portions of the pens, where there was any objectionable smell. There were very few hogs there. He told me how long it would take to kill them off.

Q. Did you distinguish any scent? *A.* I did n't distinguish but very little. I had been there previously, and on one occasion I had smelt the chloride of lime.

Q. I am speaking of the live-hog smell. Was that very strong on the night of the 31st of July? The smell came up after you left? *A.* I cannot say. We left Squire's at ten o'clock. Speaking of these hogs and pens, I did not smell anything very strongly until I got down where the hogs were, and then I smelt the ammonia so strong that the water ran down my cheeks, and I stopped and went back. Mr. Sawin and Mr. Squire went on. I hardly needed to get it, but I got it. There was a small quantity of hogs in. I think he said it would take until next day at eleven o'clock for them to get through with what there were. They were in a pen not larger than this room. They were packed in close.

Q. Did you ever witness the unloading of the cars? *A.* Yes, sir; but I have never taken particular notice.

Q. How near have you been to an unloading train? *A.* I have been right past them.

Q. Have you noticed any smell arising at the time of unloading hogs? *A.* You cannot go by without smelling it.

Q. How far can you smell it? *A.* I have smelt it as far as Charlestown.

Q. When? *A.* The first Sunday in November of this year. I could n't swear that it was from Mr. Squire's establishment. I smelt it stronger than ever at my house.

Q. You were at Monument Square, the wind was in the direction of Mr. Squire's, and you smelled the live hog? *A.* Yes, sir.

Q. Where in Monument Square were you? *A.* In the Methodist Church, at the southwest corner of Monument Square.

Q. How long did you smell it? *A.* As long as I was there. About an hour.

Q. (*by a member of the Board*). At what time in the day? *A.* In the evening.

Q. Were the windows down? *A.* No, sir.

Q. Did you smell it after you went out? *A.* Yes, sir.

Q. (*by Dr. Derby*). You got the smell? *A.* Yes, sir.

Q. Are you sure you distinguished it from the rendering or dock smell? *A.* O yes, decidedly.

Q. You distinguished it at that time as that smell, and no other? *A.* Yes, sir.

Q. Were the windows in the church closed? *A.* I think they were. If there had been twenty hogs in the church it would not have been any stronger.

Q. And you noticed it after you went out? *A.* Yes, sir, until after I passed Prison Point Bridge, or in that direction.

Q. (*by a member of the Board*). What distance is it in an air-line from Monument Square to Mr. Squire's? *A.* Sixteen hundred feet.

Mr. McIntire. I think it is more than that; six thousand feet.

Q. Have you ever been to that church before or since? *A.* No, sir, not lately. I have been there before, of course.

Q. Did you ever smell that smell there before? *Q.* No, sir, I did n't. I was very much astonished that I could smell it. I would like to say that near the Elevator, at this end of Columbus Avenue, I was over to Mr. Pentecost's church, one day, and I smelled the rendering smell. The church is at this end of Columbus Avenue, near the Boston and Albany Grain Elevator.

Q. (*by a member of the Board*). What direction of the wind was needed to bring the smell from Mr. Squire's works? *A.* North or northwest.

Q. When was that? *A.* It might have been some time in October.

Q. Of this year? *A.* Yes, sir. I could n't say that it came from Mr. Squire's on that night.

Q. Did it smell very bad there? *A.* I smelled the rendering smell very distinctly. It was quite different from the smell I smelled at Monument Square.

Q. (*by Mr. Derby*). What is the distance from that point to Mr. Squire's? *A.* I should think it was about a mile and a quarter.

Mr. Derby. From the corner of the bridge to the Albany Elevator is over a mile. The measure upon the scale is twenty-seven inches. That would make it in the neighborhood of two miles.

Q. (*by a member of the Board*). How large a population should you estimate would be included within such a radius, who would be affected by this rendering smell? *A.* I don't know why we have n't reason to believe that it would extend farther than that by the smell I smelled at Monument Square. That probably goes as it comes from the hog-pen. The wind takes it and carries it in a current, right along like a flying balloon.

Q. Has your experience shown you that this smell goes farther over water than it does over land? *A.* I don't know.

Q. Did you trace this smell to East Cambridge? *A.* No more than I could trace anything to a certain place.

Q. Did you smell it on your way home? Did you trace it or follow it? *A.* I did n't any more than that I inhaled it.

Q. Are you sure the wind was in that direction? *A.* Yes, sir.

Cross-Examination.

Q. (*by Mr. Derby*). Have n't you smelled disagreeable odors from the vicinity of Broad Canal and other parts of Cambridge? *A.* When I have been there I have smelled them, but I have n't been there to examine them.

Q. Is this smell of drains that you smell over there quite strong and offensive? *A.* Yes, sir.

Q. Sufficient to trouble the people in the vicinity? *A.* Yes, sir. I should say more and more so for quite a number of years.

Q. You have reported to the Board upon that? *A.* I have not been employed as I formerly was for five years; and after I retired I liked to walk around and see, if there was any objection made, what it was about.

Q. Well, you heard frequent complaints of Broad Canal? *A.* Yes, sir.

Q. With regard to Miller's River. You spoke of the upper part of the river. It originates some distance above Mr. Squire's? *A.* Yes, sir, about two miles. I think there was a branch of about two miles through Cambridge and Somerville. At that time it was nice spring water. Just above the bleachery, on the side next the Colleges, there is a swampy place where there is a great deal of pure spring-water.

Q. Was that spring-water an inducement for the bleachery? *A.* I think it was.

Q. Has there not been a large amount of sewage turned into the stream in that vicinity? Has it not done the draining for that section of the country? *A.* I suppose that the natural drainage that would come down that way would be considerable. I know that there has been a great effort to get the drainage out of Miller's River. One man told me he had spent $140,000 to get it out into the Oxford Street sewer.

Q. How recently? *A.* Within three or four years.

Q. It was flowing down in a black stream last year, was it not? *A.* It has been a black stream for quite a number of years.

Q. How far up was it black? *A.* I think the blackness came from a small tannery above the bleachery.

Q. Where is that tannery? Is it there now? *A.* I think it is.

Q. Well then, when the stream comes down near the Fitchburg Road,

and comes into the basin twenty or thirty feet, it comes down a very black and turbid stream, does it not? *A.* Very black.

Q. Ever since that road was built? *A.* When the Fresh Pond Road was built. That little bridge is, I think, just exactly where it was in the original survey of the Fresh Pond branch. The other portion of the road has been altered.

Q. The Fresh Pond Road was built in 1840, '41, and '42. I went out to England to buy the iron for the Fitchburg Company. Somewhere about 1842 this bridge was built, and ever since this bridge was built there has been this black turbid stream coming down here? *A.* Yes, sir. It was so black that it would blacken the borders of the stream as it came down, but I never smelled any particular smell from it. I have been up the stream, and I have never smelt anything.

Q. Where is that bridge? *A.* Right there by the Glass Works.

Q. What is it for? *A.* It is the old Fresh Pond branch. It is just where the river comes into the upper basin, and the water from above runs through that sluiceway. Some efforts have been made to divert the drainage from that river and carry it elsewhere, by the Oxford Street sewer. There is not that harmony between the city governments of Somerville and Cambridge that might be desired. One man told me that they had spent $140,000.

Mr. Muzzey. Some three years ago the drainage was diverted from Miller's River into Charles River. And the Oxford Street sewer is a sewer that crosses the College yard; it runs then through Kirkland Street until it comes to Oxford Street, and then it takes its course up Oxford Street to North Cambridge. The outlet of the sewer was formerly into Miller's River; but Somerville objected to its being brought there, so it was turned in the opposite direction and carried into Charles River.

Mr. Magoun. The portion that comes from the tanneries has not been turned across.

Q. Then the foul water that comes from the tannery, the bleachery, and the houses in Somerville on the east side, still continues to flow down? *A.* I don't know anything to the contrary.

Q. It still comes in with a black turbid stream? *A.* Yes, sir.

Q. Whereabouts does Mr. Sortwell's drain come into the basin? *A.* It is just this side of Lincoln & Chamberlain's packing-house.

Q. It goes into what is called "Boynton's Basin"? *A.* That runs about an inch and a quarter stream.

Q. Do you know what it contains? *A.* No, sir. It looks like molasses and water, with a sort of yeast. I understand that it is the residue of the still.

Q. He distils rum, and this is the residuum of the molasses? *A.* I presume so. It looks red like blood as it flows out.

Q. Does it carry with it any froth? *A.* I never saw any.

Q. Into the other basins above Mr. Squire's, are there any other drains coming in, to your knowledge? *A.* I presume that there are others, but I have not particularly examined them.

Q. Now, with regard to the occasion when you went to the factory

and perceived some smell there. Do I understand you that this was on the 31st of July? *A.* Yes, sir.

Q. At that time you perceived it as much as at any other time? *A.* I should think so. The smell on that night was uncommonly strong.

Q. You walked down to the vicinity of the basin, and then went to Mr. Squire's. You found some of it near the bridge, or first, I understand you that it diminished? Was n't that it? *A.* I cannot say. I went in, and met Mr. Merriam, and he said: "Mr. Squire made a mistake in inviting these gentlemen here to-night, with such a horrible smell." That was inside the works. Mr. Merriam was formerly his foreman.

Q. What night was this? *A.* That of the 31st of July.

Q. Did n't you observe that as you approached the works you did not smell the odor? *A.* I did n't notice anything particularly.

Q. Was not that machine, that night, out of order, sir? Was not there something the matter with the pipe that carried the gas to the furnace? *A.* I understood it was. The parties were invited to come down and look at it, and it got out of order and would not work. They tried various experiments, turning the faucets to let on the gas.

Q. Did n't you ascribe the smells, that night, to these experiments? *A.* Yes, sir. Nothing else. That was distinct above everything else. The open tanks we could n't smell to a great extent. He had invited the Aldermen to come down there. The pipe was out of order, and they tried to fix it. Mr. Merriam said that he was surprised that he had given out his invitation at such a time. The former Mayor of Cambridge said that the machine would not work. He said that there was something out of order. I was always familiar with Mr. Kendall. He spoke about this tank while it was building, and said that, when it was ready, he wanted me to come over and see the operation of it.

Q. When you parted, was it not understood that you were to come again, when the machine was in order, and see it work? *A.* I don't know of any such understanding. He has frequently invited me to come there.

Q. It was well understood that the machine was not in order for the exhibition? *A.* Yes, sir.

Q. Do you know whether it has worked well since? *A.* I presume it has worked well. I understand he has carried a pipe into tide-water that gets rid of the water; and with regard to the gas being carried into the furnace, of course that works decently well.

Mr. McIntire. It seems to me that he is testifying to something that he does n't know anything about.

Mr. Magoun. Mr. Kendall told me all about it. I am perfectly satisfied that if it were made perfect, so that there would be no leakage, it would probably work very well.

Q. Well, you speak of having seen a ventilator on some occasion. Was that on the 31st of July? *A.* No, sir. That was at the time that we traced the smell directly to the ventilators of the factory. We passed the factory, and smelled nothing, and when we got as far as where the stream crosses Gore Street, where we were in Somerville, I told some of them that I did not want to go any farther. That was about the end of that visit.

Q. Well, with regard to the vapor, how far did you perceive it then? *A.* We did n't smell anything against North & Merriam's factory. But

we smelled the dock and this combination smell coming from the dock. It was warm weather.

Q. Now, with regard to any smell from the vapor. How much smell do you remember from the vapor? *A.* This vapor was a rendering smell. It was like the rendering of hog fat.

Q. How did it compare with the dock smell? *A.* This dock smell is a combination of everything.

Q. Well, in regard to the strength or pungency, how does one compare with the other? I speak of that evening. *A.* It smelled disagreeably, just as it would if you came into the vicinity of it anywhere.

Q. I asked how this which came from the vapor compared with that. Which was the stronger? *A.* It was an entirely different smell.

Q. Which was the most pungent and the most disagreeable, the rendering smell? Which was the strongest, the most disagreeable? *A.* I should think that the rendering smell was the most disagreeable to me.

Q. That was the smell of rendering that you found inside? *A.* You cannot get it so strong inside as out. I don't know how it is, but it seems to become concentrated after it leaves the factory.

Q. I want to ask about the smell of that odor that you perceived, how it compared with the smell of that dock. Was this rendering smell like that I perceive if I go into this establishment? Was there something much stronger than that? *A.* As you pass into the establishment you smell this smell, but not so strong as you do outside.

Q. Then you say, sir, that the smell from the vapor was to you more disagreeable than the other smell. Should you say it was as strong and acrid as the other? *A.* Either of them was strong enough for my satisfaction.

Q. Can you describe which is the most so? *A.* I have described it as far as I can.

Cross-Examination.

Q. (*by Mr. Muzzey*). It was not so pungent or so acrid? *A.* Probably different people —

Q. (*by a member of the Board*). The smell of ammonia is pungent; the smell of assafœtida is nauseating. If I understand Mr. Muzzey, he wants to get at you in that respect. Which of the two is the more pungent, and which of the two is the more nauseating? What effect would it have upon you? *A.* It depends upon the constitution of the individual how he receives it. Some organizations are more sensitive to these odors than others. So far as I am concerned, the rendering of fat and rancid fat is very disagreeable. So is that combination dock smell. I would n't like to state which I would rather have, were I obliged to have either.

Q. (*by Mr. Muzzey*). You fix one time when you perceived these smells as in July, and the other in June. Can you fix the date of the time in June? *A.* About the middle of June, I should think, but I cannot fix the date.

Q. At what hour in the day or evening was it? *A.* I should think about nine or ten o'clock in the evening.

Q. Was it on Sunday? *A.* No, sir.

Q. Can you fix the day of the week? *A.* I could not.

Q. What day of the week was it that you were near the Boston and Albany Elevator? *A.* It was either Saturday or Sunday, that was, but

I could n't say which. I had been to meeting at Mr. Pentecost's church. I had frequently been there on Saturdays and Sundays.

Q. What was the month? *A.* I think it was in September.

Q. At what hour? Whether it was before or after the evening service? *A.* If it was Saturday, it was evening; and if it was Sunday, it was in the middle of the day.

Q. You have visited the State Abattoir at Brighton? *A.* Yes, sir.

Q. How does it compare with the establishment of Mr. Squire? *A.* I don't know as I could give it unless I am obliged to answer questions about the Abattoir, because it was not under consideration. One is neat-cattle and the other is hogs; and every one knows that there is a wide difference in the slaughtering of the two. I consider Mr. Squire's establishment to be carried on as neatly as it can be, with all the appliances, that he has now, for the getting rid of the smells without extreme expense.

Q. Does it compare favorably with the Abattoir, sir, with regard to drainage? *A.* I don't know about the drainage being put through, so I don't know. I have been at the Abattoir, and have been shown through it.

Q. The systems are a little different in the two, sir? *A.* If you were to confine me to my opinion as to the different apparatus I have seen for the consuming of offal, I should pronounce Mr. Boynton's the best apparatus I have seen yet. I have seen Mr. North's, and that at the Abattoir.

The Chairman. What advantage is it to the Board to make this comparison?

Mr. Muzzey. The idea was to show that we had introduced all the appliances of modern art, and rivalled successfully the State Abattoir.

The Chairman. It seems to me that that is of no sort of importance.

Testimony of James Lee, Jr.

Q. (*by Mr. McIntire*). Are you proprietor of the Middlesex Bleachery in Somerville? *A.* Yes, sir, I am.

Q. Will you please state what you run off from your bleachery, if anything, into the basin or into Miller's River? *A.* Yes, sir. We run all our goods through lime-water. That is run off when the goods are washed. Then the goods are boiled in soda-ash water. When they are washed that is run off. Then they are run through a weak sizing, very weak sulphuric acid, no stronger than one could drink. When the goods are washed that is run off. Then they are also run through a weak solution of chloride of lime. The goods as they pass from this are squeezed, and lay in this solution for some hours. When they are washed that is run off with the water. Some of the goods sometimes go through another process of chloride of lime, and another process of acid, just as weak, and every time they are thus treated they are washed. They are finally washed clear. Goods that are bleached white are washed clear with clear water. During the day, when we are working, there are four hundred or five hundred thousand gallons run off, that carry away all of this weak solution.

Q. Daily? *A.* Yes, sir.

Q. Then you mean to say that all that you run off is merely the rinsings or washings of the goods that are put into these different substances? *A.* Yes, sir.

Q. Lime-water, soda-ash water, weak sulphuric acid, and chloride of lime. Do you mean to say that this acid is weak enough to drink when you use it, or after it is diluted? *A.* When we use it with the goods it would not hurt any one to drink it. There is hardly two per cent of strength.

Q. Have you any idea of how much solid matter you run off there in a day or week; that is, the lime, the soda, and ash? *A.* We use, probably, not exceeding six hundred pounds of lime, four hundred pounds of soda-ash, and ninety pounds of bleaching-powders or chloride of lime.

Q. (*by Mr. Derby*). How much sulphur is used, sir? *A.* We use the simple acid.

Q. The influence of that lime as to any solid part that goes down? *A.* It is all afterward emptied out. It becomes solid. The lime is dissolved, and that has to be carted away on the land. The same is true of the soda-ash; whatever there is of residuum is carted away. These things all dissolve. What runs away is a very thin liquid. You can hardly distinguish anything in it at all.

Q. (*by Mr. Newhall*). How much is the residuum of six hundred pounds of lime? *A.* It is always carted away.

Q. Well, what weight is carried away in solution? *A.* I am not prepared to say. There is always something left.

Q. Was there a quarter part left? *A.* I could n't say.

Q. Do you use any manganese? *A.* No, sir.

Q. That is all that you put into the stream? *A.* Yes, sir. There may be a little colored matter from the dye-house, perhaps, in the way of logwood-liquor. All that would run through our drains would be liquid, nothing solid.

Q. (*by Mr. Webster*). Is the water polluted that comes down to you? *A.* No, sir. I should n't think it was. It passes through my yard.

Q. Do you use it? *A.* No, sir. We used to, but it has gradually dried up.

Q. Is there any tan-yard above you? *A.* It is hardly a tan-yard. It is one of those skin-yards, where they tan skins. They are morocco dressers. It passes just into my yard, and is almost dry as it comes to me.

Q. Do you use that stream for your bleaching water? *A.* No, sir.

Q. (*by Mr. Derby*). Where do you get that? *A.* I have a reservoir up in Cambridge near Sacramento Street, and then we have also water in the yard, and we use some Mystic water. I suppose that the stream I own in Cambridge is the head-waters of Miller's River. There used to be a large spring there.

Q. (*by McIntire*). You say that you do not use this water that runs in the brook. If there were quantity sufficient to use, it would be fit to use? *A.* No, sir, we would not use it.

Cross-Examination.

Q. (*by Mr. Muzzey*). Why not? *A.* It is not clean. It is not dirty water, though it is not clean enough for the use of the establishment. We cannot use water unless it is perfectly settled.

Q. Has it become more impure year by year, since you were established there? *A.* No, sir; I cannot see any difference.

Q. How far above the basin are you situated? *A.* I think very nearly a mile.

Q. Take the upper, or Boynton Basin? *A.* Probably three quarters of a mile or a mile.

Q. You are a mile above the head of the basin. Now won't you describe the processes that are carried on in your establishment? *A.* I have described the bleaching process.

Q. What else do you do? You have a dye-house and bleachery? Do you do anything besides? Do you print? *A.* Yes, sir.

Q. Anything else? No, sir.

Q. What quantity in all of the solution is run off in a day? *A.* We run off nothing at all. We could n't afford to.

Q. What do you call water? *A.* I have said that we ran off at the rate of about five hundred thousand gallons of water a day.

Q. You mean that you contribute to Miller's River not less than five hundred thousand gallons a day of all these solutions. *A.* Yes, sir.

Q. Now, what amount of sulphuric acid is used in your works in the course of a year? *A.* About three carboys a day.

Q. Do you use iron liquors? *A.* We use a little iron liquor.

Q. You use it in connection with the logwood to make a color for the goods? *A.* Yes, sir.

Q. How much of that do you use in a day? *A.* Very little.

Q. How much logwood? *A.* The logwood is macerated. We use the liquor and carry away the woody material.

Q. Well, how much of the logwood liquor and the iron liquor do you mingle in a day and discharge into the stream? *A.* I hope not a great deal. Of course we have to use it, but we could n't afford to lose any.

Q. What quantity? *A.* I have never estimated.

Q. How much do you use of logwood? *A.* A great many tons a year. Probably a hundred tons.

Q. How much of the iron liquor? *A.* Probably fifty hogsheads a year.

Q. Does n't all the logwood fibre go into the stream? *A.* No, sir.

Q. What is done with it? *A.* We get the liquor out and then clean the casks and carry it away. No solids go into the stream at all.

Q. Well, how do you account for the black color of the water, and of the mud along the shores? *A.* A very little of something like logwood would color the banks and the water.

Mr. Derby. That is given you by the action of the iron and the logwood you use.

Q. (*by a member of the Board*). Does the logwood make the stream smell badly? *A.* No, sir.

Q. Do any of the materials? *A.* No, sir. On the contrary, it would rather cleanse it.

Testimony of Mrs. Lydia T. Rooney.

Q. (*by Mr. McIntire*). You reside at East Cambridge? *A.* Yes, sir.

Q. How long have you lived there? *A.* Twenty years.

Q. You own some houses there? *A.* I own some and have owned more.

Q. Have you perceived whether they have been affected by any of the odors? What street do you live on? *A.* I live on Thorndike Street, between Fourth and Fifth.

Q. What smells have you distinguished there during the past season? *A.* I think there are three or four distinct smells.

Q. Please state, if you can, those odors. *A.* At times there is a rendering smell, at times very offensive. The smell that comes to us about four o'clock in the morning, when the wind is northwest, is very offensive.

Q. Which of these smells that you distinguish as hog, dock, and rendering smells would you classify that way? *A.* I know it is not the dock or live-hog smell. I think it is something that is cooked.

Q. How does that affect you? With nausea? *A.* I have been sometimes affected so that I was not able to do anything.

Q. By being disturbed in the morning by these smells? *A.* Yes, sir, at one time. On the night of the 31st of July. The northwest side of my house was turned dark purple. Whatever the substance was, it ran down on to the blind and dripped on to the window-sill.

Q. What was its previous color? *A.* Drab. It had never been discolored before, nor has it been since.

Q. Did it make any one else sick in your house? *A.* It affected my daughter's throat. It made her cough.

Q. You say that this has caused nausea with you at other times? *A.* Yes, sir.

Q. During the past season? *A.* Last year, more especially than before. The smell has increased every year worse than ever. This last year the smell was worse than ever before.

Q. You say you got the smell of the live hogs? *A.* Yes, sir; and the squealing of the live hogs.

Q. How often do you get that smell? *A.* As often as the wind is northwest.

Q. (*by Dr. Derby*). You say that the most offensive smell comes to you about four in the morning? *A.* Yes, it is the trying smell.

Q. Up to what time have you noticed them? *A.* I have n't smelled them since the winter commenced as I did during the summer. Perhaps I have n't smelled them since the middle of November. I could n't give you any particular time.

Q. Did you perceive it during the month of November? *A.* I could n't say. In passing the establishment of Mr. Squire last Sunday, as I reached the establishment I met the smell of the scalding hog. Near the large chimney was the ventilator, and from that I perceived the smell of rendering. As I reached the railroad-crossing I was obliged to wait for a passing train for some minutes, and the smell of live hog was perfectly suffocating. This was last Sunday. I have n't felt like myself since I stood waiting for that train to pass.

Cross-Examination.

Q. (*by Mr. Derby*). Did you see the hogs on that occasion? *A.* I did n't; there were none visible in the open air.

Q. Did you ever pass by the rendering establishments where they make soap and boil grease? *A.* Not to my knowledge.

Q. Have you been near enough to them to inhale the smell at all? *A.* I don't think I have.

Q. You don't know the effects they produce? *A.* I do not. I don't think I was ever near a soap factory.

Q. Nor any of the places where they try out grease? *A.* No nearer than to Mr. Squire's building.

Q. But you have n't been near the other buildings. You were on the other side of the street? *A.* Yes, sir; I have passed the buildings on both sides of the street.

Q. But never have been out when the smell from the trying of grease was offensive? *A.* Yes, sir.

Q. What was the time you have most perceived this smell? *A.* Well, at four o'clock in the morning.

Q. How many times during the past summer, about four o'clock in the morning, have you perceived it? *A.* I could n't say.

Q. Could you say whether two, four, or six times? *A.* I should think it would be nearer sixty.

Q. Does it wake you up? *A.* It wakes me up, so that I have been obliged to call the doctor.

Q. Well, the sixty times during the summer it did not always depend upon the wind? *A.* I did n't say sixty. I said nearer sixty than six. I never smell it unless the wind is northwest.

Q. Have you any means at all of determining which way the wind blows, except by its blowing in at the window? *A.* My house is located north and south. We have a vane at the end of the house. I judge of the wind from the window it comes in at. My chamber is in the northwest corner of my house.

Q. In any one of these cases did you get up to see a weathercock? You mean that that guided you in the day and not in the night? *A.* I know by the odor coming in at the northwest window.

Q. You would be unable to distinguish from which of the establishments it came, whether from Boynton's, Squire's, or the rendering-house opposite? *A.* No, sir.

Q. You have smelled very offensive smells from the basin? *A.* Sometimes very offensive.

Q. Have n't they sometimes affected your house? *A.* My house has never been affected but one night. That was the 31st of July. That was the night when the vapors gave my house a purplish appearance.

Q. Was that the only time, or have you ever before had any purple appearance given to your house? *A.* That is the only time.

Q. Did you notice it that night or next morning? *A.* Next morning.

Q. You have been uncomfortable? You have been obliged to send for your physician, I understand? Have you ever vomited in consequence of it? *A.* Only once.

Q. When was that? *A.* The morning after the 31st of July.

Testimony of Mrs. Jane Binney.

Q. (*by Mr. McIntire*). You live in East Cambridge? *A.* Yes, sir, at 152 Otis Street, between Fourth and Fifth Streets.

Mr. McIntire. About twelve hundred feet from Mr. Squire's.

Q. Have you been affected by any odors at your house during the past year? *A.* Very much indeed.

Q. Please describe them. *A.* They have been very offensive. The

rendering of lard was one. It occurred about four in the morning, and seemed very offensive.

Q. Any other odors did you get? *A.* Yes, sir; but not so much.

Q. What others? *A.* I think they came from the factory.

Q. Can you describe them? *A.* Nothing very different from the rendering smell.

Q. How often during the past season have you been affected by them? *A.* A great many times in the hottest weather, so that I have been obliged to close the windows.

Q. How have these odors affected you? *A.* They have given me a headache, and irritated my throat.

Q. Can you describe the feeling in your throat? *A.* A sort of inflammation.

The Chairman. Did it make you sneeze? *A.* No, sir.

Q. How long would this effect last after smelling it? *A.* It would last me all next day, so that I could hardly sit up.

Q. Did you ever keep your bed afterwards? *A.* I have had to lie down several times.

Q. Do you mean to give us to understand that this sickness has been caused more than once this summer? *A.* Yes, sir.

Cross-Examination.

Q. (*by Mr. Derby*). Can you fix any date? There was the 31st of July. Did you notice the smell that night? *A.* Yes, sir, very much.

Q. Was that in the night? *A.* Yes, sir.

Q. Was the paint on your house affected at that time? *A.* Yes, sir; the back part, which is an L, was affected.

Q. Your house fronts which way? *A.* Towards Miller's River.

Q. Is the back part of your house white? *A.* Yes, sir.

Q. And the main part is brick? *A.* Yes, sir.

Q. In which part of the house did you sleep? *A.* In the front part.

Q. Were the windows open on the 31st of July? *A.* I think they were.

Q. Did you ever, on any other occasion, experience it as severely as on that night? *A.* Yes, sir, I believe I have.

Q. Was it not particularly severe on that night? *A.* Yes, sir, worse than at any other time.

Q. On how many days have you had to lie down on account of these bad smells this last season? *A.* Perhaps six or eight.

Q. Have you ever been by the place where they render fat and soap-grease? *A.* Yes, sir; I have been past there.

Q. You have experienced the putrid smell there? *A.* I cannot say that I have.

Q. But you have experienced the bad smells from these rendering works? *A.* Yes, sir, several times.

Q. Did you recognize the smell of grease, something putrid? *A.* I recognized something putrid.

Q. Whose works are you now speaking of? *A.* Mr. Squire's.

Q. I ask you if you have passed by any of the other places, such as the small soap-boiling places? *A.* No, sir; I don't know that I have.

Q. Have you been by the small place near Boynton's, kept by a man named Barry? *A.* No, sir.

Q. What you smelled near the basin or at Mr. Squire's is the same sort of smell? *A.* Yes, sir.

Q. You don't find different smells? *A.* It is all the same thing.

Q. One and the same odor? *A.* I think so.

Q. Whether at your house or at Mr. Squire's or in the neighborhood of the basin, it is one and the same smell? *A.* Yes, sir, I think so.

Q. On this occasion that you had to lie down, did you simply lie down upon a lounge? *A.* Yes, sir.

Q. (*by Mr. McIntire*). This one odor that you distinguished you found to be a trying odor? *A.* It was like the odor of something that was not sweet.

The names of several ladies were then called.

Dr. Derby. What do you mean to prove by all these ladies, Mr. McIntire?

Mr. McIntire. They are parties who have been affected by these smells.

The Chairman. I think it would be best to confine the examination to the effect of these smells.

Mr. McIntire. That is what I intend to do.

Testimony of Mary W. Clark.

To Mr. McIntire. I am widow of Moses Clark, late of Cambridge. I live on Otis Street, at No. 168, between Third and Fourth Streets.

Q. (*by a member of the Board*). How far from Mr. Squire's establishment? *A.* (*by Mr. McIntire and Mr. Muzzey, after looking at the map*). About 1,600 feet.

Q. (*by Mr. McIntire*). Have you ever been affected personally, or has any member of your family ever been affected, by these smells? *A.* Yes, sir; by nausea. I have been nauseated by them.

Q. I speak now within the present year? *A.* No, I have n't, because I was away all summer, from the 10th of July till nearly the 1st of September.

Q. Since you returned in September? *A.* Some little; but I have not suffered from them as before.

Q. What smells have you distinguished this summer? *A.* I don't know that I can describe them as distinct odors. One, I should judge, is a suffocating odor. One is from the fat, — I could distinguish the fat sometimes, — but I could n't describe it. It is very nauseating. Sometimes I feel as if I can hardly breathe. I have been awakened at night before it was time to rise. I have been unable to sleep, and have been obliged to close the windows on account of it.

Q. Did it affect your throat any? *A.* I think it has sometimes.

Q. Was the effect serious? *A.* Not, as I could see, particularly; only it caused a great deal of discomfort.

Q. Have you ever passed by Mr. Squire's place? *A.* I have never been in that vicinity except one morning when I went down to get a whitewasher.

Q. Have you noticed the smells on the other side of the basin? *A.*

In passing through Somerville, I have noticed odors on the other side of the basin ; have also noticed it in riding from Cambridge.

Q. That is all you know, Mrs. Clark ? *A.* Yes, sir.

Cross-Examination.

Q. (*by Mr. Derby*). You have inhaled the smell from the docks when the tide is out ? *A.* Yes, sir ; and I think there is quite a difference between the smell of the docks and the suffocating odor.

Q. It is something more oppressive in the night than the day time ? *A.* It is.

Q. You have perceived it about the docks ? *A.* No, sir, I never have.

Q. You have walked down round the docks, have n't you ? *A.* I never have.

Q. Sometimes, when down near the docks, you have noticed a smell from them, have n't you ? *A.* Yes, sir.

Q. Similar to the one from the basin ? *A.* Yes, sir ; but it is not so powerful in the day as during the night.

Q. How many times have you experienced it during the night ? How many times have you been disturbed ? *A.* I could n't say ; but more before I went away than since my return.

Q. Since your return, how many nights have you been awakened ? *A.* A good many times.

Q. Three or four times ? *A.* Yes, sir, a good many more than that ; but I have n't kept any account.

Q. Your distinction, then, between the day and night smell is that the night smell is more overpowering ? *A.* Yes, sir.

Q. (*by Mr. McIntire*). Between the time of your going away in July and returning in September, after your return, did you notice any discoloration in the houses that you did n't notice before ? *A.* I did.

Q. On your own house ? *A.* No. I was told by Miss —

Mr. Derby. Never mind what you were told.

TESTIMONY OF MISS MARIA SPARE.

To Mr. McIntire. I am an assistant teacher in Cambridge at the Putnam Grammar School, at the corner of Fourth and Otis Streets, at the top of the hill.

Q. (*by Mr. McIntire*). I will ask you if you have ever been affected by these odors from the dock ? *A.* I have. I have been made sick by them.

Q. Where ? *A.* At the house where I boarded, on Cambridge Street, betwen Fourth and Fifth Streets.

Q. Is it the next house to Mr. Munroe's, westerly ? *A.* It is.

Q. The house you boarded in faces to the south ? *A.* Yes, sir ; my room is in the L, which is on the northerly side.

Q. Will you please state how it affected you ? *A.* It made me sick at the stomach, nauseated and vomited me.

Q. How many times during the past season ? *A.* I could n't say.

Q. More than once ? *A.* More than once ; many times.

Q. (*by Mr. Derby*). Do you know where the odor came from ? *A.* It came from the direction of Mr. Squire's place.

Q. (*by Mr. McIntire*). Can you describe that odor ? *A.* It is the smell of trying lard.

Q. Were you obliged to go away? *A.* I was out of school two weeks. I was taken sick on the day before the 17th of June, and left school for two weeks. I went out of town.

Q. How long did you stay away? *A.* I returned at the end of two weeks, and remained one night, and was sick from it. I then went out and stayed till September.

Q. Were you sick while you were away? *A.* No, sir, I was not.

Q. Are you often sick? I mean, what is your general health? *A.* I had n't been out of school for two years.

Q. You had leave of absence from the committee? *A.* Yes, sir.

Cross-Examination.

Q. (*by Mr. Muzzey*). What was the nature of the sickness? *A.* It was vomiting.

Q. Was it headache? *A.* Yes, sir.

Q. Sick headache? *A.* Yes, sir.

Q. Have you been subject to sick or nervous headaches? *A.* I don't have them very often.

Q. There has been no trouble from these odors at the school-house? *A.* I have noticed them, but have never been made sick by them.

Q. Did you teach in the Thorndike School? *A.* Yes, sir.

Q. When you say the odor came from Mr. Squire's, you mean it came from that neighborhood? You never traced it there? *A.* When I have been riding by there I have been affected by it.

Q. When you ride by Boynton's or North's, have you been affected in the same way? *A.* Have never been by there.

Q. The reason you think the odor comes from Mr. Squire's is because you think it affected you when going by there? *A.* Yes, sir.

Q. Have you ever been affected by these odors before? *A.* Never till this summer.

Q. Where did you live last summer? *A.* In Spring Street, between Third and Fourth Streets.

Mr. Muzzey. That would make it about five or six hundred feet.

Q. (*by Mr. Muzzey*). How long have you lived in East Cambridge? *A.* Since I was a small child, — twenty-eight years.

Q. Has n't you health generally been delicate? *A.* I have been sick once, but have n't been out of school.

Q. Well, now take the two years before, — had n't you been ill? *A.* I have n't been out of school.

TESTIMONY OF MRS. CHARLOTTE FOGG.

The Chairman. Do you expect to bring out anything new by this witness?

Mr. McIntire. It is simply cumulative.

The Chairman. Why don't you ask the witness whether she has been affected by the odor personally, and then let the counsel on the other side cross-examine if they desire?

Mr. McIntire. This lady has been very much affected by the odors. I don't wish merely to bring the testimony of persons who have smelt

these odors, but I want to show that some have been made seriously sick by them.

The Chairman. Suppose you ask the witnesses whether they have been affected and in what way.

Q. (*Mr. McIntire to witness*). Where do you live? *A.* At No. 6 Sixth Street, between Cambridge and Gore Streets; about three hundred feet from Mr. Squire's place.

Q. Have you ever been affected by these odors? *A.* I have; my throat particularly, my stomach also.

Q. How often during the last season? *A.* Very often during the last season. I noticed the smell of the hog, the smell of the trying, and the dock smell.

Q. Can you distinguish them, and which affects you most? *A.* I can tell them; they are very different smells. I think the smell of the hogs affects me most. It is the most nauseating. It is a stycy smell.

Q. Does it affect you to vomiting? *A.* It has, and I am not easily vomited, either. It has affected me so that I have had to go away two summers.

Q. Did you go away because of the smells? *A.* I went away on that account. I have lived in Cambridge many years, and have been obliged to go away the last two summers.

Q. (*by Dr. Derby*). Do you know whence the smell comes that affects you? *A.* The smell comes so distinctly to me that I know it comes from that direction.

Q. Do you know whether it comes from Mr. Squire's? *A.* I can't say that.

Q. (*by Mr. McIntire*). Do you think they come from there? *A.* I presume they did because the trying is done there. Sometimes it comes very strong; when the wind is favorable we have to close the windows and doors, and then we have to air the house.

Cross-Examination.

Q. (*by Mr. Derby*). Are you married? *A.* Yes, sir. My husband is a machinist, and works for William L. Lockhardt, on Bridge Street.

Q. Did you notice the smell on the 31st of July? *A.* I did not. I was absent from home.

Q. You have, during the day-time, smelt the smell from the dock? *A.* Yes, sir.

Q. Sometimes it is very offensive, is it not? *A.* It is very offensive sometimes.

Q. Have you noticed that it is more offensive at some times than at others? *A.* Sometimes it is.

Q. Have you noticed that on damp days it is more suffocating? *A.* Yes, sir.

Q. Have you noticed it was worse than on moist, humid days, when the nights are damp or moist? *A.* I could n't say.

Q. Is there not a little opening near your house, through the buildings down to the basin, through which the air is drawn up from the basin? *A.* There used to be, and there was a smell came up that way; but during the last year it was built up.

Q. There is still a narrow passage-way, is n't there? *A.* I think there is.

Q. About ten feet wide? *A.* I think it is.

Q. Don't the air come up from that passage-way? *A.* I could n't say. I think we had the smell a little worse before those buildings were up.

Q. Which smell is the most perceptible? I think the dock smell is the worst.

Q. You noticed that on moist days suffocating smells came from the dock? *A.* Yes, sir.

TESTIMONY OF SAMUEL A. DURGIN.

To Mr. McIntire. I am a physician, and member of the Boston Board of Health. I reside at the Evans House, 175 Tremont Street.

Q. (*by Mr. McIntire*). As a member of the Boston Board of Health, have you ever visited the establishment of J. P. Squire & Co.? *A.* Yes, sir, I have visited it once.

Q. Please state the occasion of your visit. *A.* We have been repeatedly complained to by citizens of Boston in regard to certain smells which we did n't find the source of in Boston, and we went over there for the purpose of looking at those works, — I think on the invitation of Mr. Squire; also to see what we could find about the smells.

Q. When did you visit there? *A.* I think it was upon the 13th of September last.

Q. Will you state what you saw there? *A.* On approaching the establishment we did not detect any marked smell. We entered and were taken through the building by Mr. Squire. They were not at that time rendering, except in two or three small open kettles. The larger tanks were not in use. It was near noonday, or not far from twelve o'clock.

Q. Did you perceive any odor arising from those open kettles? *A.* Very slight indeed.

Q. Did you know what they contained? *A.* If I remember rightly, it was cut-up hogs, and some of the entrails. We went mostly through the establishment.

Q. Did you test any of the gases? *A.* I did n't test any gases.

Q. Did you try any of the vapors by putting your head over the kettles? *A.* Somewhat. I detected a very slight odor.

The Chairman. Is the testimony of Dr. Durgin to be cumulative? If so, I don't think it necessary to take up so much time.

Dr. Derby. The members of this Board desire that the official opinion of the Board of Health of Boston should be given, and that their evidence should be presented.

Mr. McIntire. I intend to give the testimony of the members of that Board, and shall call another one of them.

Dr. Derby. Official reports of the Boston Board of Health have been made in regard to this odor. We desire to know what the members saw.

Q. (*by Mr. McIntire*). Have you any opinion as to the origin of those odors which reach Boston?

Mr. Derby. Suppose you confine your remarks to the visit to the establishment. I would like to have you confine them particularly to that, and not to have general ideas.

Mr. McIntire. I would ask his opinion of what it is.

Mr. Derby. We ought to have facts as a basis of opinion.

Mr. McIntire. I will ask him, then, from what he saw at the establishment, from the business carried on, and the animals kept there, has he formed an opinion in regard to the odors which reach Boston? *A.* I found, in passing through the institution, the live-hog smell distinctly, which was, to me, very offensive.

Q. (*by Mr. Derby*). Will you have the kindness to give the time of that visit? *A.* It was on the 13th of September.

Q. And you found the hog-smell very distinct? *A.* Yes, sir.

Q. (*by Mr. McIntire*). Have you formed any opinion in regard to the origin of those smells which come into Boston? *A.* I have no doubt that those odors may go a great ways. We have satisfied ourselves that the odors at the West End do not emanate from any source on this side of the river. In my opinion they do not. We have searched a long time, and in vain, on this side to find their origin.

Q. (*by a member of the Board*). When you say your opinion you mean the Board's? *A.* Yes, sir. The odors particularly complained of were from the rendering. I should say we did not smell any, on our visit to the establishment, in marked degree, because they were not in operation, the rendering being done mostly in the evening.

Q. (*by Mr. McIntire*). The hog smell was very distinct. Had there been any attempt at deodorization? *A.* The pens were covered with charcoal, and were in very cleanly condition, not as clean as a parlor, but as clean as a hog-pen could well be.

Cross-Examination.

Q. (*by Mr. Derby*). I would inquire how long you have been upon the Board of Health? *A.* Since the 15th of January.

Q. Has your attention been called to any localities at the South End, or on the Back Bay, where they are filling in, and to any offensive odors there? *A.* Yes, sir.

Q. Have n't you found that as they were filling in the odors came up from that? *A.* Yes, sir. We found bad odors, and have not found much difficulty in remedying them.

Q. How far have you succeeded in remedying them? *A.* So far that people have ceased making complaints of them.

Q. When did they cease? *A.* Complaints were made, I think, as early as the first part of May, and ceased in July.

Q. Were they very uncomfortable in July? *A.* Yes, sir. They were quite offensive in July.

Q. What time do you think the remedy was found? *A.* The complaints lasted some time, but on letting in the tide-water the odor ceased.

Q. Did people complain that they were obliged to close the windows? *A.* Yes, sir.

Q. Did they complain of nausea, coughing, or bad headaches? Please state what was the tenor of the complaints? *A.* I think there were strong complaints of nausea. I don't remember any instance of vomiting, or irritation of the throat.

Q. That was counteracted by letting in the tide-water? *A.* Yes, sir.

Q. Did the bad smell come from the flats or sewage? *A.* No, sir; it

came from what was called, by the people in that vicinity, a cabbage or vegetable growth on the bottom of the basin, which became heated and offensive in the sun, and which the cooling off by the tides seemed to cure at once. If it remains in the sun very long it undergoes decomposition, and becomes offensive.

Q. Has n't that part of the Back Bay been frequently complained of as a depository of sewage? *A.* We have n't had trouble with that portion of the flats. This was easterly of Parker Street. We have never traced the trouble to the sewage. Once we traced it to the mouth of the sewer, and found the odor extremely offensive at certain stages of the tide. But generally we did not find it remarkably offensive, and finally concluded that the basin was the great source of the trouble. I am inclined to think it was from this vegetable growth.

Q. Have there not been times when there were complaints to your Board of those smells from the sewer? *A.* At low tide it was quite offensive, but I don't remember any positive complaint, but I remember that there was some suspicion that it came from there.

Q. Follow along down to the West Boston Bridge. Have n't odors come from there which are quite offensive? *A.* I have n't been there.

Q. Have n't you heard of the sewage from the Massachusetts General Hospital stagnating in that neighborhood? *A.* No, sir.

Q. With regard to the Miller's River basin, do *you* find an offensive odor there? *A.* I did. I should say it was very offensive.

Q. Has your attention been drawn to the Broad Canal in Cambridge? *A.* No, sir.

Q. Or to Charlestown? *A.* No, sir.

Q. On both sides of West Boston Bridge, to the flats above, has your attention been called to them as collecting sewage? *A.* No, sir.

Q. Is it not in the city a matter of serious consideration whether there should not be a drain to carry off to deeper water the sewage drained into Charles River? *A.* There is at the present time going on an extension of the sewers to deeper water from Berkeley Street.

Q. To carry the sewage from Berkeley Street to the river? *A.* The sewer has been built down to the sea-wall on the Mill Dam, but it is now being extended out into deeper water.

Q. Is it done to carry the sewage out into deeper water, or to remedy the existing evil and to counteract, to some extent, that bad odor from that side of the city? *A.* Yes, sir.

Q. (*by a member of the Board*). In what part of the city do persons reside who complained of the odor that you found no source for? *A.* At the West End, from Beacon Hill down through Charles Street. It was observed mostly when the wind was northerly.

Q. (*by Mr. Derby*). When the winds were northerly you noticed them most? *A.* That was when people complained.

Q. Did you go to the soap-works on Miller's River? *A.* No, sir, only to Mr. Squire's.

Q. Did you go through the whole works? *A.* Yes, I think, and pretty thoroughly.

Q. How did you find them in regard to neatness? *A.* As a rule they were in very fair order.

Q. As much so as any works you ever saw? *A.* Yes, sir.

Q. Have you seen the Abattoir? *A.* Yes, sir.

Q. How did they compare? *A.* One was a great nuisance to me, compared with the other. At Brighton I should say it was quite free from odors, and I was astonished to see it so free from odors. At the other place I should n't wish to stay a great while, and I could not have done so.

Q. You did n't notice anything very offensive at Squire's? *A.* When I first entered I did n't detect anything very offensive, but when I got inside and at the hog-pens, I smelt the hogs very strong.

Q. (*by a member of the Board*). Is it your opinion, as expressed from your investigations, that the odors from which the people of the West End suffer come partly from Mr. Squire's establishment? *A.* I have no doubt of it.

Q. Do they come largely from there? *A.* I have no doubt of it.

Q. (*by Mr. Derby*). If you were informed that there were large places near there where putrid meat was tried out in open kettles, should n't you ascribe a larger amount of it to these open kettles than you would to the kettles in Mr. Squire's establishment? Would n't there be a larger amount of putrid grease than in Mr. Squire's establishment? *A.* I think there might be.

Q. Your attention was not drawn to the places along shore, but simply to Mr. Squire's. *A.* We intended to visit all those establishments, but only went to this one.

Q. You noticed an offensive smell from the dock? *A.* We did.

Q. Was n't it a similar smell to what you perceived in the yard? Was n't the smell in the yard similar to that which came up from the dock? *A.* At the windows we got the smell from the dock, and in the building we got the smell from the hog. Where the scalding was going on there was a smell somewhat offensive, but not as offensive as the hog smell or the dock smell.

Q. You perceived no smell so strong as the dock or hog smell? *A.* No, sir. In the yard we smelt something pretty bad, but I can't say whether it came from the dock or not.

Q. You could n't say that it did n't come from the dock? *A.* No, sir.

Q. There was a smell you could n't determine from what source it came? *A.* No, sir, we could not determine it.

Testimony of Alonzo W. Boardman.

To Mr. McIntire. I am Chairman of the Boston Board of Health. I reside on Charles Street, between Pinckney and Revere Streets.

Q. (*by Mr. McIntire*). Has your attention been drawn to any noxious odors from the direction of Mr. Squire's establishment within the past season? *A.* Yes, sir.

Q. In consequence of that have you visited the place, and if you have, will you please state what you saw there, and give us your opinion in regard to the origin of it? *A.* During the spring and summer of this last year I have smelt several times — I can't say how many — a dreadful odor at night. I should think that I had smelt it perhaps half a dozen times up to the 17th of June. It would wake me up in the night. I felt as if there was some heavy weight on my chest. My room was full of a dreadful odor. I live on the easterly side of the street. I don't do

as many others have done, — close all the windows; I kept my windows open and let the smell out. I could n't get to sleep again for a long time. Sometimes I was kept awake for two or three hours; would sometimes lose my sleep in consequence of this odor. On the night of the 17th of June there was a different smell from anything that I was ever before conscious of. It was a different smell from any that I ever got before, that I am aware of. The only description that I can give of it is, it seemed to me to be a pork-fat smell. It was fearful. I was sick all night; my servant-girl was sick, and my youngest child was vomiting, I have no doubt from the smell. I took it more to heart on that account. I called that morning at Dr. Derby's office; he was away, but called on me that evening. Mr. Squire called upon me that evening at my house, and we had a pleasant interview, of half or three quarters of an hour. I should have said that that morning when I went to City Hall, I got my associates, Dr. Durgin, and Mr. Whiting, and the City Physician, Dr. Green, to go over to Mr. Squire's with me. We crossed over the bridge at the foot of Leverett Street, to East Cambridge, and took the right-hand street, so that when we came in sight of Squire's establishment it was on our left. We were on the right side of the basin, and Squire's place was on the left. We were going along the shore on the northerly side. We stopped our carriages there, and did n't go any farther. Before we all got to the spot, I recognized the smell that I had the night before. I compared notes with Dr. Durgin, and both agreed that we had got that smell before, but, as I think, it was less intense, or it may be because I had got used to it. After we got enough of it by staying there, we turned round and went to the windward of Squire's establishment, and there we did n't get the smell. While we stood there the wind was southwesterly, and came from Squire's establishment. I ought to add that there was intervening between us that whole place where the filling is now going on. We put ourselves in a position so that the wind came between him and us across the basin. (*Witness pointed out the location on the map.*) The tide was low that morning.

Q. (*by Mr. McIntire*). Did you detect what is known as the dock odor? *A.* I should n't want to say that there was this dock odor with it. As near as I can say it was the pork-smell. There may have been the dock odor with it, but I can't say. Several times this summer I have been affected by this smell, and almost got into a state of panic about it; I was made sick by it, but the smells we chiefly got were worse than that we got on the 17th of June. I can't express it, except by using the words of a witness here to-day. It was the smell of putrid meat. There was no getting it out of a room after it got into it. It seemed as if it would stay forever. I suppose Dr. Durgin has given you an account of the visit we made. I never made any other visit. We did n't go in on the 18th of June; we simply went there to see if I could recognize that smell. My associates had n't had the benefit of it. We went into some of the houses there, and inquired of some of the people about the smell. I noticed what appeared to be discolorations. There was one woman who handed out from a trunk some spoons, that she said were discolored by it. On the 13th of September our party went over there.

Q. (*by Mr. McIntire*). I will ask you whether you detected the live-hog smell? *A.* I recognized at three different times — while I was going through the establishment or out in the quadrangle — the odor that I

have got so much this summer, that is, the odor something like putrid meat. I got the other — this pork-fat smell — somewhere there, though I can't say in what part of the establishment ; our clothing was completely saturated with this awful stench. When we got back to City Hall we smelt it fearfully. There were two places inside in which I found some odor. We spoke to Mr. Squire about it two or three times. Dr. Durgin was standing by me at the time ; but Dr. Green, I think, was not, because he got enough and went out. We remarked to Mr. Squire about that smell, and he wanted to know what we smelt. I could n't tell him.

Q. (*by Mr. McIntire*). Do you remember going near the pens? *A.* We went all over them. That was n't so offensive to me compared with the others ; I don't mind the smell of live hogs.

Q. In your experience as a member of the Board of Health, and from what you have seen in Mr. Squire's establishment, and from what you have smelt there, and at your house on Charles Street, can you give an opinion as to where these smells came from? *A.* I am not able to swear that the whole of this smell comes from Squire's establishment, but I am ready to swear that a part of it comes from there, and it all comes from that vicinity.

Q. And a large part of it comes from Mr. Squire's place? *A.* It is a pretty difficult thing to divide that up. I should hate to apportion it out.

Cross-Examination.

Q. (*by Mr. Muzzey*). How long have you occupied your present house on Charles Street? *A.* Nearly nine years. I went there in May, 1865.

Q. When were you first troubled by any smells? *A.* I don't think I have been troubled until this last summer. I ought to explain further that I think I was led to ask Mr. Squire, and did ask him, the question at my house on the 18th of June, whether he did any different business this year from what he had ever done before, and if he did any different business at night than in the day time.

Q. What was the reply? *A.* I think he said there was one branch that he did n't carry on, though I don't recollect what it was.

Mr. Muzzey. It is the rendering of tallow, that he has dropped.

Q. When was this conversation? *A.* It was on the 18th of June.

Q. Mr. Squire invited you to go there and inspect his place? *A.* Yes, sir.

Q. When you went there did you meet him? *A.* He was there, and was very courteous indeed.

Q. Had you been troubled previous to the 17th of June, when you got this smell? *A.* Yes, sir.

Q. What had you smelt before? *A.* It was this putrid-meat smell.

Q. How did this smell differ from the other? *A.* I can't tell you. I think it was the pork-fat smell that I got on the 17th of June, and before that the odor was like the smell of putrid meat. It had n't the effect of driving me into a panic, as this had.

Q. At what hour did you first perceive the smell on the 17th of June? *A.* My impression is that it was a little before twelve o'clock.

Q. Had you been asleep? *A.* I was, and was awakened.

Q. How long did it continue? *A.* I think it lasted four or five hours. I left the windows open.

Q. On which side was your chamber located? *A.* On the street side.

Q. What kind of a night was it? *A.* I can't remember.

Q. What kind of a day had it been? *A.* I can't remember.

Q. When you went over the next morning, you were upon the northerly side of the basin, about opposite to Mr. Squire's establishment? *A.* I should hardly say opposite; I should think it was about southwest from the factory.

Q. Did you perceive the works of Merrill there? *A.* Did n't recognize any other works at all.

Q. Were you aware that all about there there are rendering establishments where a high degree of heat is obtained, and grease is collected in the houses and allowed to stand, and that the fumes go into the air? *A.* No, sir. I had heard of them, but had not visited them. We got the smell in one place, and did n't think it necessary to go any farther.

Q. Did Mr. Squire suggest to you that a man named Reardon was the cause of the trouble? *A.* I think he did at my house, — at least, he shoved it off on to somebody else, or tried to.

Q. Were there any windows open at Mr. Squire's establishment? *A.* At one end of his establishment there was a window open, and there I got a little of the pork-fat smell, and I also got the smell of putrid meat. I can't say whether it was from the building or not; neither can I say whether it came from the basin or not, but somewhere in that building I got this putrid-meat smell. Then, as I stood there and saw them butchering hogs, I got a very bad smell. We went out from the door. (*Witness explained the course taken on the map.*)

Q. (*by Mr. Muzzey*). How long were you there? Did Mr. Squire go over the premises with you? *A.* I think Mr. Squire showed us over the premises, and that we were there not less than an hour or two.

Q. What was the general appearance of the premises as to cleanliness, taken as a whole? *A.* I should indorse Dr. Durgin's reply. I should say it was fair. It is giving Mr. Squire credit enough to say it was fair.

Q. How does it compare with the Abattoir as to the general aspects of cleanliness? *A.* I thought the Abattoir at Brighton was sweet compared with this establishment of Mr. Squire's.

Q. In your visit to Brighton, you must do us the justice to remember that you did not get the basin smell? *A.* I know that. You drew the comparison.

Q. (*by a member of the Board*). Have you had complaints to your Board of Health of this offensive odor? *A.* A great many times.

Q. And they described the same stench to you that you have described to this Board? *A.* I could identify the smell which they described, but my associates had not had the benefit of my experience.

Q. (*by Mr. Muzzey*). About the interview you had with Mr. Squire at your house on the evening of the 18th, the next day after the smell, — did not he say to you that his object in calling upon you was to notify you where the smell of the night before came from? *A.* No, I don't think he did.

Q. Did n't he say that he had received a letter from Dr. Derby, the Secretary of the State Board of Health? *A.* I can't say. I think he said he had just come from Dr. Derby's. I don't think Mr. Squire would have called upon me unless he had first been there.

Q. Did n't he say to Dr. Derby that he had come to point out the

cause of the stench to the State Board of Health? *A.* I can't say that.

Q. You used an expression just now that pained Mr. Squire somewhat, — about trying to put it off on to some one else? *A.* Well, I will take that back. I don't wish to say anything to pain him. But he said there was a man named Reardon, and he said he had been talking with him and with Boynton to advise him to remedy the difficulty.

Q. Did Mr. Squire say he had notified the Cambridge Board of Health where this trouble came from? *A.* I don't remember.

Q. Now, is n't there a very general complaint of the condition of the Boston shore near to Charles River? *A.* Not that I am aware of.

Q. Has there been any suggestion that the bad odors came from the sewers emptying into Charles River? *A.* If you want to go into that at length, I can say that when these smells first came I tried my utmost to find out where they came from. I did n't think of Miller's River, and did n't trace them there. I did n't know anything about Squire's establishment, and so did n't look to that as the source of the mischief. I wondered whether this smell did n't come from Charles River. I also tried to find out whether there was anything in my own house. People came to me making complaints. Superintendent Forristall and the officers of the Massachusetts General Hospital made the same complaint, and we all finally traced it to Miller's River. I recollected what people said, and I satisfied myself that it did n't come from the sewer. Then I thought the deposit on the flats might cause it. Then I thought it might come in the night. Then my neighbors, some of them, got smells sometimes that I would n't get. At last it settled down and gave us all the benefit of it. There is a place beyond Chickering's factory which people complained of; it was complained of by people who lived at the north of it; it affected them when the wind was northwest. We went and examined that, and did our best to follow that up. Others complained of the filling in of the Back Bay, near Parker Street, and that the odor from the wind was very offensive; but we satisfied ourselves that these were distinct from the odors that settled down into our houses in the evening.

Q. Now take the sewage emptying near Braman's bath-houses, near the foot of Chestnut Street; is n't there complaint of a bad odor there? *A.* Not that I am aware of.

Q. Did n't Mr. Bradley advise that there should be constructed a marginal sewer to extend as far to the eastward as it could be discharged? *A.* I think it would be a good plan; but that has nothing to do with this thing.

Q. Do you mean to say that nothing has been talked of about this? *A.* The Board of Health have talked about it and recommended it in their Report last summer.

Q. Don't you believe that much of the trouble arises from this deposit in the river? *A.* No, sir.

Q. Have you examined into the river or made any investigation as to the amount of sewage that is poured into the river? *A.* No, sir.

Testimony of Dr. Benjamin S. Shaw.

To Mr. McIntire. I am a practising physician in the city of Boston. I was at the Massachusetts General Hospital, and had been there fifteen years previous to a year ago.

Q. (*by Mr. McIntire*). Have the patients or those at the Hospital been affected by the odors from Mr. Squire's rendering-works? *A.* Yes, sir.

Q. Do you distinguish the smells? *A.* It was an odor different from any dock smell. It was very disagreeable. It was a sour odor, something like that of decomposing fat, putrid meat, or sour swill.

Q. How often would you get that odor at the Hospital? *A.* I think we got it ten or fifteen times in the course of the summer.

Q. Was this during the past season? *A.* This last summer I know nothing about; I think in the summer of 1871 and 1872 I have noticed that odor so that we had to shut the windows.

Q. You have resided in Boston since then? *A.* I have been out of town evenings and nights.

Q. What effect had the odor upon the patients? *A.* I don't know that it had any injurious effects, but we had to close the windows, so that they suffered from the want of pure air.

Q. Did you ever have occasion to trace up any of these odors? *A.* Yes, sir; during those very summers when I noticed it. My first impression was that it was a local affair; but I found that it came with the westerly wind, and in riding through East Cambridge I noticed the same smells there. I noticed it in driving through Somerville and East Cambridge. It was where they are filling in now.

Mr. Derby. There are two fillings in, one at Boynton's and one at Squire's.

Q. (*by Mr. McIntire*). You never passed on the Gore Street side of the Medford road going to Somerville? *A.* I don't know much about the streets there; but I know that I recognized the same odor.

Cross-Examination.

Q. (*by Mr. Derby*). How many times did you notice this in 1872? *A.* From ten to fifteen times.

Q. Was the smell always the same, or sometimes was there the smell of the dock? *A.* It was a fatty or pungent smell.

Q. You think it was the smell of putrid meat? *A.* I believe it was, most all of the time.

Q. You spoke of a sour smell; did it seem to come from some place where hogs were kept? *A.* It was n't a pigsty smell, but it might have been such a smell as when the pots are not clean.

Q. The water is shoal at the General Hospital, and has the accumulation caught in the eddies there? *A.* I know it is obstructed there, but there is no sewer opening into it.

Q. I speak of the sewage coming down from above? *A.* They are gradually filling up, and I suppose that some smell sometimes comes from those docks.

Q. You have noticed the smell of sewage, or the dock-mud smell? *A.* I can't say as much, as we have not had it in the vicinity of Beacon Street. If you stand about the docks you get the usual dock smell.

Q. You can't tell what particular part of Cambridge this smell came from? *A.* I never examined it particularly. It generally came from the other shore.

TESTIMONY OF DR. JOHN B. TAYLOR.

To Mr. McIntire. I am a physician in Cambridge; reside on Third Street, opposite the Court House; am at the corner of Otis and Third Streets.

Q. (*by Mr. McIntire*). You distinguish these smells testified to, don't you? *A.* I have noticed different odors from the vicinity of Squire's factory.

Q. In regard to the effect of these smells upon your patients in that neighborhood, what has it been? *A.* It has nauseated them in a great many cases; in some cases it has vomited them.

Q. In what time of the year does it most affect them? *A.* In the hot months.

Q. (*by a member of the Board*). Have you been called on that account? *A.* I don't know that I have been called on that account. But I have known persons to complain of this nausea. Persons who were sick have complained of it. I have been annoyed by patients who were sick experiencing this smell and being prevented from passing a good night. I think convalescence has been prevented by this in some cases.

Q. Did you ever detect any of these odors arising from that establishment? *A.* In whatever direction I may be I find these odors from that establishment when the wind is right. At my own house I get it when the wind is northwest.

Q. Have you ever driven or walked in the current of the odor and followed it to its source? *A.* Not into the building, but on Cambridge Street and on Gore Street. So long as I was in the direction of the wind I could smell it.

Cross-Examination.

Q. (*by Mr. Muzzey*). The cases of vomiting have been rare? *A.* They have been rare, I think.

Q. The odors from the basin are very sickening, are they not? *A.* Yes, sir; particularly at this season.

Q. Is n't it a fact that the odors from the basin have become very much like the rendering odors? Is n't there a very strong resemblance between the odors of the basins and the odors of the rendering establishments? *A.* I think the odor from the basin has grown to be very much like what the odors of the establishment were last year.

Q. Is n't there very much relief expected from filling in the basin? *A.* I should suppose there would be.

Q. Is n't there very much expected? *A.* They expect partial relief from it.

Q. Have you been in Mr. Squire's establishment? *A.* Not recently.

Q. Do you know what has been the effect of the improvements there? *A.* No, sir.

Q. Don't you get some odors on the other side of the basin when the wind is favorable? *A.* Yes, sir.

Q. Do you get some odors as far as Fourth Street? *A.* At times we do, when the wind is favorable.

Q. Have you ever perceived those odors at your house, unless when the wind was blowing from the direction of Miller's River, — a south or southerly wind? *A.* No, sir, never.

TESTIMONY OF DR. ANSON P. HOOKER.

(*To Mr. McIntire.*) I am a practising physician in Cambridge; live on Otis Street, between Third and Fourth Streets, about 1,500 feet from Squire's establishment.

Q. (*by Mr. McIntire*). You have distinguished these several odors? *A.* I have.

Q. Have you known of their affecting any persons? *A.* In one case the rendering odor affected a son of Dr. Clark, who was suffering from typhoid fever, and was obliged to have the windows closed in the middle of the hot weather to keep out the rendering odor. We traced the odor to the river. That is the only case that I can trace. I was obliged to have the windows closed.

Q. (*by Mr. Derby*). It was while the patient was sick? *A.* He was very sick.

Q. (*by Mr. McIntire*). You mean to say you traced it to the locality? *A.* I traced it to the locality. I also remember seeing some patients at the Massachusetts General Hospital, who said there was a pig odor at the south window.

Q. (*by Mr. Derby*). Did your patient recover? *A.* Yes, sir.

Q. (*by Mr. McIntire*). Do you know any cases of vomiting? *A.* I know of my own. I think it was on the evening of the 31st of July. That night we had our house filled with the odor. I don't know where it came from.

Cross-Examination.

Q. (*by Mr. Derby*). This was the 31st of July? Did you note the day? *A.* I think it was then.

Q. What time of night was it? *A.* I should say it was between ten and eleven o'clock; and it continued some time.

Q. And it affected several members of your family? *A.* It did.

Q. With respect to the basins and the river, are they not in a very foul condition? *A.* They have been; but I don't know whether they are now or not.

Q. I mean the portions not filled up? *A.* Yes, sir.

Q. By odors emanating from them? *A.* Yes, sir.

Adjourned.

THE CASE FOR THE RESPONDENTS.

THE CASE FOR THE RESPONDENTS.

SIXTH DAY.

Monday, December 8.

DR. DERBY, the Secretary, in compliance with the wishes of the counsel of Mr. Squire, has received the following note: —

"DR. DERBY: Dear Sir, — In compliance with your request, I to-day examined the file of the 'Boston Daily Transcript,' and find that my communication was printed on the 12th of June last, consequently the event referred to in it took place in the early morning of that day.

"Very truly yours,

"S. L. ABBOT."

The Chairman. The Board is ready to proceed.

Mr. Muzzey. Mr. Chairmen and Gentlemen, — I am still suffering from the effects of a severe cold, and Mr. Derby has kindly offered to take my situation, and will now introduce the case and make the opening argument.

Mr. Derby. I did not receive the information in behalf of my friend, Mr. Muzzey, that he desired me to present the case this morning until last evening, and I have been obliged to make the best preparation I could in so short time. I will, however, proceed to open it. Before I proceed I will take the liberty to present a map prepared by Mr. E. F. Bowker, from a survey of the territory by Mr. Boskey, which indicates the flats and the rendering establishments; with your permission I will have the map introduced before I proceed.

Mr. E. F. Bowker was then sworn; described his map, and pointed out the various localities under consideration.

Mr. Derby proceeded with his opening argument as follows: —

OPENING ARGUMENT FOR THE RESPONDENTS BY HON. E. H. DERBY.

MR. CHAIRMAN AND GENTLEMEN OF THE BOARD OF HEALTH: —

In the discharge of the duty which has so suddenly devolved upon me, by the ill health of my associate, Mr. Muzzey, I will proceed to open this case. Had I more time to condense, I could be more brief. But you will pardon me, gentlemen, if I should exceed the appropriate time, as so few moments were allowed me for preparation. I notice that Mr. McIntire is not here. I will most cheerfully wait for him, if it is the pleasure of the Board.

The Chairman. I don't know that it is necessary for the Board to wait. We are here according to arrangement, and I don't know that we will wait for any one.

Mr. Derby. I have in the first place, gentlemen, to thank Mr. McIntire — I regret I must do it in his absence — for the courtesy with which he has conducted this case. I must then deal with some of the points which he has made in his opening. I adopt his first point, that this Miller's River is, and has been for a length of time, a nuisance. We concede at once that the river has become intolerable. But the firm we represent has not created such a nuisance. It has sprung from other sources. For the last twenty years it has been made the cesspool for a very large portion of Somerville and Cambridge. You have observed, gentlemen, the water-shed of these two sections, and you have seen how large an area, probably several square miles, drains into this receptacle. It has been not only a settling basin, but a catch-basin, for the drains and sewers of a population of 10,000 to 20,000 people, and you may well imagine it would accumulate here a very large amount of sewage, and that it would become offensive to the senses. It has also been supplied by the dye-works. Three carboys of sulphuric acid, according to the evidence, have been poured into it daily for a long series of years by the bleachery. Many tons of logwood, as well as other dye-stuffs, have flowed down in that turbid stream. The distillery of Mr. Sortwell contributes daily 50,000 gallons of its refuse. The yeast from this distillery comes down into this basin, and then the sulphuric acid mingles with the yeast and the sewage, and produces effects upon the olfactories of the people, when the flats are exposed to the sun, which exceed those produced by the ordinary emanations from the sewers. The river, in the words of the complainants,

has become an intolerable nuisance to the people who live upon its borders ; not sufficient to destroy health, perhaps, but to affect their comfort. This is the first proposition of the complainants. This nuisance led to the steps which have been taken, which resulted in the joint action of your Commission and the Commission on the Harbor in the requirement of drains, and in the filling up of these basins, in which the party I represent here to-day, Mr. Squire, has most zealously engaged. According to the testimony of the complainants, he has filled up at the rate of an acre per month, and during the next season will complete the filling of the whole area, which is now his own. He has bought out Mr. Merrill, who held one of those small establishments for rendering, and is filling his part also. He is followed by the Boynton Packing Company, who have also set the steam-shovel in motion, and are emulating Mr. Squire, who fills the basins below.

I draw your attention, gentlemen, to the fact that here are basins, one of which, with land previously made by Mr. Squire, comprises twenty acres ; another, the Boynton Basin, ten acres ; and another, belonging to Mr. North, containing several acres, — in all about thirty-five acres, now appropriated for the killing and packing of swine. It is an area conveniently near the markets and railways, and admirably adapted for the purposes to which it is devoted.

The position of Mr. McIntire was that, after these improvements had been commenced, there came up, on a certain night last summer, a most horrible smell, and the day assigned for it is the 31st of July. Mr. McIntire examined some twenty-four witnesses, and of these twenty were from the vicinity of Somerville and Cambridge, and testified to offensive smells which they had encountered. Upon recurring to that evidence last evening, I found that more than three fourths of all those witnesses fixed the most offensive day, the most offensive night that they experienced, the night on which the paint was discolored and people were waked in their beds and were obliged to close their windows, as the 31st of July. I am very glad, gentlemen, that they fix the particular date. I was careful on the cross-examination to draw their attention to it particularly, and I find they all agree to it that the worst they experienced was on the night of the 31st of July.

Now, there is no evidence that there was any wind blowing from Mr. Squire's establishment that night ; there was no wind discovered except by some individual who moistened his finger and put it up

to the air, and what was perceptible he thought came from the north. I put it to you, gentlemen, that there is nothing in the evidence to show that there was any connection between the establishment of J. P. Squire & Co. and this scent, or that the scent was carried by the wind from their works. And I will show you, gentlemen, that on this night there is a perfect failure of sequence and connection between cause and effect. There are interstices in the evidence of the plaintiff in this case which remain to be filled. I intend to fill them, but we shall ask at your hands in advance that if there were no other evidence offered you should find that the complainants have not made out a case. All that they say is, that they were waked up at night by uncomfortable smells; but they did not trace them to this establishment. So far as they went in that direction they found that the smell abated, and when they arrived at the works they found there was no smell there whatever.

You will find, gentlemen, in the course of the evidence which we will now present to you, that on this evening of the 31st of July, at the invitation of Mr. Squire, an assemblage of the Mayor and Aldermen met at the works. Several gentlemen were present at this establishment to witness an experiment with a new condenser, and the only smell that was perceptible was when the stop-cocks were opened at the request of these visitors. The establishment that night will be shown to have been one of the sweetest places in Cambridge.

The complainants have introduced several persons from Cambridge who have identified this night, and draw from them the testimony that they were affected a little about the throat by the smells of that night and of other nights. With regard to the evidence, I ask your attention to the fact that there is no case, whatever the smells may have been, or whence they may have come, — whether from the basins, from the works of Reardon, or from the establishment of my clients. No one has proved that Mr Squire's establishment is the source of these smells. The most that is done is that certain parties are brought here, probably those who are the most sensitive to anything of this kind, who state that they have been waked up in the night with coughing, and that they have experienced uncomfortable feelings; that a lady who was subject to sore throat, who had it when at the Point and when elsewhere; that a school-girl or two, and one lady who had worn herself out in school, were affected by the smells, which came from some place in the

direction of J. P. Squire & Co.'s. That is the evidence. It is not conclusive, and it will be answered by the evidence which we shall introduce in the course of the hearing.

The final position taken by Mr. McIntire in his opening was, that in view of all the facts of this case, he should not ask you to peremptorily close the establishment of J. P. Squire & Co. He thought it would be unreasonable. It would be for you, gentlemen, to indicate some future time when the great business there conducted should be abandoned. This was the position taken by Mr. McIntire, and it shows how slight is his confidence in his case. He called his witnesses, and you heard them. I have adverted to some of them. With regard to the witnesses from East Cambridge, I shall not only meet their allegations by the absence of links in the chain of testimony, but I shall reply with downright evidence. We shall show you that on all these occasions there was some state of the atmosphere which brought up emanations from docks, sewers, and basins, under a fall of the barometer. We shall show you that there are other establishments in East Cambridge of a different character from this, from which these emanations came. In the evidence which I hope to introduce, you will see that these red spots upon the map are establishments in which trying is carried on ; in some with care and fidelity, as in the large factories of the Boynton Packing Company, and of North, late North & Merriam, and that there are others where the parties conducting the business were active at those hours in the night when they could best escape detection ; that at some of these there were men who lighted their fires at ten or twelve o'clock in the night, and kept them burning until people rose in the morning, and during that time were not rendering pure, inoffensive leaf-lard, such as we render in the establishment I represent, but were rendering putrid grease, standing for weeks and sometimes for months in the yards of this great city, collected in small carts or wagons and carried to these establishments ; and adding to that the spoiled mutton that came from a great market, a load of which I will show you was carried toward them and offered at other establishments before it reached them, — that they were receiving this rancid material and burning it, gentlemen, in open caldrons, and making odors that were intolerable at the midnight hour, and in the early hours of the morning, when people were absent from the streets of the city, and that these odors, carried by the wind down Cambridge and Gore Streets, and

across Fifth, Sixth, and Seventh Streets, affected the inhabitants of Craigie's Point. This, gentlemen, is the evidence which I hope to introduce into this case.

I have referred to the putrid meat with which East Cambridge is regaled, —

"'T is grease, but living grease no more," —

when it leaves the caldron. I will also draw your attention to two or three other points from which these smells arise. Canal Street, familiar to one of the members of this Board, bordering on the Mill Pond of Charlestown, on which the Eastern Railroad proposes to make improvements, a place where a large number of carts, employed in Boston during the day, are kept at night, and when they go out from Boston they carry the refuse of the markets, which they tip into the dock on Charles Street. Another point is where the Boston and Lowell Railroad has been enlarging its freight yard, at Prison Point Bridge, to which refuse matter, decaying oranges, and other things of that kind are carried, and there engender a putrid smell. From these spots come many of the emanations which have been referred to by the witnesses. It will be my duty to draw your attention to the fact that in various parts of the city, along its western shores, there has been an accumulation from the drains and sewers; that from these come fetid odors. Beginning as high up as the borders of Roxbury, in the Stony Brook drain, and coming down the sides of the Mill Pond by Braman's Docks, and passing down by Cambridge Bridge, to Craigie's Bridge, you will find that within the last ten years the flats, composed of the sewage of the city, have risen three feet along wharves of which I was proprietor thirty years since, when I built them out to deep water, so that vessels could come there and discharge their cargoes. Now at low water there are emanations from these flats most offensive to the senses. I shall be able to show you that on the night of the thirty-first of July, the night in question, by records kept at the Observatory in Cambridge, and by the records kept at Mr. Squire's works, the wind was southerly and southeasterly during the entire night, and on the morning of the first of August; that the wind was not from Miller's River across Cambridge towards Boston, but from Boston to Cambridge. I think the evidence on that point will be perfectly conclusive with regard to the thirty-first of July. I shall be able to show you that there were watchmen very wisely detached by the firm of

J. P. Squire & Co., and provided with a carriage, who, on that night, and until the latter part of September, made observations of the winds and smells; that on the thirty-first of July they found the most odious emanations coming up from Canal Street, in Charlestown, and from Prison Point, from the basin of Roxbury, and the shores of Charles River; and that, passing by the Broad Canal in Cambridge, they found emanations coming up similar to those from the basins; that on this night the establishment of Mr. Squire was visited, and I might say was in possession of the city officers of Cambridge. They were there, and found it more free from smell than any other point. That in Boston on this night the watchmen found odors on Cambridge Bridge, on the shores of Charles River, by the foot of Chestnut Street, Braman's Docks, and as far up as Parker Street, and they were very offensive. You will remember one witness for the complainants', who attended church in Charlestown, said that he had visited the house of some friend near Boylston Street, and found this smell so offensive that his friends closed their windows. That witness told the truth. His only mistake was in imagining that it came from Miller's River, against the wind. On that night, with the wind blowing from the south, these emanations came up, the state of the barometer will be explained to you by Professor Horsford, and he will prove that no such smell could come from Mr. Squire's establishment.

This brings me to another important point. Nearly all the witnesses said to you that on their visits to the establishment of Mr. Squire they found, when close to the building, no smell whatever. Now, gentlemen, I wish to explain to you for a moment, as we proceed, why there was no smell there. Mr. Squire's blocks are two or three hundred feet long, and form a barrier between the basin and the buildings. They prevented these odors that rose from the basin from striking the buildings on the opposite side of the street; they were to a certain extent a barrier, as the buildings opposite will show. The witnesses will apprise you that there are houses opposite the works painted white, and that they have remained so for a long time. The discoloration of paint was on buildings lower down, opposite the basin, where there was no protection between them and the basin. There was no barrier there.

Before I proceed further, let me advert to another point in the case. There are certain limits to the jurisdiction of this Board, although it is clothed with very large powers. I do not find in the

laws of the State any provision that the Commission shall interdict the travel of the pig on his way down from Iowa or Ohio to the market here, or on the other side of the ocean. These denizens of the West, like other citizens, are permitted to pass through our State. We have no right to interdict them, any more than we have to interdict the emigrant and tax him, as we ventured to do some years ago. They have the right to pass; while on the cars they are beyond the jurisdiction of the Board of Health. I think we may relieve the case from the passage of the pigs on their way to the yard. They come under the jurisdiction of the Commission when they breathe their last, when they ascend the scaffold.

I have adverted, gentlemen, to the evidence. There were three classes of testimony. The first witnesses could not trace the smell to the establishment of Mr. Squire; some said it came from that direction. It might have come from North & Merriam's, or from some rendering establishment above. They could only say it came from that direction.

I pass now, gentlemen, to other evidence offered for complainants, in the shape of testimony from experts. A young gentleman, recently a student at Cambridge, and now a professor in the Dental College, — Mr. Munroe, — a good analyzer, I am told, and I believe an honest man, but a little too eager to trace the nauseous smells to the establishment of Mr. Squire, in accordance with the views of a certain clique at the Point, — has testified in this case; he has given you the results of some of the experiments he made. He had certain stations and exposed upon them his tissue papers, and he found that these papers were not affected in the first two experiments, but that somewhere between night and morning, during various stages of the tide, these were affected. But the wind did not come from Mr. Squire's establishment; it came from the east, across the basin. They were evidently discolored, but there is nothing in them to affect Mr. Squire. Then he referred to certain spokes of wheels, some of which had been in the water, some in the mud, and some upon a wagon standing in a shed near the basin. But you will notice that he found them some half a mile below the establishment of Squire & Co., quite a distance down the stream, and there is nothing to show that they were affected by anything that came from above. They were affected by the gases from the basin, from the flats, and from the water; such was the result of the experiment. Well, then he rows

under the establishment in a boat, and finds some hair, which in the course of the fifteen or twenty years Mr. Squire has been there may at some time have dropped down. He was able to gather possibly a handful of hair or bristles of the swine, which had caught against the piles in former days, when less care was exercised than is exercised now. There is nothing in the fact of his finding a few bristles upon the piles, or seeing something upon the bottom of the basin, which can bring him or you to the conclusion that Mr. Squire is responsible for those smells which affect the community.

I come, then, to the analysis of the different articles which now pass from this establishment into the water. And, first, I come to the tank which is spoken of as the tank for dead hogs. Why it should be called so I do not know, except it be that there were once seen by one of these witnesses one or two dead hogs upon the platform. That is the only evidence that any dead hogs are ever immersed in this tank. I shall have the evidence of Mr. Squire upon that point; and it will be substantially this: that on the journey from Albany to Boston, occupying usually about twelve hours, sometimes there will be a hog trampled to death on the way. The average time it would be on the cars would be less than six hours; and probably the animal is not three hours dead when it reaches here. Perhaps two or three a week of these animals are immersed in this close tank, from which no smell emanates, and converted into oil and scraps. The oil is drawn off, and the scrap is sold for fertilizing. What remains is soup, three pints to each hog. The solid matter in that is about nine per cent, which would be less than two ounces. Now, if this great basin is to be disturbed by two ounces a day of this solid matter, how much is it disturbed by the ten tons of material which come down the stream every day from the water-closets of Somerville and Cambridge?

Then comes the scalding water. I have seen allusion to it in the newspapers, that the water in which 400,000 hogs are washed was dashed into that river every day. In place of these there are 1,000 or 1,200 hogs, from which the bristles are removed by immersing them in warm water. These bristles are sold, and carried off. I think they are sold for six cents per animal, or for $ 24,000 a year. They are gathered up carefully, and not allowed to float away on the water of the basin. Well, now take the water. It is clarified and used over. The solid matter is taken out, so that only clear water remains. According to the testimony, the whole amount of solid

matter which might go into the basin is from 200 to 300 pounds per diem, — a very small quantity. Dr. Munroe says it is a little more. He has evidently made a mistake. He had taken, perhaps, the whole quantity in the tanks. Mr. Sharples reduced it to about one third. We shall reduce it still more; and you will find that this matter, which is soluble in water and usually preserved, amounts to about 300 pounds a day. About 15,000 tons of salt water from the sea come into the basin at each tide; and this solid matter cannot possibly pollute it. There is not basis sufficient for such an assertion.

I have dealt, then, with everything except a little residuum of moisture from the steam, which trickles down under the channel from the condensing pipe; and that, gentlemen, is no cause for this odor. I put it to you, gentlemen, that there is no ground on which you can trace these horrible smells to the discharge of these trifling liquids into that stream. With regard to the sulphide of ammonium, if there is any to be found, you must look for it, gentlemen, to putrid meat elsewhere, which, as Professor Munroe informs you, is more dangerous than the innocent and harmless lard which is tried out in the establishment of Mr. Squire.

I have adverted to two classes of evidence presented by these complainants. There is a third class, and that is the evidence from residents of Boston. Certain gentlemen, highly respectable, — Mr. Russell, Mr. Boardman, and Dr. Abbot, — come here and say that they have experienced sickening smells. Why, gentlemen, it seems to Mr. Squire almost impossible that any smell should have travelled two miles, from Cambridge and Somerville to the homes of persons living on the heights of Mount Vernon; and he imagines that it must have risen from drains or sewers, which are becoming so offensive on the Boston shore. The impression may possibly have been left on your minds that some of these odors may have been wafted over by a northwesterly wind from the vicinity of Mr. Squire's. Possibly they may have come from the shores of Charles River; possibly from the deposit from the drains of Boston; possibly from the Broad Canal in Cambridge; but probably, if they came over to this side of Charles River, they came from the works of the two Reardons, O'Neil and Barry, where the putrid fat was rendered, where, if there is a foul smell to be found anywhere, it will be found. It is our misfortune to be southeast of these works,

and intercept, it may be, more or less of the smells that come down Cambridge, Thorndike, and other streets. If we can prove to you that the odious smells come from others, I shall look to this Commission not to visit them upon us, but upon the parties who are guilty. The evidence from Boston is too remote. It is quite unreliable.

Not to advert further to the case presented to you by these parties, I will proceed to give you an outline of the evidence we propose to introduce.

But first, gentlemen, I will call your attention to the powers intrusted to this Commission, and the duties of the Commission, as they present themselves to us. We are parties deeply interested in the results of your investigations. Your power was derived from various acts of the Legislature, the principal act being that of 1871. By the acts of this State establishing local boards of health, and by its acts authorizing the Board to close certain slaughter-houses and to require their occupants to remove to the Abattoir in Brighton, provision is made for a jury trial before a place of business can be closed, thus relieving the Board of Health from that duty. In the Act of 1871, giving additional powers to this Board, the power is given to them to pass, as a jury, upon this question. They are invested with all the powers of a court of chancery in England, to decide upon fact as well as upon law. You have a duty, gentlemen, to perform more serious than the ordinary duties of the court and juries, for you are the court and jury, as I understand it, in this case. Very great powers are confided to you by the State. By the Constitution of the State the property of no citizen can be taken for the public use without the payment of full compensation, to be assessed by a jury. In building a line of railroad the citizen is not to be deprived of property without the award of damages, by a jury. No such provision is made in this case. Now, gentlemen, I would suggest to you that in cases of this magnitude, in exercising this great power upon masses of property, you will feel that you represent the State; that you will look carefully to what you are doing, and consider very thoroughly the question of the public health, the public convenience, and public comfort in deciding this question. There are some who might suggest to you that if an enterprise or an establishment created an inconvenience, a discomfort, some injury to health, it was at once to be abated. There are

two sides to that question, gentlemen, certainly. You are to consider whether the closing up of this establishment would not be prejudicial to the convenience and health of the people. If the establishment is so situate that it ministers to the comfort of the people, because they need the cheap food which it provides, — if this is to be lost by the breaking up of the establishment, — then more injury may result from the discontinuance of it, to the comfort and convenience of the people, than from its continuance.

Another fact, gentlemen. Life itself is quite as important as health, indeed more so. Cheap food ministers to life. So, also, does employment. Suppose five hundred or seven hundred men are employed, and they support their families, who in turn support as many more, in dependent trades. Here are thousands dependent upon an establishment. We shall give you in this case the population of Cambridge and Somerville, and more especially of this ward at Craigie's Point. We shall show that in this ward there are thirteen hundred houses, and at the establishment of J. P. Squire & Co., and others near it, thirteen hundred men are employed. There are from five to six people in each of these houses, and but one or two of these are males. You will find that most of these males in this region are dependent upon these establishments, and a large amount of wages is circulated monthly. You will find that many are dependent upon this business for their daily bread. What is the effect of closing this establishment? It is for the State to lose all these people and their families. Suppose they left the State, and you drove the business to New York, to Chicago, or back to Cincinnati. Does not the State lose the lives of these men, except as one of the members of this great confederacy of States? It is for you, gentlemen, to balance these considerations, and then decide whether the closing of this establishment would be of advantage or injury to the public health, comfort, and convenience.

I wish to put into this case the Report on Noxious Business, in the House of Commons, England, ordered to be printed the 8th of July, 1873. In this Report you have evidence elicited by 3,956 questions. In the contents it is stated that the number of slaughter-houses in London is 1,687, and one of the important facts connected with it is that some are situated within fifty feet of the streets, or of other buildings, and a great many houses have been erected within the distance. The Commission reported in favor of

removing the restriction. The general tone of the Report is, that these establishments are convenient to the people, and tend to cheapen the price of food. I have also reports from the city of Liverpool for 1866, the report of a Commission and of an Engineer; also the By-Laws of the slaughter-houses of Dublin, 1866, and the report of a company called the Liverpool Abattoir Company, conducting a small business in Liverpool; also the petition to Parliament from gentlemen in Liverpool, for the establishment of an abattoir and the exclusion of others With respect to Liverpool, it appears by one of these documents the petition did not succeed; that Parliament was not willing to establish an exclusive abattoir in the city of Liverpool, but decided to continue the existing establishments; that in Dublin a great many slaughtering establishments for the killing of cattle are scattered about. In Paris there are several abattoirs, and wherever they have been established population has grown up around them, just as it has done in this case. I have taken you, gentlemen, to England. There you will find that the ground for public convenience is taken that there should be a contiguity of these places to the places where the food is consumed. And the tendency of the English mind seems to be, at the present time, to have a large number of these establishments at a short distance from the centres of the cities of London, Liverpool, Glasgow, and Dublin.

In this case it will be shown to you that the present application is not sustained by the Mayor and Aldermen of either Cambridge or Somerville, and is urged by individuals with strong prejudices but little influence. They have already applied to the local boards of health, and city authorities of Cambridge and Somerville, who refuse to complain, because they are well satisfied with the steps already taken by these defendants. The grand jury of Middlesex also have thrown out all complaints against this establishment.

Mr. McIntire. I understand the grand jury have not thrown out the complaint, and it is continued.

Mr. Derby. I understand from a gentleman upon the grand jury that the case has been abandoned.

Mr. McIntire. The case has not been abandoned.

Mr. Derby. You should, perhaps, know better than myself. But, at all events, before this hearing is closed, the fact will be settled by the expiration of the term of the grand jury itself. I understand

that the Mayor of Somerville did request the Board of Health to make some suggestion about the matter, and received the reply that it was not expected of the Board to give any advice.

Dr. Derby. We said we were ready to give advice to any one who wanted it, at all times.

Mr. Derby. Your letter to the Mayor is in the case, and speaks for itself. I draw attention to the fact, which is a prominent one, that this case is not supported by the Mayor and Aldermen of Somerville or of Cambridge, nor does it come supported by an indictment of the grand jury. It comes before you on a somewhat singular petition, signed by a few indviduals of the city of Cambridge.

The Chairman. It is all the same.

Mr. Derby. I do not mean to say that it is not. But if the people were in favor of it, it seems to me it would have been taken up by these authorities.

Mr. Newhall. Would not the authorities have had the power to have corrected the evil?

Mr. Derby. Certainly.

Mr. McIntire. So that is to be an argument why we should have applied to those tribunals. I think we can show why we did not.

Mr. Muzzey. The Cambridge Aldermen refused, eight to one, to do anything in the matter.

Mr. McIntire. One of them was convicted by this same Board in 1871, of this same offence.

Mr. Derby. I am here to present nothing but this case. I speak in this case only. I will now, gentlemen, present a series of propositions, which I wish to submit for the consideration of this Commission.

We concede that Miller's River and its basins have for many years been a nuisance, having been the common cesspool of Cambridge and Somerville, and defiled by dyes and sulphuric acid of the bleacheries. This dark, loathsome, and Lethean stream has spread the sewage of two cities over flats bare at low water, from which offensive gases and odors were exhaled long before the works of the defendants were established.

That is one of the propositions.

Another: The exhalations from these flats have been aggravated by gases and offensive smells from the small works of other parties, used for rendering tallow, carelessly conducted; and also, by neg-

lected piggeries on the north bank of the river; and if at any time in past years they have received any addition from the blood of animals killed at the defendants' works, there has been no blood allowed to flow, for the past year, from these works into the river.

Another point: The exhalations from Miller's River have been unjustly ascribed to the defendants' establishment. This will be proved by the most clear and conclusive evidence, by Professor Horsford, Mr. Avery, and other eminent chemists, by buildings blackened on one side, which borders on the sewers which flow into the river, but bright on the other side, which borders on the defendants' works. It has been well proved, also, that no deleterious odors come from their works; that their pens are daily cleansed, swept, and sprinkled with charcoal; that the blood and offal, instead of going into the stream, are daily removed in air-tight carts; that even the water in which the swine are scalded is purified by chemicals before it is allowed to flow away; and, in fine, their whole establishment is kept in admirable condition.

Another: That the site of the defendants' works is adjacent to those long occupied by the Winchesters, which for nearly fifty years have been devoted to the killing and packing of cattle. If there were anything that could encourage these defendants to select this position, it was the fact that for nearly half a century this business had been carried on there, commencing certainly half a century before.

Another fact is the particular topography of the locality. On the one side is the rising ground of Cambridge and Somerville heights, appropriate for dwellings, and on the other side these flats, appropriated for the factories and workshops attendant on a great city. Like the Mill Pond land of Boston, this will be the Mill Pond land of Cambridge and Somerville. We shall offer you evidence on this point to prove that this portion of the ward is commercial and manufacturing, and that the value of the factories and of the workshops exceeds the value of the houses. I think we shall be able to show you that more than half the houses at Craigie's Point are occupied by the people who toil in these establishments.

Another proposition is, that, if any odors ever issue from the defendants' works, which is not admitted, they are inoffensive, and much less perceptible than those which arise from an ordinary kitchen and from many harmless manufactures. The vats

in which fresh leaf-lard is tried out will soon be replaced by close tanks now building, like those now in use at the works; all gases from which are consumed under the boiler. Mr. Squire has been gradually adopting improvements. He has introduced the burning of the gases under the furnace; he has introduced better arrangements for killing the hogs, conducting it in the third story above the flats; he adopts every improvement that is feasible. Let me say with regard to the odors, that there are certain gentlemen who are sickened by going into the kitchen where beef and cabbage are boiled, and where doughnuts, one of the chief staples of New England, are fried. I think this case, however, is not to be judged by such standards, by such keen sense of smell. I know of gentlemen — perhaps one of them is in this room; possibly there may be one on your Board — who, if an unfortunate cat or dog should lie down under their table, would be so affected by the odor they would be obliged to leave the room. So keen a perception is a misfortune and not a fault. But it is not a standard by which a case of this kind is to be judged. With regard to the rendering smell of pure leaf-lard it will be obviated by the close tanks we propose to introduce; but we would suggest that in conducting any great branch of industry, some smells will arise. A gentleman of the Board of Trade, Mr. Rice, illustrated this subject by saying that a complaint came to him, when Mayor, of an establishment on Water Street which burned coffee; a few neighbors complained of it as a nuisance; but he said, "I took the liberty to say that if the smell was offensive to certain individuals, I would suggest the policy of their removing to some spot where coffee was not ground. There were places in the city where they could live without inhaling an odor so offensive as the smell of coffee." So with regard to the great manufacturing places of the State. Take the town of Danvers, which recently changed its name to Peabody. If any gentleman goes there, he would perhaps say that there was the smell of the bark and the tan, and also of the tan water; not very agreeable to the olfactory nerves, but not sufficiently disagreeable to induce the Board of Health or any commission to break up the great establishments in the vicinity of a great city, which add so much to its prosperity. There are smells from the sugar-houses, which could not induce you to break up their business. Such odors are adverted to by Dr. Holmes in one of his poems, where he describes his journey eastward, and tells us of our favorite resorts, —

"There the smells begin
Of fishy Swampscott, salt Nahant, and leather-scented Lynn."

But we are not, gentlemen, for every little smell which may be slightly offensive, to break down great works, as against the comfort, health, and convenience of the community.

Another proposition, gentlemen: In the defendant's works five hundred to seven hundred men are employed, — the number varying with the season. They live near the works, and breathe the atmosphere in and near them night and day, enjoy excellent health, and would feel greatly aggrieved should the works be closed upon the plea of injury to health. Their wages exceed half a million of dollars yearly.

It is a somewhat striking fact, gentlemen, that although Miller's River is so offensive to some people, these parties living in this establishment or doing business in this establishment enjoy very excellent health. I have recently heard that a gentleman has gone to Charles River for the purpose of drinking blood as a restorative of health. I have only newspaper authority for it, however. But I will say that the persons employed in and about this establishment, and their families who reside near by, enjoy remarkably good health, and have not suffered from their position.

Another point: In London, so celebrated for its health, the slaughter-houses are much inferior to those of the defendants. In populous districts of that city it has been proved that there are 1,687 buildings for killing sheep, swine, and cattle, and usually within fifty feet of the streets and other buildings; while in New York more than a million of swine are killed annually in a populous district, between Fortieth and Forty-first Streets, and they are also killed in populous districts of other large cities, and converted into oil and lard. There is a map here, of the city of New York, that a witness will illustrate hereafter. I will show you, gentlemen, that in wards of the city of New York containing a population of 50,000 and 100,000, these establishments exist. They are between Broadway and the North River. In them are killed 1,000,000 to 1,500,000 swine annually, and the parties are increasing their business year by year, and are not excluded from the city. I understand such to be the case in other great cities in the West, in St. Louis and Cincinnati. I am not personally familiar with those cities; but in the city of New York, the commercial metropolis of this country and the powerful rival of the city of Boston in foreign

commerce, this business is conducted on a very large scale, in a warmer climate than that of Boston, and this business is done in the very vicinity of the populous districts. It has received more or less the sanction of the Boards of Health (they are more or less under their jurisdiction), and I have heard within a day or two that the establishment at Communipaw, on the Jersey shore, is to be broken up and carried into a more populous district.

The Chairman. They are not killed there during the summer time.

Mr. Derby. The witness will be able to state more definitely than myself.

That brings me to this point, gentlemen, that one of the great advantages of this establishment at East Cambridge is, that by means of the ice which is taken from the ponds in the immediate vicinity, and brought down to the several works on the river, where some 20,000 tons are used annually, — 10,000 tons by Mr. Squire, and some 10,000 tons by those other establishments, — the ice from the ponds enables them to continue this business later, and to commence it earlier, and, in fact, to carry on a portion of it all through the year; that the ice preserves an equable temperature; that the pork goes into ice-chambers, where it is cooled off, and it becomes possible to put it in shape for packing all through the year. The business is exceedingly important, as the only steamships, if we give them only the freight in the cold weather, would leave us during the summer. Our establishment supplies the city with a very large amount of provisions, the cheap meat, the spare rib, selling at eight cents per pound, and sausages at eight and eight and one half cents per pound. Other parts of the animals, such as the hams, are sold by wholesale at eight or nine cents. This establishment, by furnishing these supplies at a low price, does it to the great comfort and convenience of the people. As to the city of New York, my impression is that the work is carried on summer and winter.

Mr. Squire. It is.

Mr. Derby. As I have some experience, — having courted my wife there in July and August, — I know how hot it is there in summer. [*Laughter.*]

The concentration of business in the establishment of John P. Squire & Co. seems to have disturbed some good people in Somerville and East Cambridge, but the concentration of a large business

in one spot, by these defendants, is in accordance with the recommendations of this Board, when it established an Abattoir. We may not have succeeded in making as perfect an establishment, in all its details, as the State Abattoir; but we have built up here very large works, composed of long ranges of buildings, separate structures, devoted one to the killing, another to rendering and the manufacturing of sausages, and another to the manufacture of lard and the cutting up of the pork into English shapes. It is cut into English breakfast bacon and Preston hams, which are shaped very differently from the American ham, and look like legs of mutton; and instead of selling for sixpence per pound, are sold for a shilling in England. The business of this establishment consists not merely in what I have enumerated. There is a cooperage on a gigantic scale. It is an establishment where one building, or suite of apartments, is devoted to the reception and killing of swine; but the greater part is a manufacturing establishment for the curing of hams, the rendering of lard, and the packing of these articles in boxes and packages, in which they are to be carried away. It is a very large establishment, of which, as I understand, gentlemen, but a small part would be amenable to your authority; that the part occupied for slaughtering would come under your jurisdiction, but the other parts, for the manufacture of boxes and the packing of the provisions, it seems to me, are not reached by your jurisdiction.

The next point is, that there is no occasion for precipitate action in this case, for we have six months of cold weather before us, and ample time for deliberation and the adoption of any modern improvements, and the counsel of complainants asks no immediate action in the premises. It is but necessary to state that point; it is not necessary for me to enlarge upon it. The measures that we have in progress will probably suffice. You have other cases to hear, and it is probable that you will find that there are offensive places demanding the attention of the Board. It is not the work of Mr. Squire, in his defence, to assume the character of an accuser; but some of the smells ascribed to him come from places which may be discovered if you are vigilant. He acts in self-defence only; makes no complaints, but would ward off unjust attacks. I also offer with this proposition another, that the defendants stand ready to adopt any reasonable safeguards that may be suggested by the Board, and will soon complete and set up iron tanks for rendering leaf-lard,

whose gases will be consumed as is the gas from those now in use. I entertain no doubt, but that, if you should wish that the "soup" should be carried off and concentrated, my friend, Mr. Squire, will endeavor to do so, if you attach any weight to that. With regard to the tanks, close tanks will be introduced, although lard cannot be rendered in them so well as in open kettles. But whether you decree it or not, he has come to the conclusion to adopt them, and so get rid of the smell of the leaf-lard, which seems to disturb the olfactories of some of the sensitive people of Cambridge. If we knew how to stop the squealing of the pig we would do that also, and if it is necessary to give them a handkerchief sprinkled with perfume or carbolic acid, while on the cars, we would be willing to do that. [*Laughter.*] We are willing to adopt anything that common-sense or good reason may dictate, to make this thing as acceptable as possible to the people.

My next proposition is: that these defendants, in conducting their vast business, are obliged to compete with rivals in other large cities, in which their business has been long established, namely, with rivals in

St. Louis, where are killed yearly	500,000	swine,
Cincinnati, " " "	620,000	"
New York, " " "	1,000,000	"
Chicago, " " " . . .	1,425,000	"
While Boston as yet kills	800,000	"

although it packs annually one or two hundred thousand and more. The defendants are enabled to compete with other cities chiefly by the adaptation of the spot they occupy to the business they pursue. Their packing-house is believed to be the largest and most perfect in the country. Their proximity to the city and to the ice-houses aids them in this competition. If, gentlemen, you should order these parties to leave the vicinity of the city, it would be a serious drawback to them. Their removal would increase the freights they pay, and perhaps prevent their competing successfully with other parties. It is by making the most of the few advantages nature gives us in this vicinity, by the greater rigor of the atmosphere, as compared with that of New York, that this spot is adapted to their business. Here is a large district of thirty acres, insulated, surrounded by streets with no dwellings upon them except a few occupied principally by the operatives; separated by a sheet of water from other estates, and which our client is now making solid at the suggestion of

the State. A large area belongs to him, and another large area belongs to other parties. Probably nowhere could we find a similar area in the vicinity of Boston. But it is not only its size that is important; it is its proximity to the wharves and to the markets. It is but a mile and a half or two miles from Faneuil Hall Market, and it takes but sixty or seventy horses to enable him to supply this market. Every step you take him away from the markets you make it necessary for him to increase his number of horses to do the business. His site is close by tide water, so that he can land his salt and other articles at the Fitchburg wharf or at East Boston, and by the facilities of the Grand Junction line he has the advantage of the Boston and Albany line, the Fitchburg or Tunnel line, and the other steam railways running out of the city to connect with North, South, East, and West, and also with the Cunard steamships at East Boston. Taking into view the fact of its nearness to market, and the configuration of the territory, I know of no spot on this continent so admirably adapted for this business, or where it is capable of being managed so well, as it can be here by our clients.

Finally, let me refer to the facilities they thus have for disposing of every part of the animals killed by these defendants, and continuing their business summer and winter, from their contiguity to the ice-houses, the sea, and Boston. It is important to them to be able to sell the refuse meat of the animals at fair prices, but it is of far greater importance to the poor people of the city to be able to purchase it at a low price. It ministers to their comfort and to their convenience.

The next point I have already adverted to. I draw a parallel thus: In Boston itself, the high ground on Mount Vernon commands four dollars a foot for dwellings, while the low ground extending from North Market to Summer Street sells at ten dollars to fifty dollars a foot for stores. If Athens had her Piræus as well as her groves and her Acropolis, why may not Cambridge and Somerville have the same? Athens had her Piræus, and I presume she had her sausage-maker, as Aristophanes, in one of his plays, tells of a sausage-maker. My idea is that the whole of Cambridge is not to be devoted to literature and residences, but that a part of it is to be devoted to commercial and manufacturing purposes, and those citizens whose nostrils are very sensitive will live upon the highlands and not upon the lowlands.

My next point is: The works of J. P. Squire & Co. have not injured, but have greatly benefited, the cities of Cambridge and Somerville, which have grown in population and wealth with more rapidity than any towns in the county of Middlesex. But a few days since I saw in one of the papers, which I will put into this case, proof that Somerville has increased in wealth as well as in population more rapidly than any other place in the vicinity of Boston. The growth of the population is dependent very largely upon the success of these establishments.

I come now to the position of the defendants, and the inconvenience that they would sustain if they should be removed. I will simply read the point. The investments of the defendants at their works exceed half a million of dollars, and the active capital used at them exceeds that sum. The perilous business they pursue requires the closest attention to details and the most rigid economy. Their business, although hazardous, is a growing one. By it the vast crops of Western corn, which will not pay freight to the sea, are utilized, for three pounds of it may be consolidated into one of pork, and thus enabled to bear transportation. The rise of wages abroad, and the increase of manufactures at home, create a demand for animal food, and pork enters largely into the consumption of the farmer, the artisan, and the fisherman. The amount exported during the last year by these defendants alone exceeds 24,000 tons. During the past year the defendants have killed at their establishment half the swine received by Boston from the West. Their aggregate sales during the past year in this State, England, and Belgium have exceeded eight millions of dollars. In this year they have employed from five hundred to seven hundred men, and sixty to seventy horses, and have also made at their works 45,000 casks and 90,000 boxes, and consumed 2,500 tons of coal, 5,000 tons of salt, with 10,000 tons of ice. Their sales have usually been half at home and half in foreign countries, and their present rates per pound are for cut meats eight cents, for bacon and lard eight and one half cents, and for hams and sausages eight to ten cents, while the price for their lard oil ranges from fifty to sixty-four cents per gallon.

Another proposition: The amount paid by the defendants of freight last year to railways was $700,000. The amount paid by them for freight to steamships and other vessels was $300,000. They furnished about one seventh of the entire exports of Boston,

and nearly one half of those exports consist of pork and its prdoucts.

The progress of our commerce, gentlemen, is somewhat remarkable. It commenced with the export of fish and lumber. It has extended to miscellaneous products. We have arrived at a period when our trade has doubled and quadrupled, and our exports now exceed $30,000,000 annually. Nearly one half of this export consists of the article of pork. Of this, Mr. Squire furnishes one third, or more than one seventh of the whole exports of the city.

This brings me to the memorial of the Cunard Steamship Company presented by Mr. Alexander. You have there the amount of freight contributed to their vessels. A few years ago they were unable to load a vessel here at all. They are now loading a weekly line which is a very important acquisition to the commerce of the city, because our merchants are enabled to send and receive goods direct instead of by way of New York, which was unsatisfactory to Boston. Now the exports of England for the time being have fallen off. The panic has had the effect to make them very light. The vessels are bringing coal and salt and other things at exceedingly low rates. The chief export from Boston at this time is pork; the market is in Liverpool and London, although some is sent to Antwerp. The "Ville du Havre," when it met with its disaster, had on board one hundred packages of pork, belonging to Mr. Squire, but fortunately it was insured.

But the English workman says: "Recently I have lived on bread and cheese, and I am not satisfied. My wages are eight shillings per day, and I must have pork." And he takes it in the shape of bacon or hams. I am apprehensive that he will become more exacting in his demand for fresh produce, and we shall have to send out fresh pork in some way or other, and possibly beef in the same condition.

Another proposition: The closing of these works would tend to reduce health and life itself by the diminution of food and employment. According to the proof in this case, the discontinuance of these works would increase the cost of fresh meat at least one third, and throw many people out of business. Another effect of closing these works will be to transfer most of the business now done in them to New York and Chicago, whose railways and steamships will receive the freight money now paid to Boston railways and steamships. Such a transfer would carry with it a large population

that would be wholly lost to the State, and would occasion a loss to these defendants of $400,000.

Another point: During the past year these defendants have supplied freight sufficient to load fourteen steamships to Liverpool, and two to Antwerp. As their export trade doubles yearly, they will be competent in the coming year to load a semi-monthly line to Liverpool, and a monthly line to Antwerp, which would be invaluable to Boston. The memorials of the Board of Trade and of the Cunard Steamship Company sustain these points. The committee appointed by the Board of Trade tell us that if the establishment is not disturbed, a second weekly line of steamships will be started from Boston to Liverpool by April, but will be abandoned if these works are closed. I hope that in time we may have an Antwerp line, but at present we depend upon sailing vessels sent out from this city. I understand that during this very past week a very large part of the cargo of the Marathon and two or three other vessels bound for the Continent of Europe was furnished from the works of John P. Squire & Co. Again, the evidence of Judge Russell, the Collector of the port of Boston, establishes the fact that one half the exports of Boston consists of hams, lard, and bacon, and that half the annual increase of its exports consists of the same staples. Very many of the above points are sustained by the memorial and evidence of the Boston and Albany Railroad Company, in which the State is a large stockholder. To sustain the firm of J. P. Squire & Co. is the true policy of the State, as it is interested to the extent of a million in the Boston and Albany line, and to the extent of twelve millions in the Tunnel line, — both of which must draw a large revenue from this firm if it is left undisturbed. If they are sent off to Cincinnati or to Chicago, that business will to a certainty be lost to the State.

The State has evinced a desire to preserve the establishment of J. P. Squire & Co., by the action of two committees and two commissions, as also by the efforts it has made to keep open the lower basins of Miller's River, and the cellars under the Squire establishment. It has done so, too, by the requirement of new drains, and of the filling of Miller's River. The whole subject of a nuisance in Miller's River has been confided to a State Commission, who supervise both filling and drainage, and it is respectfully submitted to this Board that the true course for the Board of Health to pursue in this case is to await the result of the operations directed by the

State. We hope to put on one or two of the State Commissioners, certainly one of them, Mr. Parker, who once appeared for the closing of the river, and trust we shall be able to show that this work which is now going on, the filling of the basins and the building of the drains, will substantially do away with the nuisance that comes from the river. We respectfully submit that the Commission should be permitted to finish its work, and see what can be done before this Board interferes. One of the witnesses who was examined, I think the homœopathic physician, testified that he thought the effect of the closing up of the basin would be to enable them to locate the smell and get rid of it. He was uncertain whence it came, and most of the witnesses were uncertain. You require certainty, not conjecture. Mr. Squire stands before you as a party presumed to be innocent until he is proved to be guilty. He is not to be tried upon suspicion or conjecture, or by any prejudgment that any one or more members of this Commission may have formed, but upon evidence rendered to this Commission; upon this he is to be acquitted or found guilty. Why dishearten him? Why discourage him? Why break up what is going on successfully? Why cut off his means and resources for filling in? Why deprive him of the opportunity of doing what the State has enjoined upon him?

I have a few suggestions more which I will soon finish. My next point I have already adverted to, and I will merely glance at it. The animals on their way to the defendants' works are taken often by night, and usually in one or two trains across a marsh and other lowlands, and pass near few dwellings. They pass rapidly into the packing-house; if any odor comes from them, it is transient and inconsiderable, and if need be, may be subdued by charcoal or disinfectants in the cars: it should not be suffered to outweigh the great interest of commerce. *De minimis non curat lex.*

I will call your attention to the location of the Grand Junction Railroad. It runs across that unsettled district in Cambridge, and passes near very few buildings, and I think occasions offence to very few people. I think of no road that could be used for that purpose with so little objection as this.

The defendants, in accordance with the advice given by the State Commission, have improved their works, set a steam-shovel in motion, and are filling up the basin of the river near them at a cost of twenty-five cents a foot, and are thus expending more than $ 75,000,

and it would be cruel for the State to disturb them after they have, at the instance of the State, incurred such heavy expenses.

The next point is: That which remains to be done is to accelerate the drain which the State has required to be built through Cambridge to deep water in Charles River. The Mayor of Somerville has begun this drain with energy, but it is delayed by Cambridge. If there is any nuisance next year, it must come from other sources, or from the neglect to build this drain which has been ordered by the State. I understand that Cambridge intends to appeal from the decision of the State next year. If its people are so solicitous to get rid of the smell, let them finish the sewer.

Mr. McIntire. We don't want it in the neighborhood of Charles Street. We want it down the harbor.

Mr. Derby. I have no objection personally to its going down the harbor.

I am coming to my last proposition. It is incumbent on the State Board of Health to take a broad view of this question, and not to look with an eagle's eye for small defects, or to proceed in the spirit of an inquisition for blood; but, while taking reasonable care of the comfort and health of the public, to cherish the business by which thousands of the people of this State earn both bread and meat, and thereby sustain the Commonwealth. Within one hour of this State House is a population of a million, doubling once in twenty years. If permitted to extend its foreign trade, it will, in less than half a century, exhibit a population as large as that of London. In our foreign trade imports depend on exports, and exports with us depend chiefly on a single staple of meat, which increases as grain diminishes. Our inland trade depends more or less on foreign commerce, for the Western merchant seeks the largest assortments. Great interests are not to be sacrificed to those who have sewage on the brain. No excitement on this subject by gentlemen who wish to make Craigie's Point what nature never designed it to be, and no solicitude to get rid of a little annoyance, must stand in the way of the commerce of our city and State.

Gentlemen, I close with a single expression of my own feelings, which I have reduced to writing: that the much-abused John P. Squire, who has in a few years built up a great business and expanded the commerce of the State and its metropolis, and who is beloved by his men as their benefactor and friend, has done more

for the commerce of the State than any other individual. No Perkins, Thorndike, Gray, or Lawrence have done what he has done for the development of its trade.

This is the opening which I have the honor to submit.

Mr. Derby then put in the following report: —

Report of the Special Committee of the Boston Board of Trade on the Pork-Packing Business and the Export Trade.

The committee find that these establishments are three in number, owned and managed respectively by Messrs. J. P. Squire & Co., C. H. North & Co., and the Boynton Packing Company; and they are all located in East Cambridge or Somerville, on the water-shed of Miller's River, and the business and process in each are substantially the same. One of these establishments has been brought conspicuously to public notice by a protracted controversy — between parties interested in property lying in the neighborhood of their works and other persons on the one part, and Messrs. J. P. Squire & Co., the proprietors, on the other part — respecting the sanitary results from the prosecution of their business in this locality, it being alleged that these results are the pollution of the basin and flats adjacent to the river, and the corruption of the atmosphere by noxious odors and miasmatic exhalations, which are not only extremely offensive, but deleterious to the health of the neighborhood.

On the other hand, it is replied that no perceptible increase of these disagreeable and dangerous influences has been engendered by the business of these establishments; but that their cause is to be found in the nature and topography of the soil, and in the defective drainage of the whole territory, both of the portion occupied by residences and of that used by industrial establishments of all kinds which depend upon Miller's River for the outlet of their sewers; moreover, that measures have been undertaken, and are now in progress, in the nature of improved processes of "melting and rendering," of chemical disinfectants, of filling the mud-flats with clean gravel, and of constructing ample sewers, leading to full tidal currents, which, when completed, will eradicate the evils complained of.

It will be evident upon the briefest reflection that the sanitary question here involved is one not to be settled by mere visit and inspection by any committee; and that no intelligent and impartial opinion thereon worthy of adoption by this Board can be formed except by an exhaustive examination of all the facts involved, and a careful maturing of the deductions therefrom. And even then the determination of these sanitary influences would seem to belong rather to the department of chemistry and hygiene, under the treatment of professional experts, than to a commercial organization whose members are unfamiliar with this class of investigations. Moreover, such an investigation could be conducted only during a considerable period of time and by large pecuniary cost, for which this committee is not informed that any provision has been made.

They therefore conclude that no such elaborate sanitary investigation

was contemplated in their appointment by the Board. We find, however, in the examination of the subject, that such an investigation has already been made by a Joint Commission appointed by the Legislature of Massachusetts in 1872, consisting of the Harbor Commissioners and the State Board of Health. This Commission was charged with the duty of "devising a plan for the abatement of the Miller's River nuisance." In the execution of this plan they employed Mr. Phineas Ball, civil engineer of Worcester, to make the necessary surveys of the district in question, and estimates for improvements therein. The Report of Mr. Ball, and of the Commission which is based thereon, are herewith submitted for the information of the Board.

The Commissioners' plan for abating the Miller's River nuisance embraces four points, all of which refer to additional drainage, and filling with clean gravel all the basins and flats contiguous to that river, until the drainage of all the territory of Cambridge and Somerville now leading into these basins has been diverted from them into Charles and Mystic Rivers. No special allusion is made in the Report of the Commission to the establishments referred to in the resolution of the Board of Trade, either as among the contributing causes to the alleged nuisance, or as involved in the remedies proposed; but the report is summed up, after stating its four propositions, in the following language: —

> "The Commission has adopted no temporary measures in regard to this nuisance, because it was conceded by the representatives of both cities (Cambridge and Somerville) and of all other parties appearing before the Commission, that none could be devised that would give any substantial relief; and such was the unanimous opinion of the Commission."

Your committee visited two of the packing-establishments alluded to, on the 12th of November, and found them to be remarkably clean, and free from noxious or offensive odors. Indeed, they were much less offensive than many of the small slaughter-houses in the neighboring towns, and less, also, than many establishments in different localities where other kinds of industry are prosecuted. From a business and commercial point of view, and especially with reference to our export trade, these establishments appear of cardinal importance, and deserve all reasonable and safe expedients to preserve them undisturbed, or to increase their facilities. Those who are not familiar with the development and growth of this branch of our trade will probably be surprised to learn that Boston is already second only among American cities in the magnitude of its business in pork-packing; the amount of which annually reaches ten millions of dollars, and furnishes about forty-five per cent of the exports of this city to Europe.

The following summary of the exports of pork in various forms, by the establishments named, from the port of Boston during the years 1870, 1871, and 1872, and to September 30 (being nine months of 1873), have been obligingly furnished from the books of the Cunard Steamship Company, by direction of Mr. James Alexander, the agent of the company at this port, and the statement shows the present magnitude, and, by comparison, the rapid growth of this branch of industry during the period named: —

Summary of Shipments by Messrs. J. P. Squire & Co., North & Co., and the Boynton Packing Company, per Cunard Steamers from Boston, during the Years 1870 – 72, *and nine Months of* 1873.

J. P. Squire & Co.	Boxes.	Barrels.	Tierces.	Hhds.	Total Weight. Tons.	Cwt.
For year 1870 . . .	3,322	...	...	...	798	10
" 1871 . . .	14,376	2,025	3,950	129	4,586	8
" 1872 . . .	43,859	4,130	1,665	338	12,118	5
" 1873 . . . (to September 30).	60,364	5,205	2,367	1,086	16,969	10
C. H. North & Co.						
For year 1870	100	...	...	...	25	..
" 1871 . . .	14,042	100	1,475	176	1,288	9
" 1872 . . .	12,555	1,034	2,078	255	3,466	6
" 1873 . . . (to September 30).	14,234	1,175	885	104	3,590	3
Boynton Packing Company.						
For year 1870	...	...	...	...	...	...
" 1871 . . .	1,948	...	868	...	576	8
" 1872	1,606	16	642	51	510	14
" 1873 . . . (to September 30).	2,769	304	132	45	728	17

The following statement, furnished by Messrs. Squire & Co., respecting some items of their annual business, will further illustrate the magnitude which this industry has attained in a single establishment; at the same time that it gives some interesting statistics, by way of comparison, of the hog killing and packing business of this and some of the leading Western cities.

Statement of Annual Business of J. P. Squire & Co.

Yearly sales	$ 8,000,000
Number of swine slaughtered	400,000
Number of men employed	500 to 700
Number of horses employed	60 to 70
Salt used	5,000 tons
Coal used	2,500 tons
Wood used	200 cords
Ice used	10,000 tons
Number of casks used	45,000
Number of boxes used	90,000
Wages paid to employees	$ 500,000
Freight paid Boston & Albany Railroad	$ 700,000
Freight paid Cunard Steamship Company to Liverpool . .	$ 350,000
Freight paid on shipments to Antwerp	$ 25,000
Value of products sold in domestic market	$ 5,000,000
" " shipped to Europe	$ 3,000,000
Cost of land and buildings (J. P. Squire & Co.)	$ 500,000
Land used in connection with their business	19 $\frac{81}{100}$ acres
Land covered by their buildings	about 5$\frac{1}{2}$ acres
Cost of filling basin of Miller's River, under act of Legislature .	$ 100,000
Number of hogs slaughtered past year in Chicago . . .	1,425,000
" " " Cambridge and Somerville	800,000
" " " Cincinnati . . .	620,000
" " " St. Louis . . .	500,000

The foreign market for these products is, consequently, growing. The establishments of Messrs. North & Co. and of the Boynton Packing Company are of more recent origin than that of the Messrs. Squire & Co., but the statistics of their product and sales show a corresponding growth. Whether, therefore, these establishments be considered with reference to the large amount of capital employed, the number of persons also employed, the value of their products, the large amount of cheap food which they furnish, or the important contributions which they make to our domestic and foreign trade, they seem of notable magnitude; while in all these respects combined it is not easy to point to any new branch of business so full of promise and value to those who aspire to sustain this city as one of the leading commercial ports of the country.

All of which is respectfully submitted.

(Signed) Alexander H. Rice,
Jerome Jones,
J. H. Danforth,
Edward Sands,
Edward W. Kinsley,
George O. Carpenter,
Eugene H. Sampson,
Committee.

Testimony of Mr. John P. Squire.

Q. (*by Mr. Muzzey*). What is your business? *A.* Provision business.

Q. How long have you been in that business? *A.* About thirty-one years.

Q. Where have you been occupied in that business? *A.* In Faneuil Hall Market.

Q. When did you first locate your slaughtering establishment on Miller's River? *A.* We commenced slaughtering there on the 9th of April, 1856.

Q. Give a general and brief description of the business and its extent. *A.* It was about one fifth the extent it is now.

Q. How much land did you cover then? *A.* I think about 250 by 350 feet.

Q. That was the size of the building? What territory of land was there about the buildings? *A.* That was about what we had.

Q. Now, you have added what? *A.* What there is between these buildings and the Grand Junction Railroad.

Q. Will you give a minute description of the manner in which you conduct your business, — how many swine do you kill in a day on the average? *A.* Some 1,200 or 1,300 daily. They are received from the Grand Junction Railroad, on the platform, and driven into the yards. They do not pass into the streets.

Q. It is a covered building that you receive them into? How many stories high? *A.* Three.

Q. What holding capacity has it? *A.* We might crowd in 7,000 hogs.

Q. Now, come to the slaughtering, which is the next step: how is that conducted at present, and what recent changes have you made in that

department? *A.* Very recently we have put our slaughtering establishment up stairs, and have a hard pine floor. We conduct the business as we conduct everything else, on the new system. The floor of the slaughtering-room has a hard pine floor, with conductors to take everything off into the sewer which is completed.

Q. Is it possible, now, for anything from the slaughtering-floors to reach the river by any dripping through? *A.* Every part of the blood and offal is taken off in wagons.

Q. Describe these wagons, — are they tight? *A.* Yes, sir.

Q. How often is the blood removed? *A.* Just as often as we get a load. Three or four loads a day, or five.

Q. Where is it carried? *A.* To Mr. Bradley's, in Everett, where it is made into fertilizers.

Q. Then we come to the scalding-tank. Will you describe that? *A.* Some ten feet long, six or seven feet deep.

Q. Where do you get the water to supply it? *A.* From Fresh Pond.

Q. How often is the water removed in the scalding-tank? *A.* Every ten or twelve hours.

Q. Is anything put into it to precipitate the solid matter? *A.* I don't know the article. One part is blood, but I don't know the others.

Q. But there is a method by which the solid matter is precipitated? *A.* Yes, sir.

Q. What is then done with the water? Is it let off, or used again? *A.* I don't think it is used again very often.

Q. Are you trying experiments with the scalding-water? *A.* Yes, sir; we are trying to find the best way to dispose of it.

Q. Is there any change made in the place where you formerly washed the hogs? *A.* It is done in the same manner; but the business is transferred up stairs.

Q. Are the improvements going on in your establishment entirely completed? *A.* Not entirely. We intend, when this sewer is completed, to turn everything into that.

Q. When did you begin these improvements? *A.* We began them last summer.

Q. Well, now come to the rendering department. How many tight tanks do you now use? *A.* Four.

Q. As to dead hogs, how many of these do you receive? *A.* None to any extent, say, ten a week.

Q. (*by the Chairman*). You have four tight tanks? How many kettles? *A.* There are nine kettles that we use; but we don't use them all at once. We used to use them previous to having put in these tanks.

Q. (*by Mr. Muzzey*). You have close tanks which will do the work of the open kettles? *A.* Yes. We shall set them up just as soon as we can get at it.

Q. What delays your doing it at once? *A.* We have got to have the building hoisted up, and put a story under it.

Q. That is in progress now? *A.* Yes, sir.

Q. How long have you had these tanks actually constructed? *A.* I think we have had them as much as two months.

Q. Then, when they are set up, all the rendering will be done in close tanks? *A.* Yes, sir.

Q. Describe the process by which you get rid of the gases that are

generated. *A.* The pipe runs from the tight tanks to the condenser. The gases then go through a lime chest, and are purified ; and then they are passed through gasoline to the furnace. The tanks are all perfectly tight, or intended to be so. The pipes are connected with all the boilers ; so that, in case one is out of order, we can turn the gas into another of the ten that we have.

Q. What other buildings have you beside your slaughtering establishment on the ground ? *A.* We have buildings for wheelwrights, carpenters, coopers ; and ice and packing houses.

Q. Do you make your own boxes, and do your own coopering ? *A.* Yes, sir. We also have a blacksmith-shop.

Q. What have you done in the way of filling the flats, under the Act of last winter ? *A.* I don't know the exact area. I suppose we have covered about four acres.

Q. How many acres have you to fill ? *A.* There is as much more, and perhaps a little more.

Q. Can you tell what you have spent in filling in, under the Act of the Legislature ? *A.* About $ 25,000.

Q. What do you anticipate your whole filling will cost ? *A.* It is deeper towards the channel, and will cost, I suppose, about $ 75,000.

Q. That does not include your contract with the city to fill up the rest ? *A.* No, sir.

Q. Where do you get the gravel ? *A.* From Prospect Hill.

Q. Have you constructed a railroad ? *A.* No, sir. It is brought down in horse-carts.

Q. I see that the Legislature, by the Act, requires you to build a bulkhead about your building. What do you intend to do with the material now under your building ? *A.* I intend to clean it out ; and when the bulkhead is built, it will allow nothing to go under it. It will be as clean as a cellar.

Q. Are you at work upon the bulkhead ? *A.* We have built most of it, but have left openings underneath it, to remain till the sewer is completed.

Q. Have you filled against it ? *A.* No, sir ; we have n't got as far as that yet.

Q. What delays that ? *A.* We have not got as far as that yet. The city sewer is on the other side. When the city of Cambridge diverted the Gore Street sewer into Broad Canal, there was a break in the Gore Street sewer which runs under my buildings, and has been there ever since.

Q. Until the cities of Somerville and Cambridge have constructed the large sewer, it is not possible to close the channel of Miller's River entirely ? *A.* No, sir.

Q. What are other people doing toward meeting this legislative requirement to fill in ? *A.* All the rest of them have done about one third of what I have.

Q. Within what time is it expected that the entire valley of Miller's River down to the Boston and Lowell Railroad will be filled in ? *A.* I have a contract to fill the balance of the basin, excepting a little around the Kerosene Works and a little which is in Somerville below the bridge. I have a contract from the city, which I could complete before hot weather began, if they could provide the way for the channel. I could finish the work by the 1st of June.

Mr. Muzzey. The Legislative Act of last winter in substance is this: It requires the filling, so far as the scheme of the Act goes, of the entire territory of Miller's River and its basins lying above the crossing of the Boston and Lowell Railroad. That takes in the whole of the Squire Basin, the Boynton Basin, and the stream above, so that the whole district is made solid land. Then, consequently, a sewer is to be built, — compulsory legislation in this case was had, for the first time in Massachusetts, as to a sewer. That sewer, it was provided, should be built, taking the course of Milk Street in Somerville, which is Bridge Street as continued in Cambridge, and find its outlet in the deep water at Craigie Bridge. The Commission, which was composed of this Board and the Harbor Commission, in 1872 reported in favor of the filling and the building of the trunk sewer. There were six lines reported, by the engineer employed, as all feasible lines, and the choice of the engineer lay between two of these routes, one of which would have put the mouth of the sewer at Tufts Dock, Mystic River, near its opening into the sea. There was a controversy upon that point, and finally it was decided in favor of Craigie Bridge. And here let me say that Mr. Squire went to the Legislature to ask that everything that they had recommended be done. The cities of Somerville and Cambridge went before the Joint Commission, and asked that the sewer should continue to find its outlet somewhere in Miller's River by the Boston and Lowell Crossing. But the Commission and their engineer agreed that Miller's River should no longer be the point of discharge for sewers. The engineer recommended these two lines. A compromise was made, so that while the filling was to be required, it gave a choice of the route of the sewer to the election of the two cities, and compelled them to build on some one line. It provided also for the appointment of a commission of three gentlemen who should have control of the locating and carrying on of the work. When the bill got into the Legislature, it was amended, so that the route was selected by the Legislature itself, and pointed to Craigie's Bridge for the outlet. Mr. Squire interposed no further than in his appearance before the Committee. It was the decision of the Legislature. And here I may say that the Chairman of the Committee on Water Supply and Drainage, who himself was an East Cambridge man, from this very territory, thought that route should be selected. Well, now, while Mr. Squire has entered upon this work, and has filled in a large share of his territory, and is now with his men and his carts turning Prospect Hill into the basin, the others have not got one third as far with the work. Somerville has commenced to build its sewer on its own territory; but Cambridge murmurs a little resistance to this Act of the Legislature, and proposes to go and ask that they may be relieved of the requirement as to the building of the sewer.

Mr. McIntire. I don't think that is quite so, Mr. Muzzey. They don't think the sewer should be built on the line indicated by the Act. They want the sewer and admit the necessity; but we see that, built upon this line, it will afford no relief, but, on the contrary, it will be the greater nuisance. It should go to deeper water.

Dr. Derby. There is one point I wish you would explain, if you can, and that is this: the Joint Commission recommended the cities of Cambridge and Somerville and others to fill up the basins, including the Squire Basin, but a part of this basin, directly underneath the establishment, is not to be filled, but is still to remain there unfilled.

Mr. Muzzey. Mr. Squire owns some twenty acres, and his buildings cover, I think, four or five. By not filling this space underneath the building he is saved money and preserved a cellar. The deposit will be taken out and the bulkhead will form an impervious wall.

Q. (*by Mr. Newhall*). Whatever gets into that cellar cannot get out?

Mr. Muzzey. You understand, sir, it is to be cleaned out, and is to be as pure a place as any dwelling-house cellar.

Q. How many acres of the basin are thus covered?

Mr. Muzzey. I think about four or five.

Mr. Squire. I will make a proposition to the Board. When the cellar is cleaned out, if they are not satisfied I will fill it up. There shall be nothing there that anybody shall have any chance to complain of.

Mr. Newhall. That disposes of that.

Mr. Squire. If it is not in proper shape, I will finish it.

Q. (*by Mr. Muzzey*). When did you put in the new machinery for destroying the gases? *A.* In July.

Q. Did the city of Cambridge pass an order requiring all persons engaged in rendering by steam to use close tanks? *A.* I think they did.

Q. Do you render anything that is not sweet? *A.* We have occasionally a dead hog.

Q. Where are they rendered? *A.* We have a small tank, and when we have a dead hog we put it into that.

Q. Take the average of the arrival of animals dead in the cars, how many of them do you receive in a week, take the whole year? *A.* I don't think they average more than one a day. I don't know, but I can furnish the exact number. I keep a record of the whole.

Q. (*by Mr. Newhall*). Everything that is rendered at your establishment comes there alive? *A.* Everything, with the exception of a hog that may die in coming to us. We do, occasionally, if a man has a hog that dies, take it if it is not offensive.

Q. Well, now, what is rendered from the dead animals in your establishment? *A.* It is manufactured into grease-oil.

Q. Is it ever made any other use of? *A.* No, sir.

Q. Is it ever made into purified lard? *A.* No, sir.

Q. (*by Mr. Muzzey*). Well, now, I want you to give us a little account of how you receive these animals, where and how they are gathered, what

method of selection is pursued, and of their journey till they reach your place? *A.* Most of them are brought from the stock-yard in Chicago.

Q. Have you agents there? *A.* Yes, sir; I have agents constantly there, hired by the year. The cars are opened, and they are taken off at Toledo. Sometimes they run through from Chicago to Buffalo, and from Buffalo to Boston.

Q. They are loaded at Chicago, and taken off at Buffalo, and fed and watered. Are they fed and watered in the cars at all? *A.* Never.

Q. Then where is the next stopping-place? *A.* At Buffalo.

Q. Then from Buffalo they come to Boston? *A.* No, sir; we take them off at Albany. They make three stops upon the road.

Q. What are their habits in the cars? *A.* They make no nuisance on the cars.

Q. For what period of time are they on the way from Chicago to your house? *A.* Five days is the regular time.

Q. How many come in a car on the average? *A.* That is according to the size of the hogs. We calculate about twenty-three thousand or twenty-four thousand pounds to the car. The average number is from seventy to one hundred and ten. In the spring they are lighter than at other times.

Q. Are they all on one floor? *A.* There is a deck in each car, making two floors. They are what are called double-deckers, and are counted as two cars.

Q. How many of these car-loads do you receive in a day on the average? *A.* Perhaps from the first of March till the time of the panic we ran about ninety cars per week; sixteen a day at that time. In the summer-time we run a few less.

Q. How long does it take to unload the swine from the cars into your place? *A.* If we had fifteen cars we would unload them in fifteen minutes. They can be unloaded at the same time from both decks of the same car.

Q. Ten or fifteen minutes is sufficient time to discharge the freight of sixteen cars? *A.* Yes, sir.

Q. Are the cars after their arrival allowed to stand on the track? *A.* The engine generally takes them back. They whistle when they arrive, and we go to take care of them.

Q. Have you made experiments, under the direction of Professor Horsford, to see what can be done to sweeten the animals in the cars on their passage? *A.* No, sir.

Q. Has he not made one experiment? *A.* I think he has.

Q. Have you requested his professional advice and assistance in that matter? *A.* Yes, sir.

Q. Now, take the floors of your pens in your hog-houses; what do you do with them? *A.* We never allow our hogs to stay in the yard over night.

Q. How often are the pens cleansed and sprinkled with charcoal? *A.* Every day, if there has been anything in them.

Q. Before I forget it, let me ask you if you are in the constant practice of running your works on Sunday? *A.* No, sir.

Q. Now, it has been testified that you have been running the works on Sunday. Won't you state under what circumstances, and why you do it? *A.* Because of the delays in the trains. We have sometimes to

kill in warm weather. We can double the force in the day-time and kill twelve or fifteen car-loads at once. I consider every dollar we pay out on Sundays as lost.

Q. How long do you keep them before you kill them? *A.* We don't keep them any longer than over night except they get delayed, and then we might keep them some two or three days.

Q. But as a rule you receive them just as fast as you are able to kill them, and do not have them accumulate on hand? When the trains are delayed they come altogether, and you kill them at once? *A.* We buy every day in Chicago, and kill every day here.

Q. Does it ever happen that the transportation of three days arrives at your house at once? *A.* We have had such an occurrence in the winter, when there were storms at the West.

Q. Do you not have in view, in working upon Sunday ever, the public comfort, in getting rid of the animals from the house? *A.* That is the object.

Q. Then again as to the supply of the early Monday market; has it anything to do with that? *A.* Yes, sir.

Q. (*by a member of the Board*). How much do they shrink between Chicago and Boston? *A.* About twenty per cent from their live weight in Chicago to the dressed weight here.

Q. (*by Mr. Muzzey*). I will put you a question. If the soup-liquor which you now run into the river is, in the opinion of this Board, an article that ought not to be put into it or into the sewer, are you ready and willing to carry it away, and dispose of it in any way they may direct? *A.* Certainly.

Q. So also as to the scalding-tanks, will you submit yourself to their direction, whatever it may be? *A.* Yes, sir.

Q. In fact, without going into details, would you welcome their advice gladly, if they would give it to you? *A.* I would be very glad to have their advice.

Q. And you would follow the advice of this Board in conducting your business? *A.* Certainly.

Q. Why could not you adopt the suggestion of the Board, that you should remove to some other place to carry on your business? *A.* It would be very expensive. The farther we get from the markets, of course that is expensive. The buildings we have there would not be worth anything. It would be about equal to tearing them down, as you do here to widen streets. It would not amount to anything.

Q. Well, then, would you be willing to go into business with some of these individuals, — for instance, Barry, — and let them do their business with you? *A.* I should not want their reputation for stinks.

Q. You would object to the business association to begin with? A. Yes, sir.

Q. Then whether or not your own establishment is as large as it can comfortably be under one person's management? *A.* Yes, sir.

Q. How does it compare in size with the Brighton Abattoir? *A.* I don't know. I was never there.

Q. What led you originally to select Miller's River as the place for the establishment of this business? *A.* Its nearness to market. We slaughtered out at the Arlington Heights before I was here.

Q. What is the distance by rail that you have to transport your products to the Cunard wharves? *A.* Less than three miles.

Q. To the Faneuil Hall Market? *A.* I call it about a mile and three quarters.

Q. What you send into Faneuil Hall Market goes there by teams. How is that sent which goes to the Cunard wharf for shipment to Europe and to the vessels that go to Antwerp? *A.* On the cars to East Boston.

Q. You state that the amount of your domestic trade is about half of the eight millions of your production. How widely extended in the community is your domestic trade? *A.* All over New England and into New York.

Q. Now in sending out your products to all parts of New England and to New York, how generally is the product transmitted by rail? Is any use made of the roads that connect with the Grand Junction Railroad? *A.* Not often to any extent.

Q. By the circuitous route of the Grand Junction Railroad it is about six miles to East Boston, is it not? *A.* I do not know the distance. I did not suppose it to be more than three miles.

Q. What is wanted for the domestic markets is delivered from your establishments in East Cambridge and Somerville, the greater bulk of it? *A.* Yes, sir.

Q. And others buy of your houses in Boston? *A.* Yes, sir.

Q. What business places have you in Boston, of your own? *A.* There are properly three stalls in Faneuil Hall Market which are our own and two with which we are connected.

Q. Have you any places in Boston supplied from your establishment in East Cambridge? *A.* Yes, sir. I have a store in North Market Street and on Blackstone Street, and one in Merchants' Row; another on North Market Street where we cut up stuff for the stall.

Q. Now you are doing something in Cambridge opposite your place in Gore Street, putting up a large brick building. What is that for? *A.* There are several parties carrying on work there.

Q. Is that to be a free market-house? Do you intend to make any difference of prices in carrying that on? *A.* No, sir.

Q. Do you intend to charge the same prices there that are charged in provision-shops in East Cambridge? *A.* I calculate to sell for prices that we can afford.

Q. Whether you mean to sell at wholesale prices or at retail prices? *A.* I calculate to sell at wholesale and retail prices. I do not intend to interfere with East Cambridge shops, of course.

Q. Well, how much of the first story of that building will the market occupy? *A.* We may probably occupy the whole of it for a market.

Q. What is the size of the building and of what material is it built? *A.* It is built of brick and is 56 by 57 feet.

Q. How many stories? *A.* Three.

Q. What will you do with the stories above the first? *A.* Use them for tenements or boarding-houses, as it may be convenient.

Q. Do you own, besides your slaughtering establishment, the houses that your men occupy? *A.* There are twenty-nine, besides the works, which are occupied by my men, and which are owned by me.

Q. Your workmen mainly live in East Cambridge and in Somerville? *A.* Yes, sir; right close by.

Q. Take the general condition of your men as to health, what is it?

A. I think that their health will compare favorably with that of any people in any community.

Q. As to their families? *A.* And their families.

Q. They constitute the population nearest your works? *A.* They do.

Q. How many men have you? *A.* We have about five hundred now. I think the greatest number on the pay-roll was six hundred and eighty-seven.

Q. Mr. Squire, do they carry on the Toby and Booth slaughtering-house on the North River during the summer as well as during the winter? *A.* Yes, sir.

Q. Well, what is the reason that in Chicago they do not do the amount of business in the summer season that they do in the winter? Has the getting of ice anything to do with it? *A.* I think that they can get ice enough. They are working around into summer, packing more than they have done.

Q. Their former habit was to kill only in the winter? *A.* Yes, sir; but that is not true at the present. They kill to some extent now in the summer.

Q. I wish you would describe what you know personally about the establishments around you, besides those of Boynton, Lincoln, Chamberlin & Co., and North & Co., — of the other establishments pursuing the business of rendering? *A.* It is well known to all of the inhabitants of East Cambridge that decayed matter and grease are collected, carried out there, and tried. Some of them will get an accumulation of a week, some longer. It is carried out there and tried, and makes an awful smell. Some of these men have made these smells there this summer; lots of them. When I have been going home, there is O'Neil's place a short distance off, which has made me sick, so that I almost vomited, a great many times.

Q. What is the odor that is given off? *A.* It is a very stinking odor; that is all I can say about it. It is an odor I know and can recognize from others there.

Q. Do you ever smell that odor up in your own neighborhood? *A.* Yes, sir, often.

Q. Well, what sort of places are O'Neil's and Shevvellin's? Did n't O'Neil pass some judgment upon himself, and in place of his open kettles put in close tanks? *A.* Yes, sir, he did.

Q. And did the city of Somerville prevent his using them? *A.* Yes, sir.

Q. Now, Mr. Squire, have you taken any measures to assist the public authorities, as well as to protect yourself, in ascertaining what there is, excepting the basins of Miller's River, that makes mischief in the air in that locality? And if so, tell what you have done. *A.* I have tried to call the attention of the authorities of Charlestown and Boston to the subject.

Q. Well, have you employed any men to keep an eye upon the neighborhood and ascertain the source, as far as possible, of anything that was disagreeable? *A.* Since the 26th of June, I think, with the exception of one night, — I am not certain of that, — until the 10th of September, we had men out every night this present year. They used to come in from eleven to one o'clock.

Q. Have they kept a record of what they have observed? *A.* Yes, sir; including the direction of the wind.

Q. Have you a report of the discoveries that have been made by them of the condition of things on any particular occasions? *A.* On the morning of the 18th of June, when I came down to the works, I was informed by one of my men that Reardon had been making an awful stink. He said to me, "They lay it to us. What shall we do?" I said, "Take the horse and buggy and go to Brine." He is one of the members of the Board of Health in East Cambridge. He went to his house and did n't find him, and then went to his store in Boston and informed him of it. On that same evening I received a letter from Dr. Derby in regard to the bad smells that we had had. I had just got ready to go home, and stepped into my buggy and went away to Dr. Derby's house. I did n't find him at home, but the lady at the house said he was over at Mr. Boardman's. I went there, and told Dr. Derby that I was very glad to receive the letter from him while the matter was fresh in mind, and I related the circumstance that I had notified a member of the Board of Health in Cambridge with regard to this matter.

Q. Do you remember anything in particular that occurred on the 9th, 10th, and 11th of June? *A.* No, sir; nothing particular. There were a great many nights that they complained of bad stinks, but they always came from the wrong direction to be ascribed to us. There is a dock smell there, which, of course, they have all of the time. These big stinks were always in the wrong direction to come from our works, so far as our investigation went.

Q. Do you remember anything occurring to produce the bad smell in the neighborhood on the 17th of June? *A.* That is what I have just spoken of.

Q. Now, I want to come to the night of the 31st of July. What occurred in your establishment on that night? *A.* That night the patentee of this apparatus that we have, wanted to exhibit it, and wanted to have the Board of Aldermen and the people about there to come and see it and advertise it. We arranged for an exhibition of it for that evening. The Aldermen came there and the apparatus was exhibited. From some fault or other, the men were not acquainted with the working of it, and they could not get it to work, at first. He was a little disappointed for perhaps three quarters of an hour; but after it was understood, the gas burned very well and without any difficulty. Before we got it to burn, there was a little smell of gas from the water getting hot in the condenser. It was nothing more than you would smell when the gas is leaking in the street, for perhaps ten or fifteen minutes. After the water got cool and the gas began to burn, it was all right and sweet around there. The apparatus was a success in every way.

Q. Well, how late were they there, — the Committee of the City Government? *A.* Some of them might have gone away at nine, some at half past, and others at ten or eleven.

Q. Who were these gentlemen that constituted that Committee? *A.* Mayor Bradford, and I think pretty nearly all of the Aldermen.

Q. It was not, then, the Committee on Health only? *A.* No, sir.

Q. How long were you about the premises yourself? *A.* I went away about half past eleven, perhaps a little later.

Q. Did you receive a visit from Mr. Magoun and others that evening? *A.* Mr. Magoun was there with the others.

Q. Was Mr. Hastings there? *A.* I don't know that he was.

Q. Was Mr. Meyer there? *A.* No, sir.

Q. Do you recollect any other persons except Mr. Magoun and the Board of Mayor and Aldermen? *A.* It does not come to my mind just now.

Q. Well, now, what was going on that night in your establishment? *A.* The tanks were going all night after that.

Q. Were the open kettles? *A.* Yes, sir.

Q. How many close tanks were in operation? *A.* Four, I think.

Q. Do you do anything in the night that differs from what is done in the day? *A.* The open kettles are run both in the day and night, and the tanks only in the night.

Q. At what time do you begin to run the tanks? *A.* Perhaps we get the steam on them at four, five, or six o'clock. As soon as we get a tank full we put the steam on.

Q. How long do you run them? *A.* About ten hours.

Q. Well, was anything going on in your establishment that night which differed from the ordinary state of things? *A.* Not at all. There could not have been, except this little escape of gas for a few minutes. This occurred about eight o'clock. This disappeared in about fifteen minutes.

Q. Do you know of any other nuisance in the vicinity of Miller's River, — take the Prison Point Bridge locality, for instance? *A.* The stinks around there are very thick. The water up the ditch along the side of the Grand Junction Railway is very offensive, indeed. My attention was called to it one night, and I got into a boat and went up there. It made me sick for twenty minutes. Mr. Brine's attention was called to it several times.

Q. How far is that from your place, Mr. Squire? *A.* About five hundred feet.

Q. (*by the Committee*). Was that a sewage odor? *A.* It was a combination of everything, I should think. I think the ditch is now filled up.

Q. (*by Mr. Muzzey*). It is not your property? *A.* No, sir. There is property west of the Grand Junction Railway where there is no sewer, and that is very offensive. There is other territory that they are filling up now, which is being filled without any sewers. Mr. McSorley told me that he was made sick working about there, and that he had to go home and go to bed.

Q. That is land that the basin does not touch or flow over? *A.* Yes, sir.

Q. Are there other such places in your vicinity? *A.* There are a great many ditch-holes there that make bad smells. There are lots of them this side of Medford Street.

Q. Is that the territory that is to be filled by Act of the Legislature? *A.* Part of it is, but not all of it.

Q. How far distant are you from Broad Canal, in Cambridgeport, which is drawing now so much attention? *A.* I could n't tell you ; half a mile, I should think.

Q. Do you speak of the marsh land lying between Cambridge Street and Broad Canal, as a spot not covered by the Act of Legislature, but which ought to be filled? *A.* I think it should be.

Q. Do you know anything of a sewer in a bad condition connected with the House of Correction in East Cambridge? *A.* There is one there, and I think that the County Commissioners awarded the city of Cambridge $ 800 to carry it out into deep water.

Q. What has been the condition of things there? *A.* I think it is just as bad as Miller's River, any part of it, and worse.

Q. When you first established your business where it is located now, were there many dwelling-houses in the immediate vicinity? *A.* No, sir.

Q. Have they been built quite generally since you came there, so that the land is now pretty well covered over? *A.* Yes, sir.

Q. What is the class of buildings that have been put up there within ten years? *A.* They are of the poorer class; such as working people build.

Q. What was the condition of the river when you first came there? *A.* I think when I came there there were no sewers, the drains ran directly into the basin.

Q. What sewers have been running in there since? *A.* The Cambridge Street sewer for one, which runs back as far as Hovey's Nursery. Then there is the Gore Street sewer, which used to pass down through our cooper yard. Four years ago they built a sewer alongside of the Grand Junction, and it was turned into that. Formerly it used to empty immediately under our buildings.

Q. Did that have any effect upon the basin or the condition of things beneath your buildings? *A.* It caused more nuisance, five times over, than all that we put in, of course.

Q. How long was this sewer which came from Hovey's Nursery down to the basin? *A.* About a mile.

Q. What district did the Gore Street sewer drain? *A.* It drained Fourth, Fifth, and Sixth Streets, — a populous district, thickly settled.

Q. Where did the Medford Street sewer enter? *A.* It entered at the upper end of the basin.

Q. That drains Somerville territory, does it? *A.* Yes, sir. There is also a Winter Street sewer down below.

Q. Is there not another sewer coming from above the Grand Junction Railroad? *A.* Yes, sir. There is also the Fifth Street sewer.

Q. That, then, makes six sewers, above Miller's River, flowing into this basin alone. Now, then, how many of these sewers continue to run into the basin? *A.* All except the Gore Street, which we have just turned out. The Cambridge Street sewer was diverted last fall.

Q. Does any open under your buildings now? *A.* We have planked it up, so that it does not run directly under, and we have extended it a little farther beyond, but it still empties into the Miller's River basin.

Q. You have been charged with putting offal and blood into the basin in times past. Will you state whether you do anything of that kind now? *A.* No, sir; not at all.

Q. How long since you ceased to make any use of the basin in that way? *A.* Three or four years. Since the first of this month Mr. Bradley has taken it all.

Q. Well, have you for a year polluted the basin with any offal or blood? *A.* Nothing more than comes from washing the hogs.

Q. Have you had anybody keeping an account of the direction of the wind? *A.* We have a watchman who is a very competent man, who has made a record several times a day.

Q. When did he begin? *A.* He had kept it previously for my benefit, but he put it on cards before the 31st of July.

Q. How many times a day does he take the direction of the wind? *A.* He is there from six o'clock in the evening until six or seven in the morning, and if there is a change he makes a note of it. During the day he does not make a note of it.

Q. Now, Mr. Squire, if your business should be stopped where it is now conducted, what would you do? where would you go? *A.* I don't know. I don't know of any better place than that I have got.

Q. Would you transfer it to any other place in Massachusetts? *A.* Not of the magnitude that it is now.

Q. Where would it probably be transferred to? *A.* To the West.

Q. What injury would it be to you, if this Board should order you to stop carrying on your business? *A.* *It would wipe out thirty years of my savings.*

Q. Why? *A.* The buildings would be almost valueless.

Q. What effect would the stopping of the pork-packing business, as carried on by yourself, by the Boynton Packing Company, by North, and by Lincoln & Chamberlin, have upon the price of pork in the market? *A.* It would have a tendency to shorten the market, and make prices a great deal higher.

Q. How much higher would pork be in price in this market?

The Chairman. It seems to me that is a question we cannot take into consideration.

Mr. Squire. I think it would raise the price at least twenty-five per cent on all fresh meat.

Q. Would it affect anything except the price of pork? *A.* Yes, sir. Pork is the great leveller of prices of all meats.

The Chairman. I don't think that is relevant to the subject.

Mr. Muzzey. We put it in the light that cheap meat concerns the health, comfort, and convenience of the whole community.

AFTERNOON SESSION. — TESTIMONY OF MR. SQUIRE CONTINUED.

Q. (*by Mr. Muzzey*). You listened, Mr. Squire, to the testimony of Mr. Boardman and Dr. Durgin, members of the Boston City Board of Health. They made a visit to your establishment. I would like to have you relate what occurred on that occasion? *A.* I went over the works very thoroughly with them, and showed them everything there was there. After having been around with them, and supposing that they had seen everything, some one said they would like to see where we smoke hams, so I went out and showed them that. Then Dr. Durgin, as we were going along, began to snuff. He said, "What smells so?" I said, "I can't smell anything." I could not smell the first thing.

Q. In point of fact, is the floor over that area you were crossing tight, or can the odors find their way through? *A.* The floor is not tight and never was intended to be.

Q. Some witnesses have spoken of a smell or smells in various parts of the building. I want to know if any one visiting your building in the warm weather does not get smells from outside? *A.* Yes, sir.

Q. And do not odors always come in from the basin outside? *A.* Yes, sir.

Q. Do you know it as a fact, that the odors from the basin invade your establishment, and are perceived in it? *A.* Yes, sir.

Q. Have you anything further that you would like to state to the Board? *A.* I would like to say of Mr. Munroe, that what he said about the state of things was greatly magnifying things, like making one hogshead ten hogsheads.

Cross-Examination.

Q. (*by Mr. McIntire*). Mr. Squire, you spoke of those places where they tried out soap-grease; you were there seventeen years ago? *A.* Yes, sir.

Q. Did you know anything of those places then? Don't you know that seventeen years ago there was n't a great deal more soap-grease tried out there then than now? *A.* I don't think there was so much then as now.

Q. Don't you know that there was so much, — don't you know that single individuals used to collect grease in the country, and each individual tried out his own grease? *A.* Yes, sir.

Q. Don't you know that that whole locality, where Barry and O'Neil are, that there were many of them there? *A.* There were more in number, but things have been more concentrated. O'Neil does a great deal more.

Q. Now each man sends off from three to twenty collectors, and gets in grease and tries it out in one place, instead of each collector trying it at his own place? *A.* Yes, sir. There are a great many of them, I know, who work that way.

Q. Don't you know that each of them used to get his kettle full and try it out, and did n't it smell as much as now? *A.* No, sir.

Q. Don't you know that twenty years ago they got that smell in Charlestown? *A.* I don't know; they used to use small tanks then.

Q. Don't you know that the smell of the pork-fat in Charlestown came from Reardon's place? *A.* I don't think it came from the tanks. This stink that Reardon made on the 17th of June might possibly have gone over there.

Q. What do you think that stink that was in Boston then came from? *A.* It may be taking somebody else's business out of their hands, but I will give you my opinion, if you wish. As the tide rises at the mouth of the sewers there is an accumulation in the sewer. During that time this accumulation is undergoing decomposition, and perhaps for four, six, eight, or ten hours. But when the tide drops away that don't relieve the sewer. The air is hotter and hotter, and there is a smell inside. If there is a crack in the sewer and there is a draught, it makes a horrible stink.

Q. Then you say those smells came from the sewer? *A.* I do.

Q. And they are not rendering odors? *A.* They are not rendering odors. They don't create the heat there. It is n't the rendering odors that the stuff and vapor rise from.

Q. (*by a member of the Board*). I don't fully comprehend the answer. You say that when the tide falls the vapors come out of the sewers? *A.* When the tide leaves the mouth of the sewer, the air is hotter inside than it is outside. But if there is a crack in the sewer, or an opening in the house or in the inlets in the streets, there will be a draught created, the same as up a chimney.

Q. (*by Mr. McIntire*). You spoke of all that low district where all the sewage is, between the Grand Junction Railroad and Cambridgeport; now, as a fact, houses have not been commenced to be built there till within four or five years? *A.* It is some four, five, or six years.

Q. Has n't it been gradually built up within a few years? and have not those houses been filled up to a great extent with workingmen? *A.* Yes, sir.

Q. That locality is not in Cambridge? *A.* Only a portion of it. I don't exactly know where the line is.

Q. Is n't all above the Grand Junction Railroad in Cambridgeport? *A.* I don't know that.

Q. Mr. Derby stated that about seven hundred of the houses in East Cambridge are occupied by your employees and establishments of that kind. Do you mean to swear to anything of that kind? *A.* I don't swear to anything of the kind.

Q. How many of your workmen live in East Cambridge? *A.* You politicians ought to know that. I don't know anything about it.

Q. Will you swear that two hundred of your workmen live there? *A.* I don't swear to anything of the kind. You politicians ought to know better than I do.

Mr. Derby. That was my proposition, sir.

Mr. McIntire. I want to see if it was based upon his own computation.

Q. (*by Mr. McIntire*). Mr. Derby said there are about thirteen hundred houses in East Cambridge; will you swear that a majority of those houses are occupied by your workmen? *A.* I can't tell you anything about it.

Q. Do you know how many live in Ward 2? *A.* I do not. I don't know where Ward 2 extends.

Mr. McIntire. Everything west of the dike is in Ward 2; everything east of that is in Ward 3.

Q. Now, out of thirteen hundred houses, how large a proportion are occupied by your employees? *A.* I don't know anything about it. I don't know upon what Mr. Derby bases his computation.

Q. You own some houses there? *A.* I own twenty-nine houses or tenements there. There are nineteen tenements in three blocks.

Q. Don't most of your employees live in those houses or tenements? *A.* Nothing like all of them.

Q. Don't most of the others live beyond the Grand Junction Railroad in Somerville? *A.* I don't know anything about that. I only know those who live in my houses.

Q. Most of those who live with you are healthy, ain't they? *A.* Most of them are.

Q. Have n't you known anybody to become sick in your establishment; I don't mean those who come there from day to day, but that some got sick when they first came there? *A.* I don't remember a single instance.

Q. Don't you remember that a man got sick on the roof one day? *A.* Never heard of it before.

Q. Don't you remember testifying anything about that at the hearing before the Board of Aldermen in Cambridge? *A.* I don't remember about it. It is news to me now.

Mr. Muzzey. There was a case that you refer to; it was that of a man at work underneath the building.

Q. (*by Mr. McIntire*). There was a man underneath affected, was n't there? *A.* I don't know. I supposed it was beer. His head and eyes were affected a little, I believe.

Q. Never heard of this man being affected on top of the building? *A.* Never heard of it.

Q. Speaking of dead hogs, I think it has been stated that the hogs that your get there become dead coming from Albany. What is done with the hogs that die on the way. *A.* They are sold to parties there, at Buffalo, Toledo, and Albany.

Q. Have n't you had some come through dead? *A.* I don't know that I have. If they are dead they never bring them through. At Albany a man examines and sees that they are shipped all right. That is his business.

Q. What parties do you sell them to at Toledo? *A.* I can't tell you. It is a party's business there.

Mr. Muzzey. Please not to forget, Mr. Squire, to put in a statement of the whole number of dead hogs received by you during this year.

Q. (*by Mr. McIntire*). Now, in regard to working on Sundays. You stated that you never work on Sundays except on extraordinary occasions. Don't that happen very often, and have n't you actually employed your men there some part of every Sunday this past season? *A.* There are some men who have to work there on Sundays taking care of the lard.

Q. The necessity of your establishment requires that you should do some work on Sundays, and you have to work, slaughtering and scalding, etc., part of the day? *A.* Sometimes we have to slaughter, beginning work on Sunday night and ending on Saturday night. We are obliged to do so.

Q. Then as a matter of fact you have to work every Sunday? *A.* There is some work to be done there every Sunday.

Q. Then, what has to be done every Sunday? *A.* Slaughtering has to be done Sunday night.

Q. Then you have to render on Sundays? *A.* We have to clean up Saturday nights, and of course, if we have anything in the kettles, we have to render it. The lard that we take from the inside of the hogs we must put in the kettles.

Q. That is gut-lard, is n't it? *A.* Yes, sir.

Q. All the fat that is rendered into lard is tried out in open kettles? *A.* Most all.

Q. If I understand it, the scrapings and trimmings are put in the tanks? *A.* We put all the trimmings in the tanks.

Q. You cart most all the hogs over to Boston just to cut them up, don't you? *A.* For the last two or three years we take and split them, and that saves the carting.

Q. These whole hogs are taken to market and cut up there, and the trimmings are brought back and put into these close tanks? *A.* Yes, sir.

Q. What do you do with those trimmings? *A.* Put them into the tanks.

Q. Don't those trimmings get a little soured sometimes? *A.* No,

sir. We have a process that prevents that. They are put into barrels and brought back the next day from Boston. We can't afford to wait to let them smell.

Q. But don't they get sour before they are brought back? *A.* The trimmings are taken out and teams bring them back. The lean meat is trimmed off and the lard is put into kettles.

Q. Those trimmings are put into barrels, — are they left open? *A.* We put a sail-cloth over them in hot weather.

Q. Do you have those sail-cloths for hot weather only? *A.* We have them for both hot and cold weather.

Q. You put the head, feet, and trimmings into the kettles to be tried out? *A.* The head, feet, and trimmings. If there is an overplus it goes into the tanks.

Q. These dead hogs, — do you put them into the same tanks that the trimmings are put into? *A.* In slaughtering there is a sort of waste stuff that is n't fit for lard. If we have a dead hog it is put in with the waste stuff. We render this stuff every day. Some of it is made into oil.

Q. Please to tell us what it is that you make oil of, — what parts of the hog do you make oil of and what parts do you sell off? *A.* We press a great deal of our lard, and we use it all except the waste stuff and the dead hog, which is made into grease, and we press the oil out of the grease. There are two qualities of oil, — grease oil and extra oil.

Q. What are the different oils used for? *A.* They are used on railroads generally.

Q. What is the difference in the grade of the oil? *A.* One is made from grease and the other from lard.

Q. Is there any difference in the appearance of them when they come out? *A.* One is a little more colored than the other.

Q. You don't have any method of clarifying them? *A.* No, sir. Lard is pressed naturally, and grease is pressed naturally.

Q. These kettles are in the same room that the lower portion of the tank is, and you have four close tanks, — about how many open kettles have you? *A.* We calculate they will hold, when full, about 17,000 pounds.

Q. How many pounds will the open kettles hold? *A.* Ten or eleven flour barrels full of stuff.

Q. (*by a member of the Board*). What is the capacity of a close tank? *A.* About 17,000 pounds. We generally put in about 14,000 pounds.

Q. (*by Mr. McIntire*). How many hundred pounds will the round open kettles hold? *A.* I only know that those round kettles hold about ten or eleven barrels and each barrel holds about 200 pounds.

Q. At all events, you think two closed tanks will render all that your open kettles render now? *A.* I think that two more than we have would.

Q. How much will they hold? *A.* About 22,000 or 23,000 pounds. I don't know, — never made any calculation.

Q. And where you put in pork or scrap to render in the close tanks is up stairs, and you let it out below? *A.* Yes, sir.

Q. Well, now, on the night of the 31st you had this new apparatus tried. How long had it been put up? *A.* I don't know exactly. It was put in by Mr. Kendall, a member of the Board of Health.

Q. Mr. Kendall has done your work for the past three or four years? *A.* If he has done it he has got it by bidding for it. We put out our work by the contract, and advertise for the lowest bidder. Mr. Kendall has done a portion of those kettles.

Q. He did a portion of those kettles last year? *A.* No, sir, he did not. He furnished us a boiler two years ago, and we did n't consider it good for anything.

Q. When was the experiment with gas-burning machine first tried? *A.* On the night of the 31st.

Q. Never tried it before? *A.* I don't know. They might have tried it somewhat, but I think that was the time it was perfected.

Q. Before that, I think your apparatus was something that carried off this smell into the basin? *A.* We blowed it off at high tide.

Q. What were the dimensions of the vat that you turned it off into? *A.* It was 15 by 16.

Q. You generally blowed it off at high tide unless you had to blow off the tank when the tide did n't happen to be high? *A.* We never did so, because there was no necessity to.

Q. A year ago, Mr. Squire, you claimed that that method was the best to get rid of the matter? *A.* I think now that, on a full tide, it was the best.

Q. Do you think now that it is better than the present method? *A.* If we had a full ocean to turn it into, I should think it would be best.

Q. But it went into the Miller's River basin? *A.* It would be just as good as what I have now, when the tide is full.

Q. But you changed it for this apparatus? *A.* Yes, sir.

Q. Do you run this apparatus often now? *A.* We run it off whenever it is necessary. It is attached to every boiler we have got now, and runs through it.

Q. If I understand this apparatus, it is the gasoline that is burned? *A.* The gasoline makes a certainty of its burning.

Q. Don't you have some burners that run into the boiler? *A.* No, sir.

Q. Did n't you have something of the kind the night you made the experiment? *A.* No, sir; we had one to show to exhibit it.

Q. And you don't use the gasoline except to burn? *A.* We used it at the beginning.

Q. As the apparatus is now made, is there no chance or opportunity to turn off those gases without turning them through this coil into the fires beneath the furnace? *A.* You can blow them off while the dirty water goes out, but that would n't do if you let the dirty water get hot. The pipes have to be kept immersed in water.

Q. Then I understand that if the water should get warm that it would n't work, and the gases not rise from the water and mingle with the water? *A.* No, sir.

Q. (*by a member of the Board.*) The whole thing would go into the stream, would n't it? *A.* Yes, sir.

Q. And part of it escape in the shape of steam? *A.* Yes, sir.

Q. Did I understand you to say that the steam would condense and pass off? *A.* I meant that if we blowed the water through these pipes it would be steam.

Mr. McIntire. I understand him to say it would run off into the at-

mosphere and form steam. But there is a place in the apparatus where the gas rises from the water.

Q. (*by a member of the Board*). That is where the steam passes into the tank. The steam mingles with the water in the tank, and the gases escape and go into the burner. Am I right in understanding that the whole product — gases, steam, and all — passes through the coil, and when the coil is kept cool, the steam is condensed and the gases pass along on the gasoline tank, and the water passes out through the aperture?

Mr. McIntire. That is it. These gases rise through the coil, which purifies them, and then they pass off into the gasoline.

Q. (*by Mr. McIntire.*) What portion of the gasoline, and what kind of gases rise from the coil? *A.* I don't know much about the machine myself.

Q. Is n't it after the gases pass through the coil that the gas rises from the water? *A.* It is after the steam is condensed.

Q. (*by a member of the Board*). The gas and steam are mixed; and the lower chamber condenses the steam? *A.* That is it.

Q. (*by Mr. McIntire*). Now, I will ask if that water is warm and the steam does not condense, whether the steam does not come out and the gases go off into the atmosphere? *A.* No, sir; they would come through the steam-chamber, and press through that, the same as gas would. Part would go one way and part the other; but our engineer could explain this matter better than I can. I think the steam would go out where the condensed water would.

Q. I suppose it is now fixed that the gases pass off after the steam is condensed and passes through the still. The water runs in a different direction? *A.* Yes, sir.

Q. How many hams do you smoke in the course of a year? *A.* I could n't tell you. We smoke all we can sell. I can't give any idea of the number.

Q. Do you keep your smoke-houses going all the while? *A.* Some of them are doubtless going all the time.

Q. How many smoke-houses do you have, or how many hams can you smoke in each house? *A.* In some of them we can put 4,000 hams, in some others 400.

Q. Where does the smoke pass off? *A.* Out of the chimneys.

Q. How high are the chimneys? *A.* I don't know exactly. We have two roofs, one a sort of loose roof, and another tight roof over it. When I said the chimney, I did n't say what I meant. The object is not to have a strong draught, but to let them smoulder.

Q. How many hogs do you keep on hand generally through the year? *A.* I don't think we average more than a day's work.

Q. How many trains do you have daily? *A.* One train would bring all we wanted.

Q. I understand you to say that you had one train a day, and each car averaging eighty hogs? *A.* Sometimes they come along scattering, but I should think we generally kept about two thirds of a day's work on hand.

Q. And sometimes you get blocked up, and keep more than that amount? *A.* Sometimes we get blocked, and keep more than that amount.

Q. Don't you wash the pens occasionally? *A.* Yes, sir.

Q. How often? *A.* Since we began to use charcoal, that is scraped up and washed out about every day, or when the hogs are taken out.

Q. Where does that water run down to? *A.* It runs down into the tide. We manage to conduct everything into the sewer, or we intend to, but everybody knows we can't enlarge it, because we have n't got the sewer.

Q. Has any part of your establishment been turned into the sewer? *A.* No part of our works are running into it now.

Q. Will you please to tell us how you catch the blood? *A.* We have a large tank for it; we have changed it from where it was.

Q. How large is the place where you kill the hogs, — where the actual killing is done? *A.* It is made just large enough for work, and no more.

Q. How many hogs can you get into it at once? *A.* Perhaps ten or a dozen at once.

Q. You have only one man in there at a time? *A.* Only one man.

Q. You haul up your hogs to kill them now? *A.* We put a chain on his hind leg, and when he is hoisted to a certain height a man takes him and sticks him.

Q. Does the man who sticks them stand on the floor below? *A.* He does. I can't say how far from the floor he is, though I think it is about four feet.

Q. He takes the hog by the leg, and sticks him. The floor of this place, where the sticking is done, is made of planks running edgeways, is n't it? The old method used to be with a two-inch plank by an inch, and all the blood fell into the water? *A.* That was the old plan.

Q. Now, you say, the floor is inclined and tight, runs off from the centre, sloping into the tub? *A.* It is made so as to let the blood run out, so that we can wash it, and clean it all up.

Q. That place is washed occasionally, is n't it? *A.* Yes, sir.

Q. Where do the washings from the blood-tub go? *A.* It runs down into the tub.

Q. How long has that tub been there? *A.* Ever since the blood has been carried off in that way.

Q. Then these hogs are carried off into the scalding-tank. What is done with the bristles? *A.* They are sold to a party who takes them off every day and night, except in cold weather, when he does n't come so often.

Q. And the intestines? *A.* They are carried off too.

Q. And when the hogs are passed out of the scalding-tank and put on to the benches they are swung up by the legs and opened? *A.* Yes, sir.

Q. There is a certain amount of blood that escapes from the hog when it is washed. Where does that go to? *A.* That must go into the tide till we get the sewer.

Q. And what is done with the intestines and inwards? *A.* They are carried off the same as the blood is.

Q. Are they not put upon the floor before being put into the wagon? *A.* They are thrown in the wagon and cleaned. It has been done in that way always.

Q. What is taken out from them? *A.* The sausage-skins.

Q. Where do you put those? *A.* They are stripped and put down on to the floor.

Q. The livers, hearts, etc., they are kept there, are they not?

A. They are all carted off. We save what is wanted, and the rest is carted off. I make a contract with a party to take them off.

Q. What is done with the plucks? *A.* They are rendered into fertilizers.

Q. Don't you save the hearts? *A.* We do. We keep the hearts, and salt them. They are all washed, and thrown into a box.

Q. Where does the washing go to? *A.* Into the tide. When the sewer is built we shall have a proper place to run it off in.

Q. Are the intestines washed first? *A.* No, they are stripped.

Q. Where do the washings of them go? *A.* They go into the tide, of course.

Q. The intestines are taken into the gut-room; what is done with them? *A.* We salt them, and men dress them for market use.

Q. Is n't that very nasty work? *A.* I don't know that it is very nasty. We can make a nasty job of anything if we have a mind to.

Q. But most of your poor workmen are employed in doing that work? You don't have any of your best men there? *A.* They are mostly one-legged men and men who are disabled.

Q. And some Portuguese? *A.* I don't know of any Portuguese in my establishment.

Q. That is n't a very pleasant smell, is it? *A.* It is merely a local smell. There is no odor there that will affect anybody outside.

Q. Why do you put chloride of lime there? *A.* Why do you put chloride of lime anywhere?

Q. To get rid of smells, I suppose. Do the washings from the gut-room go into the tide? *A.* Of course the cleanings from the gut-room go into the tide.

Q. You don't try to influence any local boards of health there? *A.* I never did.

Q. Or tried to influence elections in any way to prevent parties from going into the Board who were opposed to you? *A.* Do you want to go into that?

Q. It was alluded to in the opening argument here. I want to ask you whether you tried to influence the action of the local Board of Health? *A.* I don't think the men on that Board are men of that stamp.

Q. Mr. Woodbridge is a neighbor of yours, is n't he? *A.* He is a neighbor of mine.

Q. And Mr. Kendall does your piping? *A.* He does what work for me he can get.

Q. You had more or less conversation with Mr. Sawin at the hearing, had n't you? *A.* Never saw him before that night.

Q. Have you had some conversation with him since? *A.* Never have had a conversation with him since.

Q. But your men have tried to defeat one of the candidates for Alderman? *A.* And they did defeat him, because he was n't fit to be there.

The Chairman. I don't see the object of going into this, Mr. McIntire.

Mr. Muzzey. We don't object. Mr. Squire does n't live in the town. His men have been turned out of meetings and had their rights invaded.

Mr. McIntire. I don't wish to go into that. We wish to show that

they did go to the meetings, and we can show that money has been spent to defeat a man from our ward who has acted with the petitioners.

Mr. Muzzey. We have not the slightest objection. All I desire to say, now that the question has been raised, is, that we do not object; but the Board will recognize the propriety, if any false aspersions are cast upon us, of our making a proper reply.

The Chairman. I think the subject had better stop here.

Mr. McIntire. I don't care to follow it any further.

Q. (*by Mr. McIntire*). On the night of the 31st of July, when this horrible stench came up that has been testified to, you say you first tried the experiment of using this apparatus in the presence of Mr. Magoun and others besides, and that night it did n't work well? *A.* For a few minutes it did n't work well, and then the gas came out. Then in ten minutes it was attached and there was no more chance for it to come out.

Q. (*by a member of the Board*). Where was it attached? *A.* Right on the bridge.

Q. (*by Mr. McIntire*). Then you think the gas did come out, and that was the cause of the smell? *A.* No, not a bit of it. The smell we had did n't last ten or fifteen minutes, and it began about seven o'clock.

Q. You heard Mr. Munroe testify that the water was hot? *A.* Yes; they did n't know how to use it.

Q. Did the water get hot again that night? *A.* Yes. It got hot again before they came there.

Q. And you regarded the result of the trial satisfactory? *A.* I did.

Q. How do you know that the sewer at the House of Correction is so foul? *A.* It must be so, because of the number of water-closets discharged there.

Q. You don't know about it yourself? *A.* No, sir.

Q. Have you seen any blackening of the houses there near the bridge? *A.* No, sir, I don't think I have.

Q. Then you were not testifying of anything that you had seen yourself? *A.* No, I have not examined the sewer. I heard people say so.

Q. What you have testified to has been upon what you have heard other people say of the sewers? *A.* I know where they are. I have noticed a smell from them, and, in crossing Dock Square, I have noticed a smell that corresponds to these vilest stinks.

Q. (*by Mr. Muzzey*). Do you mean to say that you are aware of the situation of the sewer that you described in your direct examination, and have smelt odors that came from there? *A.* These smells that they have been talking about, — these ranky, knock-down smells, — I don't know anything about them.

Q. You are familiar with the smells in your basin? *A.* I am familiar with them, of course.

Q. (*by a member of the Board*). You mean to say you have smelt these odors of sewers in the streets of Boston? *A.* I have heard a great many descriptions of these stinks, and, in passing oyster saloons in Dock Square, I have smelt the vilest stinks I ever got.

Q. Have you a similar smell? *A.* We have a strong dock smell, but not as bad.

Q. I would like to know if Mr. Squire has noticed this bad smell at

the mouth of the sewer? *A.* No, only from general remark; I have n't been to these outside ones.

Q. (*by Mr. Derby*). You smell the sewers that run into your basin? *A.* Of course we get a smell from them.

Q. (*by Mr. McIntire*). Is there more than one sewer that empties under your establishment. *A.* There is one other that empties inside of mine. It is within my ground.

Q. Do you ever notice the mouth of that sewer? *A.* I have noticed it a good many times, but I never noticed these other smells that you have been talking about. We have a strong dock smell, but not the knock-down smell that they are talking about. I think the quantity is small for the locality. There is a good deal of water.

Q. Do you suffer with catarrh? *A.* No, sir, not a bit.

Q. You heard Dr. Durgin and Mr. Boardman tell of a smell they got in the quandrangle. I believe Professor Munroe also testified in regard to it. What do you think that smell was? *A.* I can't tell you. Dr. Durgin snuffed around there and I could n't smell anything.

Q. And you could n't smell anything that they did? *A.* I look at it just this way: I calculate that anybody being down in the market — a man who is there every day — would n't smell anything, and a man just come in would.

Q. Now, you have long ventilators the whole length of your building, have n't you? *A.* This is a new apparatus. We put ventilators there that did n't exist there before.

Q. What is there that passes into the tall chimney? *A.* Nothing but wood and coal, except this gas.

Q. What was the object of building it so tall? *A.* We built it so because we thought it might be needed.

Q. Did you expect to turn off any steam there? *A.* We thought it might be needed.

Q. You are building a large enclosed space there in the basin; what is that for? *A.* It is a reservoir for water.

Q. Where do you intend to get your water from? *A.* On the other side of the basin people get any amount of water by digging twelve or fourteen feet. Folks who live there said we could supply our works if we had a reservoir there. So I drove piles and planked it up eighty feet square. Then we shall clean out the mud and dig down there.

Q. Do you think that will be pure water? *A.* Yes; the man said it was clean, pure, and fresh.

Q. Don't you intend to do anything there but dig out for water? *A.* I don't intend to do anything else.

Q. Do you think the water that runs in there would be pure enough to use? *A.* Yes, sir; pure enough, if the spiles are driven down far enough.

Q. Is there any connection between that place and your sewer? *A.* No, sir.

Q. It is n't intended to blow off with? *A.* No, sir.

Q. (*by a member of the Board*). Do you think it will be good water? *A.* Yes, sir. If it is not what we expect, we will fill it up.

Q. (*by Mr. McIntire*). You say you have tried to call the attention of the authorities to the cause of the odor that has arisen? Whom have

you ever applied to? *A.* I sent a petition to the city of Boston. The reason I did it was because the newspapers accused me of making stinks which I did n't make. I came to the conclusion that the difficulty was with the draughts up the sewers.

Q. And you notified the authorities that the draughts were in good condition?

Mr. Muzzey. We have the document here which will show it.

A. That was the object of it.

Q. What did you do with Charlestown? *A.* I sent a petition, and called attention to their own difficulties in Canal Street. Knowing that I did n't make the smells, I wanted them to look for them at their own doors.

Q. You stated that there was more than one hog a day which came through dead? *A.* I won't be certain, but I think it would n't average more than one a day.

Q. But they came mostly in hot weather? *A.* Extremely cold weather is about as bad as hot weather.

Q. How do you collect solid matter that is in the scalding-tank? What is your method? *A.* I said I did n't understand it.

Q. Do you understand that you collect all the solid matter?

Mr. Derby. We will put on the foreman presently, and he will explain that.

Witness. We have a method of disposing of the solid matter. It is passed off into offal wagons, and goes to Mr. Bradley's.

Q. (*by Mr. McIntire*). Is there not a certain amount of bristles in there? Do you take any care to catch them before they go into the solid matter? *A.* The bristles there don't amount to anything. When the hog is scalded, some of them are rubbed off. They are scraped off.

Q. (*by Mr. Derby*). There is a specific process for that? *A.* Yes, sir.

Q. (*by a member of the Board*). Why would n't it be a safer thing to have the cutting up done at your place? *A.* It is better to have them carried in and cut up as people want them for market. We have ice-boxes for them to be put in.

Q. Your impression is that this smell of the sewer came from the Boston side of the river? *A.* I have no doubt that this stink of July 31 came from the sewer at the House of Correction. I left our works not more than five minutes from half past eleven, and nothing could be sweeter than they were then.

Q. (*by Mr. Muzzey*). You were asked about the old grease establishments in former days, whether they did n't keep their rancid grease on hand to boil it; let me ask you whether the odor comes from the discharge into the water? *A.* No, sir.

Q. (*by Mr. McIntire*). What do I understand you to state, — that if a hog die on the way from Chicago, he is taken out and sold? *A.* He is left there. The cars are examined at the first stopping-place, and the dead ones are taken out, and so on to the last place; so that no hog reaches the works unless alive, unless he has been killed on the way from Albany to Cambridge.

Q. (*by Mr. Muzzey*). Speaking of the gases that you now burn into the furnaces, I will ask you whether Dr. Jackson said that the former method was satisfactory in disposing of the gases? *A.* He did.

Q. Do you know whether Tobin and Beal have the same method at their establishment on East River? *A.* I know they have.

Mr. Muzzey. In one of those establishments none of those gases are consumed by fire.

Q. (*by Mr. McIntire*). Now, there was a little escape of gas on the first trial of your gas-consuming apparatus on July 31. I wish to ask you whether since then there has been any trouble, and whether that machine performs its service without irregularity? *A.* It does, or seems to.

Q. (*by Mr. Muzzey*). You spoke of sometimes having seven thousand hogs in your slaughter-house; does that happen except during the cold weather? *A.* No, sir.

Q. Does it happen except when the cars are delayed by snow-storms or there is a block up on the road? *A.* No, sir.

Q. (*by Mr. McIntire*). What did I understand you to say about the blood from the intestines? Does that go into the river? *A.* There is n't any there.

Q. Only the washings and drippings ever run into the river? *A.* No, sir.

Q. (*by Mr. Muzzey*). Now, Mr. Kendall — Deacon Kendall, as he is called — has been spoken of as a man likely to be influenced because you bought certain things of him. Is he not a member of the firm of Kendall & Roberts in Cambridge? *A.* He is.

Mr. Muzzey. That is a sufficient indorsement of him for the public and this Board.

Mr. Derby. I have in my possession some account in a newspaper of the progress of Somerville. I have n't time to read it, but will simply give it to the Board.

REPORT

ON AN INVESTIGATION OF THE SOURCES OF THE OFFENSIVE ODORS WHICH ARE ASCRIBED IN A PETITION BY JOHN M. TYLER AND OTHERS, BEFORE THE STATE BOARD OF HEALTH, TO THE HOG-SLAUGHTERING ESTABLISHMENT OF JOHN P. SQUIRE & CO. OF EAST CAMBRIDGE. BY PROF. E. N. HORSFORD.

Mr. Muzzey. When I was first employed in this case, and was notified of the time allowed for the preparation of the case, I regretted very much that we were deprived of the services of Dr. Jackson, who had been employed in the case. I inquired of my client whether he knew Professor Horsford, and he said he did not. I asked whether he had ever been to the establishment, and learned that he had not. I then asked my client if he was willing to trust his case to the investigation of Professor Horsford, and he replied that he was. Immediately upon the return of Professor Horsford from Europe, I waited upon him, requested him to make an investigation of the case, and obtained from him a promise to visit the establishment. I am happy to state that this Board was willing to grant my request to give him time for his investigations, and I am still more happy to call him to give the results of those investigations to this Board.

Professor Horsford was sworn.

Mr. Muzzey. I desire, Professor Horsford, to put to you this general question: Will you state briefly the general circumstances under which you entered into this investigation and what results you have reached?

Professor Horsford. As Mr. Muzzey stated in his opening remarks in regard to my testimony, he waited upon me very soon after I arrived in town after an absence of six months, with a request that I should examine the case of alleged nuisance in East Cambridge. I doubted very much whether I could command the time, in view of the numerous engagements that devolved upon me, partly in consequence of my business and partly in consequence of the peculiar state of affairs in which I found myself. But I was willing to go down and see whether it was a practical subject to follow up. I then said that if I had time I could make myself familiar with the subject and be qualified to give an opinion in regard to it. He then intimated to me that I could probably have until the 1st of December in which to make the investigations. I set about it immediately, and have continued from that time until this. I may say that I completed a report upon the whole question about a fortnight ago. Mr. Muzzey requested that I should put it in writing and

have it printed for his convenience, and, as it was possible, I thought it might be well to put the result of my labor into permanent form, and I have the whole manuscript in my hands. That I might have the light of anything that was presented by the prosecution, and that I might *amend* my judgment if it became necessary, I have retained the manuscript until the present moment. I believe that I have put into a few words the reasons which have led me to the opinion, and I have put it into fewer words than I can present it in any other form.

THE REPORT.

The question of connection between the Squire Hog-Slaughtering Establishment at East Cambridge and the offensive vapors which have been the subject of complaint in Somerville, East Cambridge, Cambridgeport, Old Cambridge, Charlestown, and Boston, during the last two years, resolves itself mainly into three inquiries, relating, —

1. To the smell of sulphuretted hydrogen, which, under certain circumstances, rises from decaying animal matter, and which is capable, under certain atmospheric conditions, of changing the white color of silver to brown, and of lead paint from whiteness, or from light shades, to a slate-color.

2. To the smell due to fat rendering, soup-liquor, and scalding-water.

3. To the smell of living swine.

In regard to the first of these, it may be stated that it is believed by many persons that sulphuretted hydrogen, the chief offensive gas arising from putrid animal matter, is necessarily exhaled from any slaughter-house, with whatever care its processes may be carried on.

The foundation for this belief rests mainly, doubtless, in the well-known offensiveness of the neighborhood of old and long-used slaughter-houses. This belief is strengthened in the particular case of Mr. Squire by several considerations which may be enumerated.

1. There are more houses, the paint of which is discolored, in the immediate neighborhood of Mr. Squire's establishment than at great distances from it; and sulphuretted hydrogen is known to change the light shades of lead paints to a dark slate-color.

2. The discoloration of houses and the offensiveness of the atmosphere have increased somewhat in the ratio of the increase of the works.

3. This increase of annoyance and of the industry have been coincident in point of time.

These foundations of popular belief are entitled to full consideration.

Mere Slaughtering not necessarily Offensive.

In the first place, the mere slaughtering of animals need not be attended with exhalations offensive to persons at any considerable distance. If the opposite were true, an inoffensive and successful abattoir would be an impossibility. That abattoirs are successful and inoffensive we know from the experience of Paris, of Marseilles, of Pesth, of New York, and of Brighton. The cause of offence lies not in the slaughtering, but in the want of care of the fat, blood, and inedible parts.

If the viscera, blood, and waste matters are permitted spontaneously to go into putrefactive fermentation, sulphuretted hydrogen, either by itself or in combination with ammonia, will escape into the air. In Pesth all such matter is washed from stone walls and floors into the Danube. In Paris every portion is most carefully utilized, taking advantage of heat, water, and antiseptics to altogether prevent the fact of putrefactive fermentation. The presence of smooth stone and cement surfaces in Paris and Pesth make thorough removal of the animal refuse and waste practicable.

But in our old and long-used slaughter-houses, without proper floors or drainage, the soil of the underlying and surrounding grounds is saturated with animal matter in a state of decay, and so is a source of fetid exhalations.

The local considerations applying to Squire's works are, at first glance, of considerable weight.

It is natural to think that two events, uniformly coincident in time, should be in some way mutually dependent. But it is possible to err.

The inference that Mr. Squire's slaughtering or rendering is the direct and only cause of the blackening of the houses in the neighborhood demands that there should be found no other adequate cause, and that we should be able to find somewhere in the establishment an adequate cause. It involves this also: that if the influence of blackening goes out from Mr. Squire's works, it should produce its effects of discoloration first on the sides of painted ob-

jects nearest the works, and that the effects should be uniform over the surface. This is obvious from the consideration that the blackening influence must be carried by the wind. It would of course reach the nearer side first. Such an effect as blackening the most distant side of a house, while the side directly open to a current of air from the slaughter-house and nearest to it was unchanged in color, is simply impossible. It is especially and manifestly impossible that a black *spot* should be produced on the distant side of a house, while all around and especially the nearer and more exposed surfaces were unchanged in color.

Photographs of Discoloration.

The application of this principle to the question in hand is illustrated in two photographs which have been taken,— one exhibiting a dwelling-house and the establishment of Mr. Squire at a little distance and across an open area, and another exhibiting a black spot on the same dwelling-house on the side most distant from the works. [The map gives the position of the dwelling-house as third in the line of the Boston and Albany Railroad from Cambridge Street on the left side of the track.] Nothing can well be clearer than that no agency transmitted through the air from the slaughter-house of Mr. Squire could have produced this particular effect of discoloration.

Sulphuretted Hydrogen, the nauseous, irritating Gas that discolors Paint.

The cause of this kind of discoloration is well known, as already stated, to be sulphuretted hydrogen, which decomposes paints having a basis of white lead; zinc and ochre paints are not affected.

The same agent, as is well known, is the source of one of the most offensive and irritating smells found about accumulations of putrid animal matter, as vaults, the mouths of sewers, docks, etc.

The Offensive Vapors of July 31, 1873.

This particular odor, arising from putrefying animal matter, is soluble in water; its escape from water or from decaying substances is facilitated by a falling barometer, — that is, by diminished atmospheric pressure, — and its production by warm weather. Its intensification as an annoyance is aggravated by all these quali-

ties being taken advantage of, in concurrence with a muggy atmosphere and a very gentle breeze, as a dry, high wind would rapidly dilute the gas beyond recognition. Most of these qualities were favorably concurrent to offensiveness on the evening of the 31st of last July. There was, following that particular evening, an almost universal outbreak of complaint against this particular smell. Popular suspicion fastened on the establishment of Mr. Squire as the source of the offensive odor.

To test the justice of this suspicion there are obvious resources. The smell was sickening that night at the Lower Port, in East Cambridge, in Old Cambridge, and in Somerville; but it also compelled families in Chestnut Street, as well as on the Back Bay and in Charles Street, Boston, to close their windows. It was offensive even at the Harvard College Observatory. The smell was universally characterized as the "dock smell," — the smell that one occasionally experiences on the West Boston Bridge. This was the odor that reached the Observatory. Now, it is highly probable that annoyances of the same nature could not reach all these different localities from one source in *any* length of time. But it is positively certain that the offensive gas of sulphuretted hydrogen could not have proceeded from one centre to so many different and distant points on the same occasion; because, if the air was at rest, it would not move at all, and if it were in motion, it could not be in motion in various opposing directions at the same time.

Let us look at the condition of the atmosphere as shown by the meteorological record kept at the Observatory. The day had been cloudy, the evening was muggy, — that is, the air was saturated or supersaturated with moisture. The barometer at ten o'clock on the morning of July 31 stood 30°.18; at four o'clock in the afternoon, 30°.16. The next morning it stood at 30°.06, and the next afternoon at 29°.97. It was a *falling* barometer, and so favorable to the escape of gas from decaying matter or from water. The temperature all day was above 80°.

There was a breeze of four miles an hour at four o'clock in the afternoon. This breeze was from the southeast veering to the south. [The next morning at ten o'clock it was from the south.] The tide was going out. According to the Coast Survey Tide-Tables it was dead low at the Navy Yard at about 10.53 P. M. The flats along the Cambridge shore, which are covered by four

and a half feet of water at high tide, must have been bare before eight o'clock. Between eight and nine o'clock in the evening of July 31, the offensive smell at the Observatory was experienced.

If we take the Coast Survey map of Boston Harbor, and lay the edge of a ruler on the Harvard College Observatory in the direction of southeast and northwest, it will be seen to pass, not through Squire's establishment, or even East Cambridge at all, but to pass through Cambridgeport, to the south of Broad Canal, and over the flat land, bare at low tide, above West Boston Bridge, in the direction of Boston Back Bay. These observations determine that on the night of July 31 not only was the offensive smell in East Cambridge not due to Squire's works, but the offensiveness of the atmosphere of Cambridgeport, and even of the whole city of Cambridge, on that evening, was not at all due to Squire's works, for the simple reason that the wind and its direction made it impossible. What applies to Squire's works applies with nearly equal force to all the basins of Miller's River. Somerville must have suffered from the exhalations of the river basins on the night of July 31, but no portion of Cambridge, except, possibly, from deflected currents, that along the immediate margin of the basins.

Coincidences and their Explanation.

To consider in the next place the meaning of the coincidence in the ratio of annoyance with that of increase of the works and the coincidence of these in time, is almost rendered unnecessary by the conclusion already arrived at. Still it may be desirable to show their real significance.

Settling Basins; Normal Action of Flood Tide.

It is well known that until the advent, in point of time, of the offensive smells in various parts of Cambridge, where, until comparatively recently, they had not been observed, the slaughter-works on Miller's River were in the way of discharging their blood and refuse directly into the basins, to be removed twice a day by the visits of the tide. As on the retreat of the sea the basins were emptied, whatever had been received into them that was either soluble in sea-water, or of less specific gravity than sea-water, was, as a general rule, carried out. There was, however, a variable amount of insoluble material brought in by the rising tide and left at each ebb.

This action of the incoming tide is familiar to engineers. The Report of 1861 of the Boston Harbor Commission — consisting of General Totten, Chief of the United States Engineers, Prof. Bache, chief of the Coast Survey, and Admiral Davis — contains, at page 19, the following. Speaking of deposits in the Mystic River, it says: "A considerable portion of those large masses of mud lands, which are found in all such places, are deposited on the top of the flood tide, and especially at those periods when the agitation of the water, under the influence of violent winds, disturbs the bottom and sides of the channel. The lightest material is carried upon the shoal ground to the highest level attained by the tide, where the water becomes quiet, and the currents of the ebb have but little appreciable velocity and no determinate direction. The current of the ebb therefore carries back only a part of the material. Every successive tide for a certain time increases in this manner (however slowly) these banks of mud that are to be seen wherever the tide flows."

To this deposit, due to flood tide, consisting more or less of Boston, East Boston, and Charlestown sewage, were added varied contributions, from the shore, of dead animals and refuse material of the streets and through the sewers from 2,000 dwellings, all contributing to swell the accumulation at the bottom of the basins.

On inquiry of various observant persons, resident in the neighborhood for many years, it has been ascertained that eighteen years ago the water of Miller's River was sufficiently clear to bathe in; that eels and flounders visited it and were captured from it. But that since that time the water has gradually become turbid and offensive; and the blackening of paint on houses, and the coincident visit to dwellings of sickening odors, have been more frequent.

One coincident fact is the appearance of Squire's Slaughtering Works on the shore of the basin; but another is that about twenty years ago the embankment of Bridge Street, and the narrowing of the channel to some eighteen feet, was accomplished, by which work the Squire Basin was converted into a marked *settling area*.

The filling up and progressive contraction of the Boston Back Bay, which was previously a great settling basin, is another coincident fact. With this contraction, the settling capacity of the remaining areas, including the flats and indentations of the Cambridge shore, has been brought into larger service.

Effect of introducing Water into the Cities upon the Amount of Sediment in Sewage.

Previous to the introduction of the Mystic water into Charlestown, — that is, some seven to eight years ago, — there were numerous cesspools and privies which had no communication with the harbor, but were cleaned out from time to time by the night-cart service. Since the introduction of the aqueduct these deposits have been more and more conducted to the sewers, and so to the harbor. What is true of Charlestown and Somerville was true at an earlier day of Cambridge on the introduction and distribution of the Fresh Pond water and the increased development of the system of sewers; and, at a still earlier day, of Boston and East Boston on the introduction of the Cochituate.

Bridge Street Dam in 1871.

But there has been another coincidence. There seemed to be in the summer of 1871 a sudden augmentation of the offensive odors about the basins of Miller's River. It appears on inquiry that this marked increase had followed a well-intended act of the City Government of Cambridge. Ascribing the annoyance to the exposure of the bare surface of the bottom of the Squire Basin at low tide, and the exhalations from the mud so exposed, it was thought that covering the bottom permanently with water would prevent the exposure, and so the exhalations and annoyance. Accordingly, by an order of the City Government, the outlet of Squire's basin between the piers of the bridge on Bridge Street was filled up to a depth of six feet, so as to flood Squire's basin.

This dam was permitted to remain for several weeks, when the exhalations from the basins above having been rendered, as was believed, more instead of less offensive, upon the remonstrance of the city of Somerville the dam under the bridge was removed.

The immediate effects of the erection of this dam were to deprive the Squire's works, as well as the contributions of the sewers, the vaults, the street refuse, and all the slaughtering and rendering and soap works, above, of the advantages of the effluent tide in removing the matters received into the basins. The dam converted what had before served as settling areas into *catch-basins.*

In illustration of this kind of action, the Report of the Harbor Commissioners for 1861, p. 22, City Doc. No. 12, remarks, "Wherever a dam, bridge, or weir has been built across a river, it has been observed that the alluvial deposits, whether of sand or mud, brought up by the flood accumulate very rapidly, particularly in the neighborhood of the obstruction, and in this way a quick and sensible diminution of water capacity takes place."

It is not to be wondered at that the offensive exhalations were intensified after the dam was removed. On the retreat of the water and the laying bare of the bottom of the basins, they were covered with the accumulations from all the sources above and around, during the period the dam had been standing. At each flood this deposit was stirred up by the rush of incoming sea-water, — with each ebb the deposit was laid bare to the sun and the air. We do not need to dwell upon what must have been the consequences of the mistaken act of erecting a dam under Bridge Street Bridge.

Source of the Dock Mud in Squire's Basin.

How much of this increase of the offensive dock-mud in Squire's basin is due to contributions from beyond the slaughtering establishments on the shores of Miller's River?

To answer this question somewhat extensive observations were instituted.

Wherever the sulphates of sea-water and organic matter of any kind remain long in contact (with exclusion of the air), reduction of the sulphates of sea-water to sulphides takes place. The sulphates soaking through rotten logs experience this reduction. An acid — sour water of any kind, even carbonated water like soda-water is adequate — striking such a product, sets the sulphuretted hydrogen free. Under certain circumstances, there is an accumulation of sulphur in combination, which, coming to the surface and set free, constitutes a white, somewhat gelatinous, body which is known to be pure sulphur. Most persons have seen it about sulphur springs. It may be seen at Avon Sulphur Springs in New York, and at the *White* Sulphur Springs in Virginia. Wherever this deposit is observable, there volatile sulphur compounds have been produced. Taking this guide, it is not necessary that one should test every locality for the volatile compound. The white deposit is itself a sufficient indication of its presence. Such

deposits are seen on the stones at the sluice below North's pork-slaughtering establishment. [Here is a stone which was covered with it, and, though dry now, has still a gray look.] It was covered with water near the close of the ebb tide. This sulphur is seen as a white deposit at various sewers about the basins, under private dwelling-houses and about privies, on the line of the Boston and Albany Railroad north of Cambridge Street, along the sides of Broad Canal about its head, and in the branch extending quite across to Cambridge Street, at the mouths of the sewers emptying into it, at the mouths of sewers against Charles Street in Boston, on the displaced mud raised above the water in the Back Bay, on the shores of the indentations on Charlestown Neck, on the Mystic, and at low tide on the South Boston flats and the flats on either side of the West Boston Bridge.

These white products are due in some localities more to sewage, and in others more to the reduction of the sulphates of sea-water by other organic refuse; for the most part in the neighborhood of cities probably to the former instrumentality. They are proofs of the capacity of the mud which they coat to evolve sulphuretted hydrogen.

The following analyses of samples of mud were made by J. M. Merrick, Esq., of the firm of Merrick & Gray, analytical and consulting chemists, 59 Broad Street, Boston. They include determinations: 1, of the free sulphuretted hydrogen gas; 2, of the gas disengaged by acid, or what may be regarded as latent but potential sulphuretted hydrogen; 3, of the ammonia; and 4, the relative proportions of water and solid matter in the mud.

Most of the samples were strongly offensive to the smell, and the odor arising from them readily blackened test-papers.

The report is printed in full, and will be submitted. The schedule includes samples of mud from localities as follows: —

No. 1. Ditch on the right-hand side of Canal Street, Charlestown, near Mitchell & Stearns's (horse-shoer's shop).
No. 2. Near mouth of drain, Canal Street, between Prison Point and Tide-Mill.
No. 3. Same as No. 2, but 100 feet farther out towards the river.
No. 4. North Branch of Broad Canal, behind the Boston Rolling-Mill, Cambridgeport.
No. 5. Ditch on the eastern side of Grand Junction R. R., opposite No. 4.
No. 6. Another ditch farther east.
No. 7. Edge of sewer behind the office of the Boston Rolling-Mill.
No. 8. Open sewer in front of the office.

No. 9. Open drain in rear of house opposite the Boston Rolling-Mill.
No. 10. Under the wagon-shed, inside the bulkhead in Squire's basin.
No. 11. Under the hog-pens of Squire's works.
No. 12. Basin outside the bulkhead against the hog-pens.
No. 13. Near entrance to Medford Street sewer.
No. 14. Near mouth of Gore Street sewer.
No. 15. Near outlet of sewer leading from the house which was photographed.
No. 16. Marsh between Allen & Endicott's boiler-factory, Cambridgeport, and the Grand Junction R. R. against Main Street.
No. 17. Same as 16, but nearer to the railroad.
No. 18. " 17, " " " "
No. 19. Cambridge Flats, near West Boston Bridge.
No. 20. " " " " "
No. 21. " " " " "
No. 22. Boston Back Bay, near mouth of Stony Brook.
No. 23. South Boston Flats, below Boston, Hartford, & Erie R. R.
No. 24. Broad Canal towards Boston from No. 8.
No. 25. From point near No. 7.
No. 26. Between No. 2 and the Tide-Mill.
No. 27. Near Beacon Street sewer, Boston.
No. 28. Near Chestnut Street sewer, Boston.

Samples.	Date.	Mud.	Dry Matter.	Water.	Free Sulphuretted Hydrogen.	Combined Sulphure'd Hydrogen.	Total free and combined.	lbs. Mud to produce one cub. foot of Sulp. hy. gas.	Ammonia as Gas.	Ammonia in the Wet Mud.
	Nov.	gram's.	per cent.	per cent.	cubic centimetres.	cubic centimetres.	cubic centimetres.	lbs.	cubic c. c.	per cent.
1	6	100	51.70	48.30	16.88	46.45	62.33	1604.0	236.	0 18
2	11	"	49.80	50.20	60.65	92.00	152.65	649.0	760.	0.58
3	11	"	51.70	48.30	0.09	115.87	115.37	857.0	511.	0.39
4	6	"	30.71	69.29	40.00	1760.00	1800.00	55.8	325.	0.25
5	6	"	17.00	83.00	9.35	60.60	69.92	1428.0	314.	0.24
6	6	"	30.04	69.96	0.00	9.00	9.00	——	195.	0.08
7	6	"	46.00	54.00	30.00	45.10	75.10	1331.0	610.	0.47
8	6	"	64.00	36.00	35.54	74.20	109.74	904.0	357.	0.27
9	6	"	80.00	20.00	3.25	45.20	48.45	2051.0	761.	0.05
10	11	"	32.95	67.05	43.10	80.30	123.40	803.0	1100.	0.84
11	11	"	30.00	70.00	38.20	75.40	114.60	865.0	787.	0.60
12	11	"	35.90	64.10	42.00	125.00	167.00	580.0	787.	0.60
13	11	"	23.30	76.70	204.00	164.00	368.00	269.0	709.	0.54
14	11	"	32.85	67.15	290.00	240.00	530.00	188.0	740.	0.57
15	17	"	70.00	30.00	45.40	62.50	107.80	924.0	839.	0.64
16	25	"	69.00	31.00	0.00	8.00	8.00	——	118.	0.09
17	25	"	68.00	32.00	0.00	10.70	10.70	——	206.	0.20
18	25	"	33.00	67.00	0.00	0.00	0.00	——	380.	0.30
19.	28	"	58.80	41.20	0.25	100.00	125.00	765.0	354.	0.27
20	28	"	50.00	50.00	0.00	172.00	172.00	570.0	354.	0.22
21	28	"	66.00	34.00	0.00	94.00	94.00	1059.0	234.	0.18
22	29	"	25.00	75.00	246.20	250.00	496.20	200.0	945.	0.72
23	29	"	30.00	70.00	142.50	284.00	426.50	234.0	603.	0.46
24	6	"	61.00	34.00	38.00	69.00	107.00	932.0	420.	0.32
25	6	"	24.00	76.00	8.00	51.00	59.00	1689.0	262.	0.20
26	11	"	50.00	50.00	38.50	90.00	128.50	779.0	550.	0.42
	Dec.									
27	4	"	35.00	65.00	25.10	100.40	125.40	797.0	538.	0.41
28	4	"	69.00	31.00	80.00	254.00	334.00	282.0	919.	0.70

These results of Mr. Merrick, to whose care and skill in making the analyses this whole question is indebted in no small degree, are of significance. They show the quality of the mud at various points where sewers discharge into the reaches of the sea above low-water mark. At these points and in their neighborhood there are sources of sulphuretted hydrogen, which are manifestly connected with sewage and with sea-water.

The largest measure of *free* sulphuretted hydrogen gas, that is, gas that may be exhaled without further chemical action, is found according to these determinations in the mud near the mouth of the Gore Street sewer, in Squire's basin. It is 290 c. c.

It is a volume three times and more that of the mud (100 grammes) from which it was expelled by boiling.

The next largest is from near the mouth of the Medford Street sewer, in Squire's basin. It is 204 c. c.

From the basin under the hog-pen building it was 38.2 c. c.

From the basin opposite the pens and outside the bulkhead it was 42 c. c.

From under the wagon-shed it was 43 c. c.

All three are inferior to the amount of free gas in the mud from the basin on Canal Street, Charlestown, between Prison Point and the Mill Pond, which gave 60.65 c. c.

They exceed a little the average product from the samples of the mud from the Broad Canal and its branches, which are severally 30 c. c., 35.54 c. c., 40 c. c.

But of the *latent* though potential sulphuretted hydrogen, which is the compound to be disengaged by the access of acid water from any source, the quantity in the mud of the North Branch near its junction with the Broad Canal is enormous, being no less than 1,760 c. c., or more than 17 times the volume of the mud from which it was derived. Adding to this the free gas, 40 c. c., we have in all, 1,800 c. c.

The spot from which this mud was collected was so situated, possibly, as to receive by action of the tide the deposits from several sewers entering into Broad Canal.

Let us compare the total of free and latent sulphuretted hydrogen in some of the more important localities.

No. 4. The mud from near the junction of the North Branch with the Broad Canal contains 1,800 c. c.

No. 14. That from near the mouth of the Gore Street sewer in Squire's basin contains 530 c. c.

No. 13. That from near the mouth of the Medford Street sewer in Squire's basin contains 368 c. c.

No. 12. That from Squire's basin outside the bulkhead against the hog-pens, 167 c. c.

No. 2. That near mouth of a sewer in the basin on Canal Street, Charlestown, 152.65 c. c.

No. 26. That between No. 2 and the Tide-Mill contain 128.5 c. c.

No. 10. That from the basin under wagon-shed of Squire's works, 123.40 c. c.

No. 11. That from the basin under Squire's hog-pens, 114.60 c. c.

No. 22. That from the Back Bay near the mouth of Stony Brook, 496.2 c. c.

No. 23. That from South Boston flats, 426 c. c.

No. 28. That from near mouth of Chestnut Street sewer, Boston, 334 c. c.

It will be seen that the total sulphuretted hydrogen — free and latent — from the mud of the North Branch near its junction with the Broad Canal, exceeds three times that from the mouth of the Gore Street sewer, — the worst point in Squire's basin ; is nearly five times that from the mouth of the Medford Street sewer, and exceeds thirteen times the average of Squire's basin.

The meaning of these results it would be difficult to mistake.

A mud composed of sewage sediment and sea-water will develop sulphuretted hydrogen. Where the conditions are such that the sewage cannot escape to be diluted and spread over an extended surface, the accumulation will manifest itself, under favoring circumstances, in accumulations of sulphuretted hydrogen. When in combination with ammonia, some of it may escape in that form. But all of it will be set free on the appearance of acid, which is one of the concomitants of the chemical changes that will return with warm weather.

The column of figures giving the required amount of mud, in pounds, in the different localities, necessary to produce a cubic foot of sulphuretted hydrogen, has been introduced to show the relative capacities of the different settling areas, as they are to-day, to evolve offensive gases on contact with acid water.

Without further pursuing the line of deduction from these analytical results, it may be fairly claimed that they establish, —

1st. That the mud of Squire's basin is most offensive to smell where nearest the mouths of sewers.

2d. That the total mud at the bottom of Squire's basin has been largely derived from the sewers heretofore discharging directly into that basin and into the basins above from Somerville and Cambridge.

3d. That the average mud of Squire's basin, away from the mouths of sewers, is not worse than that of the basin on Canal Street in Charlestown, or that of the North Branch, near its junction with the Broad Canal, or that of portions of Boston Back Bay, South Boston Flats, or the foot of Chestnut Street.

Mr. Merrick remarks of the mud from the Back Bay near the mouth of Stony Brook, and that from the South Boston Flats, that they diffused through his laboratory, while drying down, odors more offensive than any obtained from any of all the samples beside which were submitted to his analyses.

Shoaling of the Basin over Cambridge Flats.

The increase of the depth of mud in some localities in the upper interior harbor of Boston, in comparatively recent times, is well known. The actual quantity is matter of official record. In the maps submitted by Professor Mitchell to the Harbor Commissioners in 1867, there is given the number of cubic yards of shoaling and of deepening in Charles River, which took place above Craigie Bridge and below the Brookline Bridge, between 1835 and 1861. It will be seen that at *only one point* in all this area has there been deepening, and that a point near the effluent stream coming at ebb through the Milldam. Everywhere else the deposit of mud had steadily advanced. It amounted in these twenty-six years to nearly 390,000 cubic yards. Now if this was going on in the spaces between the Brookline and Craigie Bridges from the action of the tide, distributing the sewage from the adjacent shores, — in short, if it was the deposit of suspended matters borne by the incoming tide and allowed to subside before the ebb, it is fair to conclude that the filling up of Miller's River with the same kind of matter must to some extent have taken place. Not only is this true in principle, but it must be true in greater degree than in many other localities, as must be apparent from a consideration of the funnel-shaped character of the approach to the river from below, rendered such by railway embankments and the extension of wharves, as well as from the character of the sewage of the immediate shores of Charlestown and Boston.

Movement of Sediment at the Outlet to Squire's Basin.

Several determinations of the sediment in the water at the outlet to Squire's basin, on the tail of the ebb, on the young flood, at

high tide, and at half ebb and half flood, have been made in the interest of this inquiry. It will be seen that water from the surface, half an hour after high tide, yields scarcely any sediment. The suspended matter, obvious in the water of the young flood, has settled out. It has not wholly fallen to the bottom, as is shown in the water at half ebb. The effect of the rush of the water near the end of the ebb and soon after the commencement of the flood, in stirring up the sediment, is apparent in the two samples collected.

[Tubes three feet long and five eighths of an inch in diameter, closed at one end, and so converted into slender, tall jars, served to collect the water, and display its relation to the sediment it contained.]

These collections are entitled to the weight only of isolated observations. But they show conclusively the mobility of the deposits which are the source of the offensive exhalations.

It may not be easy to ascertain the precise instrumentality in increasing the offensiveness of the air in and about Squire's basin due to the waste matters thrown in former times into Miller's River from the Squire Slaughtering Establishment. They have undoubtedly added to the matters collected in the settling basin, — the filth, sewage, and refuse of whatever kind. But the character of Miller's River, as a *succession of settling and catch-basins* and an aggravated case of dock nuisance, has been brought about by agencies external to that of the manufacturing establishments on its shores; such agencies, for example, as the extension of Lechmere Point and the grounds of the Lowell Railroad, the broad embankment of the Fitchburg Road, the narrowing of the outlet of Squire's basin at Bridge Street, the construction of the dam under the bridge in 1871, — and, finally, the system of instrumentalities that has caused the filling up of the great flats on either side of West Boston Bridge.

Photographs.

The full significance of the photographs already mentioned is apparent at a glance. Near the discolored patch at the corner of the house is the open entrance to a sewer discharging into Miller's River.

Since the photographs were taken, the area has been filled with

earth. There is now observable a discoloration of the paint at another point immediately over a space where the boards have been removed, allowing the air under the house to escape. These discolorations are produced by exhalations from the filth under the house, in part, but mainly by the *dock smell*, — *the sulphuretted hydrogen gas* coming up the sewer from the mud of the basin. The analyses of Professor Thompson presented in the report of Mr. Ball to the Joint Commission on Miller's River show the abundance of these sulphur compounds in this mud, as Mr. Merrick's show the amounts in this and numerous other settling areas and basins which receive the sewage of the bordering cities.

The Effect of a Muggy Atmosphere.

It may be well to allude to the effect of a muggy atmosphere in intensifying the annoyance produced by exhalations of sulphuretted hydrogen. The gas is soluble in water. It is caught and dissolved in the fog of such an atmosphere, which is water in the state of fine division, and so not only accumulates, but is lodged and remains on surfaces against which the fine particles of water are driven. This will account for the capricious action of the gas in producing discoloration on irregular surfaces. The particles of water are driven in greater quantity against some portions of the painted surface than against others.

Persons have sometimes failed to get evidences of sulphuretted hydrogen about docks or catch-basins even in warm, muggy weather. They may have placed their test-papers too far above the surface of the mud or water, or out of the track of the vapor, if in motion, or they may have left them too long in the moist atmosphere, in which case the color sometimes becomes obliterated. It must be remembered that when the muggy atmosphere rests long immediately over the source of the exhalations, as it may when there is no wind, it becomes saturated. It is the movement of this highly charged fog, in mass, — and without dispersion or dilution by strong wind, — to be deposited on the surfaces of lead paint, that produces the blackening effect, and, entering windows and doors, produces the nausea that has been felt. The action of the gas is frequently brief, and for obvious reasons. The wind that brings the gas to a given point, if continued, and especially if brisk, soon exhausts the supply of *saturated* air. On the night of the 31st of July, when the offensive vapor was marked, and

reached the Harvard College Observatory with a southeast wind, so gentle was the breeze at the Government Signal Station at the head of Sudbury Street, in Boston, that the instrument recorded a calm. This comparative repose provided for the ascent of the sewage vapors through the sewers discharging into Charles River from the slopes of Beacon Hill. It also provided for the saturation of the muggy air over the Back Bay and Charles River flats and the Broad Canal and its tributaries, which the gentle breeze carried over the city of Cambridge. It is in conditions of the atmosphere such as these that dwelling-houses on the west slope of Beacon Hill, on the Back Bay, and the Worcester Depot are occasionally filled with the offensive exhalations of sulphuretted compounds creeping up the sewers.

The discoloration of paint by sulphuretted hydrogen is not confined to the neighborhood of vaults and catch-basins. We are familiar with it as the effect of the exhalations of bilge-water, where waste organic matters of the ship have reduced the sulphates of sea-water in the bottom of the hold, and so produced the nauseating sulphuretted hydrogen. The glazed or greasy look of an extended surface of a lead compound, like lead paint recently blackened by the action of sulphuretted hydrogen, so often observed as the effect of bilge-water, is a familiar appearance entirely independent of any agency of an oleaginous character.

There is a striking example of this action independent of docks or sewers, and indeed of human instrumentalities altogether, at a marsh in Harwich, on Cape Cod. There, the occasional breaking in of the sea at extreme high tide, and the slow drying up of the pond so occasioned in dry seasons, produces so much of volatile sulphuretted compounds at a time of muggy weather as to discolor the lead paint of the houses in the neighborhood.

The effects of the warmer water of summer in facilitating the putrefaction of animal matter in water, as well as the direct action of the sun on the black mud exposed at low tide, are obvious.

The Effect of a Falling Barometer on the Evolution of Sulphuretted Hydrogen from Dock Mud.

The effect of a falling barometer on the evolution of sulphuretted hydrogen gas may, perhaps, require explanation. Gases set free by putrefactive fermentation must pass from a solid or a liquid condition to the form of a vapor. This change is opposed by

pressure, and is facilitated by diminution of pressure, just as steam is formed at a lower temperature on high mountains than it is in valleys. Of course the increase of pressure will restrain particles that at lower pressure would have escaped, and it follows that, in a falling barometer or a declining atmospheric pressure, we shall have set free the gases due to the time of both the rising and falling barometer. The muggy atmosphere is at the same time the evidence of the falling barometer, and the instrument for accumulating and transporting the escaping offensive gas.

Effect from Acid Water.

There are four instrumentalities tending to augment the exhalation of sulphuretted hydrogen about the Squire Basin which are entitled to consideration. On one of the upper basins of Miller's River there is a distillery (Sortwell & Co.'s) which discharges a large amount of the residual water of its distillation into the basin. This material, which was originally molasses, to which ferment for the production of alcohol has been added, becomes acid. The quantity of this sour liquid sometimes discharged in a single day is said to be as high as 45,000 gallons. It is obvious that this acid liquor would decompose more or less other sulphides as well as sulphide ammonium in solution, — as, for example, the sulphides of calcium and sodium in the dock mud, — and set free the sulphuretted hydrogen gas.

A second source is the waste of Boynton's slaughter establishment. Boynton reduces portions of his waste by oil of vitriol, the whole product of which, except the solid residue, is thrown into the river.

The third is the waste waters of the dye-house in Somerville, which, whenever of an acid character, produce the same effect of liberating sulphuretted hydrogen and so facilitating its escape and the attendant offensiveness of the air.

All these unite with the fourth, the products of the sewers, which are uniformly acid, to set free the offensive gases in the mud of the basins.

The mud itself of the basins below was tested and observed to be of an acid character.

How much these agencies may have contributed hitherto to the offensiveness of the air from the Miller's River basins, it will be difficult, if not impossible, to ascertain. It is proper to mention

them as instrumentalities that must have played a part in disengaging sulphuretted hydrogen.

Fat Rendering, etc.

Of the remaining branches of the inquiry, that touching the rendering of fat has been supposed to be connected with the discoloration of paint.

This is a misapprehension. I have conducted the air of the trying-rooms over a moistened lead surface for a whole night through, with, at the utmost, only a faint trace of action. This small amount may have come in through the doors and windows from the mud of the basin, or it may have come from the shreds of meat from which the lard is melted away. The cooking of meats, whether by frying, roasting, broiling, or even boiling, is attended with the occasional escape of traces of sulphuretted hydrogen. The yolk of a boiled egg will stain a silver spoon. Other than these traces, which are not in such quantity as to be perceived, so far as I have observed, the trying of the fat of recently dressed hogs is attended only with the escape of such odors as attend the frying of doughnuts in a kitchen. Indeed, in Squire's works there is relatively much less odor, as the heat by which the fat is melted away from the scraps of meat, gristle, etc., is the heat only of steam-jackets, while that of the fat in preparing doughnuts is over an open fire and is much higher.

Acrolein.

It has been thought that acrolein was sometimes produced as a constituent of the vapors arising from the open trying-tanks. This is an error. The temperature is not high enough. We are all of us familiar with this gas, as the smell of the just-blown-out tallow candle long in the snuff. It is the product of destructive distillation, which requires a temperature no boiler could bear.

The cooling off of the tried lard in the best appointed abattoir, by exposure to the atmosphere, is attended with the unavoidable escape of vapors to some extent. Where the scrap is fresh and sweet, the odors attending the process of rendering cannot be pronounced offensive, and they do not at any time, when conducted at steam temperatures, contain acrolein. As Mr. Squire has already procured additional closed tanks for the whole rendering of fat, as the dead swine and viscera are now treated, in which all

the gases that escape are burned, it has not been deemed important to give this subject more especial attention.

It may be stated that the devices he has introduced conduct the escaping gases through many hundred feet of large pipe surrounded by cold water, which condenses the steam. Some of the offensive gases given out in the process of rendering are undoubtedly condensed with the steam, but as the condensed water — a few pails full per day, at the most — is always discharged *under* sea-water of substantially the same temperature, no exhalations can thereafter take place. The contemplated sewer will, of course, receive this water. The remaining uncondensed gases then pass over lime, on the plan of the lime-purifiers at a gas-works, then through a very light and volatile petroleum product, and then into the fires under the boiler, where they are wholly consumed.

Source of the acrid, irritating Odors sometimes perceived in the Neighborhood, but not found within Squire's Works.

There are on and near the shores of the Miller's River basins, in the immediate neighborhood of the slaughter works, several bone-boiling and soap-making establishments to which offensive odors, sought for in vain in Squire's works, may at certain times be justly ascribed. Among those at no great distance are O'Neill's, Reardon's, Spelman's, Shevelin's, and Barry's; as these establishments utilize bones, scrap, waste, inferior and tainted meat, and soap-grease from dwelling-houses, hotels, restaurants, etc., they necessarily must have animal matters in various stages of decomposition. It is to be expected that in the process of rendering the offensive volatile products already existing in the crude material will be driven out. Where putrefactive fermentation has set in and offensive smells are already produced, the first effect of heat is to drive them out. Where the mass of material is largely putrid, the evolution of the pungent, offensive, rendering smell must continue longer. Where it is carried on in the open air, under favoring conditions of the atmosphere, these acrid odors may be carried to considerable distances, — in veins, of course. That a high wind would rapidly dilute and disperse them is plain.

Scalding-Water and the Soup-Liquor.

The water in which the slaughtered hogs are scalded is charged with the scarf-skin of the swine, has a reddish-brown tint from the

presence of a small quantity of blood, and when fresh is but faintly offensive to the sense of smell. When evaporated to dryness it yields a residue of .54 per cent, a large part of which is readily soluble in water.

The average amount in the tank is, by measurement, 1,200 gallons; and, as the passing through of each carcass must be attended with a loss to be made up by a fresh supply of water, the total daily amount consumed in the scalding-tank was estimated at 1,450 gallons. This would give for the organic matter going into the basin from this source not far from 80 lbs. daily. But the solid portion of it — consisting of scarf-skin and making less than one tenth of one per cent, as ascertained by analysis — is scarcely heavier than water and is easily borne on the feeblest current.

The soup-liquor derived from the digestion of fresh trimmings of meat in closed tanks has a sweet smell, not unlike that of soup made from fresh meat. Three tanks are emptied daily, discharging, by measurement and computation, nearly 2,592 gallons. The evaporation of the liquor leaves a residue like Liebig's meat extract, which is wholly soluble in water. The amount of this residue is 3.5 per cent, which would give 907 lbs. daily to be discharged into the basin. As it is wholly soluble, its addition to the sea-water is of no moment.

The tank in which the occasional dead hogs are treated, as well as other fresh matter, yields a soup-liquor of almost precisely the same density as that from fresh trimmings above, and giving a residue of less than one hundredth of a per cent variation. Its smell, when fresh as it is discharged into the river, is sweet. When evaporated to dryness it redissolves in water. Its daily amount averages 864 gallons, and the total organic matter it contains amounts to 302.3 lbs.

The proportion of carcasses of dead hogs arriving in the cars is not large, and its effect need not be very alarming. One of the most careful and competent of the observers of the Citizens' Committee has estimated the residue of the soup-liquor at three pounds for each hog. The returns from Mr. Squire's factory show an average of *ten* carcasses of dead hogs arriving by cars per week.

As the fresh soup-liquors yield *no deposit*, and as the liquor from the scalding-vat largely redissolves in water after evaporation to dryness, — showing that it is composed in part like the soup-liquor,

— it will be seen that the amount of material that can reach the sea from the rendering apparatus and scalding-tank, to be borne out by the tide, must be small.

In the testimony before the Board of Health on December 2, it was suggested that the soup-liquor which is discharged into the basin from Squire's works may be spread as organic matter over the flats of the basins at low tide. The witness found the total 5.4 tons, or 10,800 lbs. per week. I have found less, as shown above, but the quantities undoubtedly vary somewhat from day to day, and I have found more in the scalding-tanks than was stated by the witness. He gives it at 375 lbs. per week.

But it is not the quantity so much as the quality of this material that is the proper subject of inquiry. This soup-liquor is substantially a diluted solution of a *mixture of extract of meat and glue*, — wholly soluble when fresh, — or to within a trifling amount, in water. The same is true, though with a slightly greater quantity of light flocculent residue, of the scalding-liquor. [A sample of the soup-liquor from the dead-hog tank evaporated to dryness is submitted. It resembles glue.]

Let us take the two residues of evaporation with the estimated total amounts, — in all 11,175 lbs. It is assumed that this is discharged weekly into the basin. This is diluted with the water coming into Squire's basin. How much does this amount to in a week?

Mr. Ball, of the Joint Commission, estimates the mud spread on an average over the bottom of Squire's basin to a depth of 2.7 feet, at 1,770,225 cubic feet. If the mud were water it would occupy the same space. If the water were 10 feet deep (the maximum full tide at the Boston Navy Yard is above 12 feet) over this basin at high water, there would come in with each tide 6,556,500 cubic feet; in 24 hours, 13,113,000 cubic feet; in 7 days, 91,791,000 cubic feet; convert this into pounds and we have 5,718,579,300 lbs. This is the quantity of water with which 11,175 lbs. of the almost wholly soluble matter of soup-liquor and scalding-water is to be diluted. This would give for each pound of the organic material 511,728 lbs. of sea-water.

As twenty times its volume is sufficient, in the opinion of Dr. Letheby, of London, to absolutely destroy sewage, in a distance of twelve miles of a running stream, it is safe to conclude that the soup-liquor and scalding-water of Squire's works are quite harmless

to the sense of smell with a dilution of more than half a million times its volume of sea-water. Experiment has proved that the soup-liquors and scalding-water when three weeks old, if diluted with one hundred parts of pure water, ceased to be offensive to the smell.

When we consider the refuse that passes through every sink, laundry, bathing-tub, and water-closet of the hospitals, hotels, and dwellings of Boston and Cambridge, that comes from stables, from various manufactures, from ships, and from the streets, and consider the millions of gallons of the Cochituate and Fresh Pond water contaminated in this way daily, and then compare the scalding-water and soup-liquor of Mr. Squire's works, for the most part soluble matter, discharged into and diluted with the millions upon millions of gallons of the sea-water of the harbor of Boston, it will not be difficult to assign to these instrumentalities of injury to the water their proper significance.

But even these liquors Mr. Squire is treating, to remove from them whatever they can be made to give up, so as to leave the water free from all odor.

With the completion of the changes of the rendering apparatus now in progress from open tanks to closed ones, so that the already existing arrangements for burning the exhaling gases may apply to all the tanks as they now do to a part, the establishment will be in all respects as well conducted as — and in some respects better conducted than — the works in New York which I have visited, and which have the sanction and approval of the New York Board of Health.

Different Views of the Agency of Miller's River Basin in producing the Sulphuretted Hydrogen.

In the inferences from the analyses of Professor Thompson, submitted with Mr. Ball's report to the Joint Commission a year ago, there seems to be a possible misapprehension of considerable moment. Professor Thompson finds in the mud of Squire's basin, in the form of sulphuretted hydrogen, 414 pounds of sulphur to the 1,000,000 pounds of mud, and ascribes this sulphur mainly to *blood serum*, " of which sulphur forms from 1.3 to 1.9 per cent."

Now the total quantity of mud in Squire's basin, as already

mentioned, is estimated by Mr. Ball to be 1,170,255 cubic feet, or, in round numbers, giving to the deposit a specific gravity of 1.5, about 160,000,000 pounds. This would give 66,240 pounds of sulphur for the total amount of mud in the basin.

As the dried serum is less than 5 per cent of the blood, and as the sulphur in the dried serum is on the average only 1.6 per cent, we can readily estimate the total weight of blood, corresponding to 66,240 pounds of sulphur. At the rate of 1.6 per cent of 5 per cent, 2,000 pounds of blood would contain 1.6 pounds of sulphur; and 66,240 pounds of sulphur would require 82,800,000 pounds of blood, which is a little more than half the total estimated weight — water included — of the entire mud of the basin, according to Mr. Ball.

If we assume that the blood of an entire year of slaughtering had been retained in Squire's basin, and that for that year 300,000 hogs had been slaughtered, we shall find that, with this estimate, each hog must have yielded 276 pounds of blood.

The misapprehension which must have been at the basis of the inference, as to the enormous quantity of blood in Squire's basin, is obvious.

As a matter of fact, the blood discharged into the water in times gone by was, substantially all of it, carried out by the ebb tide, — except during the period of the dam under the Bridge Street Bridge in 1871. During that time, undoubtedly, whatever was thrown or came into the basin that was heavier than sea-water, including the matters from all the slaughter-houses on all the basins, the déposits of the dye-house, the heavier sewage and refuse of every kind, deprived of the current of the retreating tide, was largely retained in the great cess-pool which the erection of the dam had created.

It is one of the curiosities of investigations of this kind, that equally zealous observers sometimes arrive at the most contradictory results. Professor Thompson finding the enormous amount we have seen above of sulphuretted hydrogen capable, in his judgment, of indefinite evil effects, in Squire's basin, ascribes it to blood from the slaughter-house. In the fact of the presence of sulphuretted hydrogen his results coincide with the observations of Mr. Merrick and of Dr. Jackson, and the testimony of the photographs. I may add that I had no difficulty at any time in

warm weather that I have visited the Squire basin at low tide in obtaining the most abundant discoloration of lead papers on exposure to the air. But Mr. Munroe's efforts in this direction, as given in his statement before the Mayor and Aldermen, October 7, 1872, were made in an unpropitious time. He found but little sulphuretted hydrogen in the atmosphere of the basins at the time he made his observations. He occasionally observed tarnishing of silver and discoloration of lead-paint surfaces by the atmosphere and the mud, but he was fully assured that in no way could the discoloration of paint, such as had been observed in a single night, have been produced by exhalations from the Miller's River basins. It must have been caused by the rendering process.

The danger of inhaling, even when greatly diluted, the offensive gas given off from the average mud of the basin is pointed out by Professor Thompson, — but Mr. Munroe experienced neither nausea nor irritation when inhaling the air of the basin in which the sulphuretted hydrogen gas was present "in large quantity," he himself stirring the mud to facilitate its escape. The latter gentleman conceives that "the Miller's River basin was proved not to be the cause of the nuisance." The former is convinced that if the mud of the basin were buried six feet below sand and gravel "it would not prevent the escape of noxious gases." Professor Thompson thinks it would not be safe for men to work at dredging the basin at any time when the "temperature is much above the freezing-point, unless the basin is kept constantly flooded." This period of danger must include the time (October 5) when Mr. Munroe made his observations near the surface of the disturbed mud, and found them to produce no ill effect upon the human organism.

These contrasts in the honest convictions of two careful gentlemen, having, as they felt, an important duty to discharge, may serve to show the difficulties that surround this subject.

With the completion of the changes now in progress by Mr. Squire, the vapors from the rendering tanks, which many persons regard as the sources of the agency that produces the blackening and nauseating effects experienced about Miller's River, will have no outlet, except through a furnace fire, and will, of course, be destroyed. With the filling of the basins, the sources of the sulphuretted hydrogen about Miller's River will be buried some ten feet below the surface of the ground.

Rinsing of Dressed Hogs.

The rinsing of the dressed hogs in Mr. Squire's establishment carries an amount of blood into the sea so inconsiderable in quantity that it must be considered altogether unobjectionable. The rinsings of the Brighton Abattoir are of the same character, and they have been observed strewn along the shore against the Abattoir, in the shape of clots of blood, when a favoring high water, and the rinsing of the floor at the winding up of the day's slaughtering, united to make the deposit possible. The blood and offal of Mr. Squire's establishment are now carried away daily in air-tight tanks, to be converted elsewhere into fertilizer, in the same manner as they are from Mr. Toby's hog-slaughtering works in New York.

[I submit a map, furnished me by the New York Board of Health, at my request, showing in the red areas the sites of the slaughtering-houses now carried on in the city of New York. Those in the neighborhood of Fourty-fourth Street on the East River are for cattle. Those between Thirty-ninth and Fortieth Street on the North River are for swine.]

Smell of Live Hogs.

In regard to the last branch of the inquiry, — the smell of the live hogs, — it is proper to say that careful examination prolonged through a whole night in the rooms in which the hogs are confined failed to reveal a trace of sulphuretted hydrogen, the gas that produces the discoloration and nausea, as is well known. Within the building the smell of the swine has already been rendered almost without offence by the free use of powdered charcoal on the floors of the pens; and experiments are making which it is hoped will result in meeting all the reasonable demands of good neigborhood in regard to the peculiar odor of swine attaching to the moving railway trains. This smell is not made a subject of complaint by the New York Board of Health. See Note A, p. 36.

Preparation of the Sausage Cases.

This work, which is necessarily offensive in the immediate apartment in which it is carried on, is conducted in a small closed room, in Squire's establishment, and is so carefully and skilfully manipulated that it gives no offence, and would not be known unless the room were actually visited.

The Smell ascribed to Squire's Works by Residents on Chestnut and Mount Vernon Streets, Boston.

The smell of *cooking putrid meat* is described by persons residing on the west slope of Beacon Hill, Boston, on the Back Bay, and in Charlestown, as having been perceived on the night of the 31st of July. That it could in no way have been connected with Miller's River basins is demonstrated by the course of the wind, which was that night from the southeast. On the nights of June 9th, 10th, and 11th there came extreme illness to two persons residing near the foot of Chestnut Street, which was ascribed by the family physician to the nauseating smells from Squire's works, or at least from that neighborhood. On the 9th and 10th the wind, recorded at the Harvard College Observatory, was from the *southeast*, on the 11th it was from the *west*. It is clear that if the offensive odors on the several nights had a common source, it could not have been in East Cambridge. It must have been from the immediate neighborhood.

The following explanation of these special annoyances is suggested: —

The maximum heat of July 30, 1873, was 93°; of July 31, 82.6°. On August 1 there was a thunder-shower. On the 9th, 11th, and 12th of June there were slight thunder-showers. The heat and the muggy weather of these months, as is well known, cause in most families an unusual amount of waste from the larder and table — cooked and uncooked — to find its way into the drain and the sewer. The water in which meats are boiled, that is, the *meat extract*, ready to undergo rapid putrefactive fermentation, is poured into the drain. Meats are purchased at the shops supposed to be sound and found to be unsound. The boiling arrests the change, but the putrid juices are poured into the sink and reach the sewer. It is well known that such weather frequently so impairs the excellence of meats that their prices are appreciably reduced.

This kind of water is to a certain extent a diluted, acid, offensive *soup*-liquor. Like that, if allowed to stand in warm weather without plentiful dilution with water, it must ferment and yield the kind of gases described as the smell of *cooking putrid meat*.

Among the principal offensive volatile ingredients that are recognized — in water in which, during hot and muggy weather, meats

and vegetables have been boiled — are traces of volatile fat acids, like the smell of cheese, rancid butter, and tainted meat, together with the smells that characterize boiled cabbage and onions, some of which contain sulphur, and acetic acid. The liquor also contains lactic acid.

These smells, when diluted, we complain of less, because we are more familiar with them. It is when the liquid from which they proceed meets sulphides of dock mud, or the fæces of vaults, and sets sulphuretted hydrogen free to mingle with the smells due to *kitchen waste*, that the offensiveness is intensified.

When now the mouth of the sewer is laid bare by the retreat of the tide, the air from without enters. This air of the river-bed is cooler than the air over the hot waters received as they are poured from the boiled meats into the sewer. But the coolness of the outer air is appreciably greater (and these smells are uniformly worst late at night) as the night advances, and the contrasts with the temperature of the air of the sewer correspondingly greater. The sewer air is of course *lighter*, and will find its way up through any opening into houses, areas, and streets.*

This smell would be likely to be mingled, after a time certainly, with the dock smell. Such has been observed in Charlestown, where persons have gone up *through* the fog-layer of offensive odor near the dock, to a clear and fresh atmosphere above, to find later the kitchen-sink smell issuing first from sinks and traps and followed soon after by the effluvium of the dock.

It is easy to see why members of the Citizens' Committee of East Cambridge have sometimes been annoyed by what is recognized as the smell of boiling putrid meat, — such as was illustrated a year ago by experiment before the Mayor and Aldermen of Cambridge, — as they have approached Squire's works, although the *wind was with them*. The fact was, at such time the offensive vapors came from the sewers. The mouths of the sewers had been laid bare by ebb tide. The wind acted to diminish the pressure over the traps or sinks through which the smells issued.

It is probable that the annoyance which appears so oppressively

* The traps of most houses — which are merely sections of tube like the letter S in shape, turned on its side thus ∽ — are known to be frequently emptied by the siphon action of the trap, and so provide a channel for the gases of the sewers to enter houses. All such traps should have a vent at the summit communicating by a tube with the kitchen chimney, or a flue by its side, or carried to an elevated point outside the house.

in the Worcester Depot, at times when the wind is southerly, will find in these considerations a ready explanation.

The troubles on Newbury Street and other points on the Back Bay are obviously of the same type.

It certainly does not require special elaboration to explain why it frequently has happened that offensive odors — especially that of the smell of boiling putrid meat — has diminished in intensity as the observers have neared Squire's establishment.

Under a portion of the slaughter-house there is a mass of dock mud, derived from the sewers formerly and now discharging there, and more or less from the materials to which contributions were made from the slaughter-houses and sewage of Cambridge and Somerville in Squire's and the other basins in former years. All this mud Mr. Squire proposes to remove, after the filling of the basin up to the bulkhead around the works so as to make it possible, then thoroughly disinfect and retain the open space under his works. With the completion of the changes now going on in the basin, the drain to be introduced will carry the matter now going into the basin to the reaches of the sea, as it is done at the Brighton Abattoir.

Why is the Nuisance becoming more and more intense Year by Year?

The parent material and the extent of surface for the exhalation of offensive gases are steadily increasing.

Parallel with Charles Street, there has been in recent times an increase in the length of horizontal, or nearly horizontal, sewers on the side towards Charles River. This is especially true of the sewers draining Chestnut Street and Mount Vernon Street. A large number of private and some public buildings have within a short time been erected between West Boston Bridge and the Milldam. The sulphuretted hydrogen of the mud by the outlet of the Chestnut Street sewer, as given by Mr. Merrick, takes rank with that from the mud from the neighborhood of Stony Brook, from South Boston Flats, from the Gore Street and Medford Street sewers emptying into Squire's basin, though it falls much below that from the mud of Broad Canal.

With the increased extent of horizontal sewers in Boston and Cambridge, the regions drained have been covered with dwelling-houses provided with kitchen sinks and water-closets.

With the mouths of these sewers opening upon steadily deepening areas of festering mud, it is natural that, with favoring conditions, offensive smells should occasionally force themselves into the dwellings and the spaces about them. The unequal settling of new made land, and especially the greater settling of houses as compared with the open areas about them, not infrequently cracks the drains, and provides openings for the escape of gases from the sewers. The longer the slightly inclined section of the sewers, giving opportunity for larger accumulations of offensive kitchen waste, and the more offensive the dock mud, the greater is the probability of annoyance when the reeking and acid sewage issues to be mingled with the mud.

General Conclusions from the Foregoing Investigations.

1st. In taking a general review of the case, one is impressed, in the first place, with the fact that the processes at Squire's works are *continuous* and *regular*, while the annoyance to the sense of smell, both in the neighborhood and at a distance, is *intermittent* and *irregular;* in the second place, that the *time* of annoyance is generally at night, and more frequently late at night, and when the tide is out; in the third place, that annoyances at the same time, and of the same kind, are sometimes greater at the more distant points than in the immediate neighborhood of Squire's works; and, finally, that at such times the annoyances are quite as great to the *windward* as to the leeward of the Miller's River basins.

2d. Miller's River has been a source of greater annoyance, in the way of offensive smells, than any other point about Boston, for the reason that it consists of a series of long, narrow, settling basins, open to the wind on all sides and surrounded by dwellings, while in most other localities the dock deposit is usually open on but one side, and the neighboring dwellings get the effects only when the wind is coming from one quarter.

3d. The impression that one receives in going through Squire's works is that of the thoughtful care and cleanliness with which the processes are conducted.

4th. In former times, when the blood and refuse of Squire's and the other slaughtering works were thrown into the basins, they contributed in some degree to the total filth derived from various sources, — mainly the sewers emptying into Miller's River.

5th. The soup-liquor, or meat extract, has no offensive smell.

It is derived from the digestion, in steam-tight tanks, of the trimmings of pork, and from the occasional carcasses of hogs arriving dead. It is separable, after the process is completed, from the fat above, and the bones, gristle, and heavy matter below. It yields, only after standing a long time, a trifling flocculent deposit, and may be said to be substantially soluble in the sea-water into which it is discharged while *fresh*. It is entirely removable with the ebb tide.

6th. The hot water, which is used over and over again in scalding a thousand hogs or more, becomes at the close of the day's work a reddish-brown dirty liquid, which is but little offensive to the sense of smell. The heat has coagulated the traces of blood. The remaining material in suspension and in solution is chiefly scarf-skin, and light particles of dirt which have been gathered and held by the products of perspiration. It is largely soluble in sea-water, and contains only light, flocculent matter that would immediately and without offence be borne away on the ebb tide. The total amount of organic matter reaching the basin from Squire's Slaughtering Works is diluted with sea-water in the ratio of one of organic matter to above 500,000 of sea-water.

7th. The gases evolved in the reduction of the trimmings and carcasses of dead hogs are not permitted to enter the air. What are not condensed by passing through tubes surrounded by cold water, or absorbed by passing over surfaces of slacked lime, are ultimately burned under the boilers.

8th. The vapor attending the rendering of fresh fat in open tanks is to most persons not offensive. In Paris it is conducted in open copper kettles. The heat employed in Squire's works is derived from steam of 60 lbs. pressure, or about 300° Fah., and is too low to produce acrolein or other offensive products. The open tanks of Squire's works are soon to be wholly, as they are already partially, replaced by closed tanks, which will conduct all the gases produced, of whatever kind, into the furnace fire.

9th. For the past year, the blood and waste, formerly thrown into Squire's basin, have been removed in air-tight carts, to be converted elsewhere into fertilizer.

10th. The offensive smell that has discolored buildings and produced nausea occasionally in East Cambridge and Somerville comes up at times from the basins on Miller's River when the atmosphere is favorable, that is, when it is warm, quiet, and muggy, —

just as it does from other deposits of dock mud, as, for example, in the basins above Canal Street in Charlestown; from the deposits in Broad Canal and its branches; from the Cambridge flats on either side of West Boston Bridge; from the areas near the mouths of sewers at the foot of Beacon Hill; from others on the Back Bay; and generally wherever, around the skirts of Boston Harbor, sewage and organic filth, mingled with sea-water to constitute a mud, are exposed to a warm atmosphere.

11th. The nauseating and irritating odors that are described as apparently coming from the cooking of putrid meat have their origin in part at the bone and soap-boiling and rancid fat-rendering establishments, — *not* the pork-slaughtering works, — near Miller's River basins, and in part at openings of the sewers, into which has been thrown from kitchens the cooking-water in which meats and vegetables, more or less tainted by the hot, muggy weather of the season, have been boiled. These, coming up mingled with the dock smell, have been observed to the *windward* of Squire's Slaughtering Works, which has led some persons to think that the odors from these works would force their way *against* the wind. They have been observed in Chestnut and Mount Vernon and Charles Streets, on the Back Bay, and in Charlestown, and ascribed to Squire's works, when the wind was demonstrably from the east and southeast.

12th. The smell of the living swine after they reach the pens strewn with charcoal is scarcely offensive at any considerable distance.

13th. The discoloring and nauseating smells of public complaint do not come from the processes pursued in Squire's works.

14th. Squire's Slaughtering Works are conducted with as much care and cleanliness as are the Hog-Slaughtering Works of New York, which are declared by the Board of Health of that city to be no nuisance.

Solicitude for the Future.

The situation of the cities about the mouth of the Charles and Mystic Rivers is somewhat peculiar. It has obviously been the persistent plan of nature, by wearing away the gravel islands at the entrance to Boston Harbor, to fill up the anchorage ground, and virtually carry the mouth of Charles River farther out to sea. The sea-walls erected and erecting by the general government have partially arrested the execution of this plan. But the task has been taken up by what may be called the "current of events,"

of which we are the directors. We leave the sewage near the mouths of the sewers, or availing ourselves of the collision between the effluent and returning tides, which provides for the arrest of whatever of solid refuse is thrown into the river and borne out on the ebb to be brought back with the flood and spread over and left upon the settling areas; we are doing, by the inevitable consequences of increasing population, an injury akin to that against which we are, through the general government, striving to protect ourselves. In some respects the injury we do is more difficult to repair. While the shifting sand and gravel only threaten the convenience of commerce, the ill-controlled and accumulating sewage menaces the health of the cities.

This is the kind of danger which, as is well known, rendered necessary the construction of the great trunk sewer inside the Thames embankment for the reception and removal of the sewage of London. It has led Paris to forbid the pollution of the Seine. It has moved the city of Glasgow on the Clyde to contemplate enormous expenditures to rid the river of the filth derived from that city. It now occupies the earnest attention of some of the best minds of the city of New York.

The annoyances of whatever nature from the establishments on Miller's River having ceased, the basins having been filled up and adequate sewers having been provided, it may be proper to remark, that, although the immediate neighborhood will have relief, the great question of annoyance from the sewage of Boston, Charlestown, and Cambridge, distributed over the settling areas of the inner harbor and laid bare at low tide, — which annoyance has at times characterized, and indeed may be said to have polluted and poisoned, the atmosphere of the municipalities on the shores of Boston Harbor, — will remain to challenge the care and solicitude of the guardians of public health.

Adjourned to Tuesday, December 9.

Note A. — The following experiment was performed after the hearing was closed · A car-load of swine, on the arrival of a train, was run upon a side track, and, after the other cars were discharged and removed, a solution — one per cent strong — of a convenient form of carbolic acid was sprinkled over the swine and the interior of the car. The peculiar odor of swine was immediately and completely destroyed, and two and a half hours later it was possible to perceive the swine-odor at only one point in going round the car. This experiment assures the possibility of so treating a train loaded with living hogs as to render its transit along the railway, and its discharge at the place of its destination, practically inoffensive.

SEVENTH DAY.

December 9, 1873.

CROSS-EXAMINATION OF PROFESSOR EBEN N. HORSFORD.

Q. (*by Mr. McIntire*). Are you aware of the locality of the outlet of this sewer which has discolored the building of which you speak? *A.* It comes into the basin, but I do not know at what point.

Mr. McIntire. That I suppose we shall have to show.

Mr. Derby. I understand from Mr. Squire, and I think I have been told the same thing before, that it replaces an old sewer that remains there and comes in at the head of the basin.

Q. (*by Mr. McIntire*). You say it is the gases that come up from the basin that have blackened them? *A.* I have no doubt of it.

Q. The heated gas passes up into the sewer in the manner you indicate; perhaps the tide closes the lower end of it, and the water inside being colder than the gas causes it to rise and issue from the openings of the sewer above. *A.* The water is probably below the mouth of this sewer at ordinary times, and the rising of the gases from the basin through the sewer causes the discoloration I have spoken of.

Q. Did you notice those other houses on the northerly and easterly side, nearer the establishment, — those that are between this house and the establishment? *A.* My impression is that most of them are painted with Spanish brown, and that color is not affected by the gas.

Q. Don't you find that the north and east sides of the houses next to Mr. Squire's are discolored? *A.* I have not noticed it. In the neighborhood of Sixth Street they are discolored more on the side toward the basin than on the other side. On Fifth Street there are houses not discolored on the side *towards the works*, but very deeply on the side towards the basin.

Q. As far as your investigation of the state of affairs on the 31st of July went, you ascertained that the wind came from the direction of Broad Canal and Back Bay, — from the southeast. Have you examined the houses on Spring, Charles, Lime, Otis, and Thorndike Streets, on the southerly side of East Cambridge, — houses facing to the south and the east, — to see whether there is any discoloration there? *A.* I have noticed some discoloration, but nothing like that in the neighborhood of the basin.

Q. But if I understand you, Professor, your idea of the vapors and gases of the 31st of July is that they came from the neighborhood of Broad Canal and Back Bay, or from that direction. The wind being from the southeast would sweep the whole area of flats that extend from Canal Street Bridge up for a mile and a half. Well, now would n't you think it rather singular that these buildings right on Cambridge Street, at the corner of Fifth Street, and along Cambridge Street, the buildings on the southerly side, and along from Fifth to Fourth, and along Fifth, from Otis across Cambridge to the establishment were the most discolored? Would n't you think it a little singular if these vapors arose from Broad Canal and passed over entirely those buildings on Charles, Otis, and Thorndike Streets without coloring them at all and came up to Cambridge Street and colored those near the establishment? *A.* Whether it

would color the houses or not would depend upon the kind of paint with which they were coated. Lead paints only are discolored.

Q. If you found all these houses from this one nearest the canal along the street facing to the south till you came to Cambridge Street entirely free from discoloration, would you then attribute the gases which arose on the 31st of July to Broad Canal? If you did n't find any color until you got up to within three or five hundred feet of Mr. Squire's establishment, would you say the gases arose from Broad Canal? *A.* My opinion would not be governed by that circumstance in the face of an easterly wind. I could not say without knowing more.

Q. Well, the wind, as I understand you, was from the south or southeasterly direction. Now, if it came from Broad Canal, it would blow right across the marshes and strike upon the southerly side of these houses. If these houses were free from any discoloration, should you say then that the vapors arose from Broad Canal? *A.* That produced the discoloration?

Q. Yes, sir? *A.* If there were houses directly in the vicinity of Broad Canal and not affected that night, I should think it required additional study to find out precisely what the fact was. They may not have been painted with lead paint.

Q. There are no houses on Broad Canal. But you go across the marsh directly, perhaps a quarter of a mile, before you meet with houses. Then there are parallel streets up to Cambridge Street. Now, on Cambridge Street, we find the most discolored houses are on Fifth Street; on this night, the night of the 31st of July, we find that the most intense discolorations are on Fifth Street, from the establishment of Mr. Squire to Otis Street; that takes it up to the buildings on Cambridge and Fourth Streets, — the houses on the northerly side. I ask you, if, in the face of the fact, that the houses along the line of Charles Street that are the nearest houses to Broad Canal, not being discolored, would you then attribute the gases which produced the discolorations to Broad Canal? *A.* My answer would be, that, the houses not being far from the corner of Gore and Sixth Streets, the discolorations might have been the effect of the easterly wind deflected from the basin.

Mr. McIntire. Professor, I don't think that is hardly an answer.

Professor Horsford. If I understand the point you wish to develop, it is whether I can account for these buildings being discolored with a southeast wind.

Mr. McIntire. That is not the point. What I wish to get at is, how you will explain the fact of the discoloration of these buildings which are within a few hundred feet of the establishment, while those nearest Broad Canal, from which you think these vapors emanate, are not discolored at all? The nearer you get to it, the less discolored they are. *A.* Allow me to state that I consider the question of the wind as settled. If I understand your question, you are seeking to find out what direction the wind was from the spots on the sides of the houses. Now, those boards yonder settle the matter as to where the wind was.

Mr. McIntire. Well, if you will answer my question, we will pass on to the boards. If the wind is settled as coming from the southeast, and if you, as you say you have, made up your mind that these gases must have come from Broad Canal or that vicinity —

Professor Horsford. Which I have not.

Mr. McIntire. The winds coming from the direction of Back Bay and Broad Canal could not come from Mr. Squire's works. Now, how do you account for the fact that all these buildings nearest Broad Canal were not discolored? *A.* Below Mr. Squire's block, I think near the junction of Sixth and Gore Streets, there is an open place, and with a moderate easterly wind I can see that the vapor of the basin might easily have been deflected through there and produced these effects.

Q. Then your idea is that all these discolorations must have come from the basin? *A.* Not entirely, but chiefly.

Q. Well, now we will say something about these boards. These boards were taken, as I understand it, from a fence at the widening of Bridge Street, right there upon Craigie's Bridge?

The Chairman. I would like to know precisely where these boards came from.

Mr. McIntire. They came from Bridge Street, near Craigie's Bridge, just where they propose to have the outlet of this big sewer. (*To witness.*) Well, if these boards were discolored on the night of the 31st of July, and if these gases which discolored these boards, which you think are a part of the same which discolored the buildings up towards Sixth Street, would n't you naturally expect to find the buildings between these streets and Craigie's Bridge, and along up Cambridge Street on the southerly side, more or less discolored until you got up as far as the discolorations went? *A.* I am not clear that that would be a fair deduction. Every additional street and every additional house breaks up the wind and scatters the current of gas, and its effects are less noticed.

Q. But, as I understand it, you assume that these boards were discolored in a single night? *A.* Substantially.

Q. Well, now, if there was hydrogen and sulphur enough in the air to color those boards to that extent, would you not expect to find that the houses for some distance from there, with a free sweep of the wind, would be discolored? *A.* Where they were exposed as these boards were, I should.

Q. Where you interpose a street, and let the gases pass directly up a street, it is not broken. Would n't you naturally look for discolorations on the sides of the houses on such a street? *A.* I think so.

Q. If you did n't find that the houses were discolored along the sides of such a street, how would you account for it? *A.* With regard to that, I should base my opinion upon the data that I could collect. I do not think you give me data enough for the consideration of that question. It would depend upon the force and direction of the wind. I can conceive that upon the margin of the dock an effect might be produced that would not be noticed farther up the street. The high board fence, the sea-wall below, and the buildings there, would tend to deflect a southeasterly or easterly breeze.

Q. Do you think that these gases and vapors travel for a longer distance over water than over land in a moist atmosphere? *A.* If the land is covered with houses, so as to break up the current, it will be more dissipated. If it is a dead level, I know no reason why it should not pass over land as well as over water.

Q. Do you think it would travel over open places? *A.* I know of no reason why it should not.

Q. If I understand you, you say that the mud in the Squire Basin is not so foul as the mud at the mouth of a great many sewers that you examined in different localities, — Broad Canal, Stony Brook, and other

places. *A.* The mud outside of the bulkhead is spoken of. The mud at the outlet of the Gore Street sewer, which is in the Squire Basin, is worse than the average mud of the basin. It is under a portion of the building that I was not able to reach. The mud at the mouth of the Medford Street sewer, also in the Squire Basin, was worse than any portion outside or under the building.

Q. But you did n't find it so intense? *A.* As in some other sewers; no, sir.

Q. Did you examine that matter to see if there was any animal matter in it? *A.* No, sir. I have no doubt that there is animal matter discharged at the mouths of sewers.

Q. I am not speaking of the mouths of the sewers? *A.* I mean in the mud there.

Q. You did n't examine? *A.* I suppose you mean with a microscope. The presence of this sulphuretted hydrogen is perhaps sufficient proof of its presence.

Q. Would n't you find something besides sulphuretted hydrogen? *A.* Yes; if you look at the table you will see that the amount of ammonia given is enormous. There are two columns devoted to that statement.

Q. Well, this large amount of sulphuretted hydrogen and large amount of ammonia in the water would be apt to get into the atmosphere, more or less, as I understand you, in muggy weather? *A.* Yes, sir; a certain amount of ammonia.

Q. Did you try any tests upon the kettles in Mr. Squire's establishment? *A.* I did. I exhibited them here yesterday. The tests show only minute quantities of sulphuretted hydrogen.

Q. You did n't get such results there as Dr. Sharples or Mr. Munroe? *A.* I got a little reaction for sulphuretted hydrogen, but I do not think it was clear that it came from the vapor or gas of the tank, because the vapors of the dock were coming in at the doors and windows. It is true that sulphuretted hydrogen escapes in the melting of the fat from the meat, just as it does in the kitchen when the cooking of meat is going on.

Q. You take the gas from the trying of the fat from the open kettles and close tanks; take the smell of the hog, the smoking of the bacon and the steam of the scalding-tank, and the scent from the hog when he is opened, as I understand there is quite an appreciable odor then; when all these odors go into a muggy atmosphere, would you expect to find the odors in that establishment as strong as you would expect to find them outside, where they become mingled and are kept down by the atmosphere? Would you expect to find the odors as strong in the establishment itself as outside, when they had come together? *A.* I should expect to find them strongest where nearest their source. I should expect if they mingled together in the factory they would be strongest there.

Q. How mingle together in the factory? The odors pass up to the top of the building and go out. There is the smell of the animals when they are opened, that takes a similar course. Might they not combine and be perceived at a distance? *A.* It is a physical impossibility for the odors shut up in the hollow enclosure of the works to produce extreme results at a distance. There is a physical impossibility of the odors getting there.

Q. You don't think it is possible for these gases to arise and become more intense in the upper atmosphere than they were where they started form? *A.* Even if they could get down, I don't think I can say that the

smells can be any more intense at a distance from the works than near them. The dilution with air would tend to destroy them.

Q. Would not you say that all these smells together would be more intense than any single one by itself? *A.* I think by a mingling the free ammonia might neutralize the sulphuretted hydrogen and the acid smell.

Q. Then there would be a certain mingling of the smells? *A.* I said that if they were mingled they might be neutralized. I think the ammonia would neutralize the offensive acid smell.

Q. What would become of them if they arose together? *A.* They would ultimately oxidize in the air and disappear from the sense of smell. There are circumstances under which, with currents, they might come down; but they go up at a higher temperature than the surrounding air, and why they should come down after that I am unable to see, unless by some special disturbance of the atmosphere, which the very circumstances of the case preclude.

Q. Take the smell of the open kettles that passes up through the ventilators into the outer atmosphere. Do you understand that this rendering odor don't come down? *A.* I suppose it is possible for a current of air to bring it down. I have noticed the smoke from the chimney of the glass-works float off horizontally for a long distance. I do not remember that I have ever seen it come down to the ground. The vapors of Mr. Squire's establishment are not visible. The rendering smell and all these odors and vapors have a tendency to go up, notwithstanding the muggy atmosphere which may prevail. They are warmer than the surrounding atmosphere and would therefore rise. A muggy atmosphere would not often reach up so high as the top of Mr. Squire's chimney.

Q. Perhaps it reaches as high as the ventilators? *A.* Possibly it might.

Q. Then, if I understand you, you say that this rendering vapor, after passing through the ventilators of the building, by its warmth rises in the atmosphere, notwithstanding it is muggy, and that it would be more intense right there than it would be at any distance. The farther off it gets the less intense it is. Do you think that would be the same in regard to these rendering kettles of Barry and others? *A.* I think so. The only way in which an intense smell can be maintained is by a very gentle current running along in a vein. I have myself known a very slender vein extend to a great distance, especially when the wind is moving very gently; but that it should be more intense at a distance remains to be seen.

Q. You would not believe, then, the remark of Mr. Derby, that the smell of those kettles of Barry and Reardon could have reached to Charlestown? *A.* I have not yet seen anything that has led me to believe that they did. Possibly they might. That they have come along the street into East Cambridge I think probable, but that they have reached Mt. Vernon Street, in Boston, I have seen nothing to convince me.

Q. You have exhibited some tubes here with the water in the different states of the tides in the basins. Did you collect these samples yourself? *A.* With the exception of one of them.

Q. Well, the water in the basin does not look quite so clear as that? *A.* When it is settled it becomes clear. The mud settled out shows the amount of mud the water contains.

Q. You tell about the acid liquor that was discharged from the distillery. Have you examined that liquor to see what amount of acid there was? *A.* No further than to test it with test-papers. I found it was acid, that was all.

Q. It was extremely diluted, was it not? *A.* Yes, sir.

Q. What does Mr. Boynton use his sulphuric acid for? *A.* Mr. Boynton, thinking to prevent the decay of scraps of animal matter on his premises, I understand, treats them with sulphuric acid, regarding it as the best thing he can do to make that product harmless. I have no doubt that the effect, so far as he is concerned, is good. Its effect upon certain undecomposed sulphur compounds is to set free sulphuretted hydrogen.

Q. I understand you that when this acid is put into the basin it sets free sulphuretted hydrogen, sometimes more in bulk than the mud itself. Well, now, I would like to ask you whether you would think there would be any advantage in running these acids through a sewer which would discharge upon the flats where these discolorations were made, — whether there would be any difference in discharging them through a sewer, or into the Squire Basin, in the result, in its effect upon the animal matter there, and upon the condition of the people? *A.* Are you assuming that the liquor is acid as it goes out?

Q. I am assuming that you are to put all the 45,000 gallons from Sortwell's, all of Boynton's, and the acids from the Bleachery and the sulphides into a common sewer, and, running them down to the point where these boards were taken, whether that place would be free from smells, or whether it would not affect the mud there in the same degree or in a greater degree than it does now in the Squire Basin? *A.* I have no doubt the effect would be in proportion to the amount of mud and acid brought together.

Q. Then you, as a chemist, would not advise a sewer of that kind to be emptied into that place? *A.* The question of sewage I should consider a question by itself.

Q. Supposing these acids which are poured into the basin should be poured into the sewers, would you advise that the sewers be emptied at the place where these boards come from, at Craigie's Bridge? *A.* It would be better to have it discharged there than where it is now, because the amount of mud would be less there, and there would, of course, be less gas evolved.

Q. But you would not have a sewer discharged above the level of the water there or anywhere else? *A.* That is a new problem, and it is impossible to answer your question in a single word.

Q. (*by Mr. Derby*). Would you carry it into the channel? *A.* If there was mud there it would be objectionable. If there were but little mud the effect would be trifling. If the amount was large the effect might be correspondingly great.

Q. (*by Mr. McIntire*). Supposing this was emptied into the water itself, the tide being high, would it produce any effect upon the flats above and below at the rising and going out of the tide? *A.* Not appreciable, I should think; it would be too diluted on reaching tide-water.

Q. Do you detect any scent yourself from the live hogs? *A.* Simply the live-hog smell, as it is called? I did.

Q. That is not agreeable, is it? *A.* No, it is not agreeable, but it is not nauseating. In the pens where the charcoal was spread it was extremely reduced. I may say, with regard to that, that I have undertaken to show that it can be greatly mitigated. I have sent to England for a preparation of carbolic acid, which I hope may be successfully used for that purpose.

Q. I understood you, in describing the effect of warm atmosphere upon the vapors of the sewers, that the water at the mouth of the sewer being colder than the vapors inside, they would give off gases which would rise through the sinks and traps and affect individuals, and that that might have been the cause of these gases and discolorations on particular occasions. Was I correct in my idea? *A.* The smell of the cooking of putrid meat I tried to explain. It perhaps needs to be a little elaborated. It is evident enough that if you pour a large amount of boiling water into a sewer the temperature of the air over the water will be above that of the general atmosphere; that is obvious. Now, at night, when the sun has gone down, radiation causes the whole surface of the earth to cool off. The covered sewer does not cool so rapidly, because it is encased. The cooler air is the denser air. The cooler air outside would press upon the warmer air of the sewer, and the effect would be to drive that warmer air out wherever there was a crack, — that is, supposing the mouth of the sewer to be open. Now, the opening of the mouth of the sewer will do another thing. If the hot waters and acid extracts of one kind and another have been poured into the sewers during the preceding twelve hours in unusual quantity, when the tide goes out of the basin all these acid liquors that have passed from the sinks into the sewers would go down, and if there were dock mud at the mouth of the sewers the acid liquors would be precipitated upon this dock mud and set free sulphuretted hydrogen; that is inevitable. Now, upon the gases at the upper part of the sewer there is increased pressure; if the wind is blowing up the sewer it further increases the pressure. Under certain circumstances the wind over the traps and houses would lessen the pressure and facilitate the escape of gases from the sewer; and when blowing in the direction from the mouth of the sewer this would force these gases out. I alluded in what I said yesterday to the gases at the Worcester Depot. I have inquired of those who live in the neighborhood, and I find that in the cellars there, the gases come up from the sewers in the immediate vicinity of the depot; and those who have had occasion to be in the depot during the summer and autumn state that there has been a most intolerable stench in that locality. I ascribe it to the atmosphere gently pressing in at the mouth of the open sewers. It is probable that imperfect traps and sinks have facilitated the escape of the gases.

Q. Do you think that is the reason of the most offensive smells experienced on Mt. Vernon and Chestnut Streets? *A.* I should say that when this gas is produced by the outflow of the sewage at the sewer's mouth, and a favoring wind is blowing, it would carry some of the gas up from the mouth of the sewer, over the sea-wall and along into the streets and avenues above the sewers as well as below.

Q. Well, then, as I understand you, you think that it does n't improve certainly the scents which arise from the sewers to pour in hot water or any hot substance? *A.* So far as increasing the temperature of the air is concerned, it would not.

Q. It gives rise to more gases? *A.* Yes, sir, and makes them lighter.

Q. Well, then, I understand that most of these liquors that are poured off from these establishments are hot liquors?

Mr. Derby. Is that so?

Q. (*by Mr. McIntire*). The water from the scalding-tank is, and the soup-liquor is more or less heated? *A.* When I have collected the soup-liquor it has been pretty cool. It must stand some time to settle clear.

Q. Well, then, these hot waters running into the sewers would make them smell very much worse than if these waters were cool, would they not? *A.* Yes, sir; I think so.

Q. Do you think it would have any effect upon the sewers itself, — the cement, or whatever it was made of, suppose it to be brick. *A.* I think not, sir.

Q. Well, then, a sewer carrying away these substances in the state that they are poured out, would not naturally be as inoffensive a sewer as that which carries out the washings and scourings of families? *A.* It would be less offensive. This soup-liquor is substantially sweet.

Q. If this sweet liquor remained long in the sewer it would begin to become acid? *A.* Yes, sir. But it would flow away at once, of course.

Q. Well, I will go on to the scalding-tank. *A.* The scalding-tank liquor will tend to neutralize any acid that is in the sewer; that would be its effect.

Q. The acid from Mr. Sortwell's and the Bleachery, being added, would increase the offensiveness of the sewer, would it not? *A.* As acid liquors they might. The liquid from Sortwell's is cold, that from the dye-house would become cold, even if it started hot. The effect of both in a sewer would be trifling.

Q. Did you ever get the odor of the close tank? I mean the pure, unadulterated odor, before it was run into the apparatus? *A.* I have not got it directly from the tank.

Q. You have never tested it then? *A.* No. I have no doubt that there is considerable sulphuretted hydrogen evolved from it.

Q. Do you know anything about that apparatus for consuming the gas? *A.* I have seen the outside of it, and seen its operation. I believe I understand how it works.

Q. Well, whether you understand the theory. Can you tell us where the gases pass off from the water? *A.* I understand there is a still, and then a pipe passes out from the still in which the steam is condensed, and from which the uncondensed gases have arisen; and there is a place where the condensed water passes off through a trap to the basin. The gas is discharged upon shelves covered with lime.

Q. Does the gas pass up through this lime chest and over the lime into gasoline, and from there through the furnace? *A.* It does. I do not recollect the detailed construction of the condenser. The gases that are condensed in the still or coil of course acquire the temperature of the surrounding water.

Q. Are you aware that there is a notion among some chemists that, when employed as experts, they are acting in the same capacity as a lawyer occupies toward his client? *A.* It may have been said.

Q. Do you hold that opinion? *A.* No, sir.

Q. Never have expressed it? *A.* No, sir. I have said that I thought the relations of experts in the courts of law admit of great improvement; that the relation needs modification, in my judgment.

Q. In what manner? *A.* Well, sir, I should say that the system which prevails in Germany would be a great improvement upon our system, where the expert stands in relation to the judge, and not to the counsel on either side. If you speak with regard to what I have had to do for Mr. Squire, I would like —

Mr. McIntire. I would like to know whether you hold that opinion.

Professor Horsford. I understand what your inquiry is. I think it is

but fair to say that in going into this matter with regard to Mr. Squire, I was a little doubtful whether I could be convinced that the establishment was inoffensive. It seemed to be so large, and there were so many difficulties in making the investigation, and I had so little time, that I could hardly venture to undertake it. When I first went there, however, I was impressed with the cleanliness of the establishment and of the business, and I was surprised at the inconsistency of the charges made against it. The idea that any offence could be observed at such distant points as was maintained seemed to me to be exceedingly problematical. The case interested me as a scientific problem. I had no definite impressions, as a general thing, from anything that I had read. Perhaps I should except that I did see in the papers that reached me while abroad, that there had been a great deal of trouble with Miller's River.

Mr. McIntire. I understood that several years ago, in a convention of chemists in Boston, you yourself expressed this idea, that the relation of the expert to the party for whom he works is the same as that of lawyer to client; something of that, — that he should write in his interest.

Professor Horsford. I think that is the general popular impression about it. That I think is wrong. I think the chemist ought to be in relation to the judge, rather than to the client. I did express my opinion as to the fact that exists. Then too, I think I expressed an opinion as to some proposed legislation about it, that impressed me as being injudicious; that is all. I would like to answer more fully a question in regard to a matter about which I think there is a little obscurity. There seems to be a conviction that the offensive gases may escape from the close tanks after the new arrangement of Mr. Squire is applied. I think that is the conviction of my brother Sharples and Professor Munroe. Now, of course, in the introduction of an apparatus into an establishment, both the operatives and the apparatus have got to get used to each other. There will be accidents at the outset. The condensation of the steam in this coil by surrounding the coil with cold water reduces that steam to a temperature corresponding with the water outside. When that steam is so condensed it will hold a certain amount of the gas that will condense with it, in proportion to the temperature of the condensed water. The colder the water the more gas it will hold. Now if this water went out saturated, the gases might be driven out of it by warmer water. But if it went out cold into other water not warmer than itself, there is no reason why these gases should go out, especially if they go into a larger volume of water, because there is the additional water present to receive and hold them. I do not see why, when this apparatus is fairly in operation as Mr. Squire has planned it, it will not do away with the odor from the tanks. I think there can be no objection to his establishment on that ground; I do not see how the apparatus can be inefficient. I will say that the rendering of fat in Paris is in open copper kettles. The exaction which is made here that the rendering shall be done in close vessels is a thing that is not required in that city.

Q. (*by a member of the Board*). Is that on a large scale? *A.* No, sir. It is carried on in a great many places. There are quite a number of abattoirs there, seven or eight of them large ones.

Q. Do they try their lard in these establishments? *A.* I think it is removed to separate places, but the trying is done in Paris.

Q. Do you know the temperature at which they render? *A.* That is a matter which must be the same there as it is here. Above a certain temperature undesirable chemical changes would take place. I do not think it exceeds three hundred degrees. I may say I speak with regard to Paris from reports rather than from examination.

Q. (*by a member of the Board*). You have heard testimony that this rendering-smell has been experienced in Cambridge seven thousand feet from the establishment, and that at that distance it has produced nausea. That is in evidence here. There is no evidence as to the effect it has produced at the Monument and along High Street. We have, however, evidence as to the effect it has produced on Mt. Vernon and Chestnut Streets, something like ten thousand feet away. Now, to what do you ascribe the origin of these smells? Or do you think that this smell which is so offensive and produces nausea is generated by the vapors arising from the basin? *A.* The smells that have been observed in Old Cambridge, I am inclined to think, are due mainly to its own sinks and drains. They are the consequence of diminished pressure, a muggy atmosphere, low tide, and the direction of the wind at the mouths of the sewers. I cannot help thinking that it is the chief explanation for those in Boston. The connections with the sewers have been cracked in some places on the new land by the settling of the houses, thus providing openings for the escape of the sewer odors. Besides these, there are smells from the Back Bay and the Charles at low tide. In Charlestown I think they have a similar explanation. Indeed, I find it beyond my power to conceive that the proper rendering odor should be noticed at any considerable distance. I can conceive that from Reardon's, Barry's, and O'Neil's, the smell arising from rendering rancid fat and soap grease should be observed at a considerable distance when it goes in a vein. But that any kind of smell goes from Mr. Squire's enclosed establishment to Boston and affects the people on Mt. Vernon and Chestnut and Newbury Streets, requires more investigation than I have given the matter, to enable me to say that I think it is possible. On the nights specially complained of, the wind was adverse.

Q. The question that I asked you was in reference to this rendering smell, — the smell which is described as the odor of boiling fat or putrid meat, and goes as far as seven thousand feet in one direction and more than seven thousand feet in another direction. My question is whether these peculiar smells which the witnesses have testified to are distinct from the smell that arises from the vapor of the basin? *A.* I think they are. The rendering smell of fresh lard is distinct from that of boiling putrid fat or meat, and both are distinct from the odor of the basin. My inquiries have made me distrust the convictions of many persons who ascribe to Squire's works odors that obviously came from the sinks or drains in their own neighborhood. I have no doubt about the misapprehension in Charlestown. I have conversed with physicians in Charlestown who have given me this information: they have gone up the hill through the fog bank in the neighborhood of the wharves, into the clear air above, and smelled first the sink smell issuing from openings in the sinks or sewers, and afterwards the dock smell.

Q. I would like to have a little explanation of what you said yesterday about the state of the barometer in cases where exhalations from the basins, from the docks, and from the sewer-mouths affected the people in

the different neighborhoods. *A.* The barometer being low, and the air muggy, the exhalations would rise more directly than when the air was denser and clear. The gases which were smelled were originally in a solid or liquid condition. In order to get into the gaseous condition they must overcome the pressure of the atmosphere. If you take that off they will escape more readily, just as the taking off the atmosphere will enable you to boil water at a lower temperature. Suppose that the barometer is at such a point that it just holds down a quantity of gas which is just ready to overcome the pressure of the atmosphere. The moment the barometer begins to go down, the restraint is removed and the gas escapes. A muggy atmosphere is usually accompanied by a falling barometer.

Q. Whether, if the heated gases should rise in the atmosphere, the barometer being low, it would not again settle down when they became cool? *A.* I think they would be diffused on rising, and descend again only with great difficulty.

Q. Can it in any way account for the rendering smells which are complained of around this neighborhood? *A.* I do not think it can, sir. I think the fact of a constant breeze, from any quarter, such as that from the east and southeast on the night of July 31, would be fatal to such a theory. I think if you distribute a given quantity of the gas, as much, for example, as might arise from all the establishments on Miller's River, together, over an area of two or three miles in diameter, after it has once ascended, it could not get back to the bottom of the atmosphere, except in such a diluted state that its effects would not be perceived.

Q. Does the muggy atmosphere, hugging the earth, have any effect on the falling vapors in such cases? Would that not dissolve them and make them more intense than before? *A.* Would it increase the offensiveness of the atmosphere, the little that did come down? Assuming that it could come down, I think the solution of the gas in the fog might make it more offensive. I cannot conceive that it could come down, if you will allow me to say it.

Q. Whether, in your opinion, there is any mode of propagating odors otherwise than by the transmission of material particles? *A.* I do not know of any other, sir.

Q. Whether there can be any propagation of odors except in the direction that the wind blows? *A.* I do not know of any, sir. There is such a thing as a diffusion of gases in a narrow, closed chamber, but as for any odor outside Squire's works moving against the wind, it is a new doctrine to me.

The Chairman. Can chemistry thoroughly analyze all odors? Can you tell us, and give the name to it, — what is the cause of it? *A.* Chemistry has not determined all possible odors.

Q. I noticed in your three bottles, yesterday, a peculiar smell, to my nose. I would ask you whether there could not be a compound of these odors arising, which would cause these troubles which we are all affected by? *A.* I do not think it possible. The distances are too great.

Q. But if the odors from the several causes are intermingled they will rather neutralize than intensify the odor? *A.* The ammonia of the hog-smell would tend to neutralize any acid vapors.

Q. (*by Mr. McIntire*). Whether there is not a difference of temperature between the water of the basin and that which runs from the still? *A.* I suppose there may be a little difference, but I do not think it sufficient to make any difference with the water issuing from its small outlet.

Q. I think you decided that the soup is entirely dissolved in the water and all taken off? *A.* Pretty nearly, sir. I have something here which will, I think, illustrate it; it is, the soup-liquor evaporated down. I find that the amount which remains undissolved after treatment with water is very small.

Q. Do you know that Mr. Sharples has given particular attention to this matter of soup? *A.* I have heard his testimony.

Q. I should say, then, that your testimony don't agree with his? He said that he could not get this soup out of the water; he did n't know of any process by which it could be got out. I think he testified that if it could be separated by evaporation it would make inferior glue. *A.* He said if you could only combine it with something producing a solid, you might separate it. But all its compounds are *soluble* in water; therefore, when you take it with its large dilution and empty it into the basin to be diluted by the enormous quantity of water there, to me it is impossible to see how it can be deposited on the bottom of the basin.

Q. I only want to call your attention to the fact that you and Mr. Sharples don't agree as to organic matter going to the bottom of the basin? *A.* I do not see how a body that is soluble in water, upon dilution with a larger quantity of water should lose its solubility.

Q. I have been informed that you are interested in a bone-boiling establishment? *A.* I am.

Q. Do you use close tanks or open kettles? *A.* We use close tanks.

Q. (*by Mr. Derby*). You spoke of some vapors that might possibly arise from the works of Mr. Squire. Let me ask you, with regard to those vapors, if, when reaching the upper atmosphere, they do not become oxidized? *A.* They are destroyed by the air which purifies itself.

Q. So that they would not be in a condition to recur to the earth? *A.* I cannot conceive of a gathering together, to any extent, of the vapors that have been carried up into the higher atmosphere, and their subsequent descent through the air.

Q. Well, then, do I understand you to say that there are no vapors that you have detected as coming from the establishment of Mr. Squire which could occasion these results which have been spoken of by people as occurring during the night? *A.* The change of the color of the houses is to be ascribed to the odors from the basin. The rendering odor, in my judgment, is not a serious thing, and its existence at all, with the use of close tanks, is, I think, hardly probable. I will say that in my visits there, which have been very frequent, certainly, within the last two months, I find perhaps less odor than might be presumed to be present in the summer season. But I have not found any odors belonging to the processes of Mr. Squire's establishment that could be perceived at any considerable distance from the works. I will say that at the unloading of the cars I have smelled the hog-smell farther than anything else. But, as legitimately due to the processes in the establishment, I have found no serious or offensive odor of which complaint is made. I think the smells of which complaint is made have settled down now upon the odors of the cooking of putrid meat, the rendering of putrid fat, as in treating soap-grease, which are not pursued at Squire's works, and the smell of the basin.

Q. Permit me to ask you if ammonia is not carried into the sewers by the fats and meats which come from the kitchens and the sinks? *A.* Not by itself, I think, sir. I think the characteristic odor of sinks is acid.

The solid excrementitious matter would become of an ammoniated character, undoubtedly. I should say that the prevailing characteristic of the matter that would come from the kitchen would be acid.

Q. With regard to these soups going into the stream, whether they were cold or hot, would it be a difficult matter to reduce them in temperature? would not a block of ice thrown in at once affect it? *A.* It could be cooled without difficulty and without much expense.

Q. Your attention was drawn, sir, to the sewer to open at Craigie's Bridge? I understand you that at the extremity where it would be carried in you believed there was not so much mud; is it not so, sir? *A.* I believe it is.

Q. Your idea would be that it would be better to carry the drain to deep water, and not deposit the matter upon the flats? *A.* Yes, sir.

Q. You have said that these gases will ascend and be oxidized? Would they oxidize as fast in a light atmosphere, the barometer being low, as they would if the atmosphere were heavy? *A.* I do not think they would.

Mr. Derby. I have no more questions, sir.

TESTIMONY OF MR. CHARLES E. AVERY.

Q. (*by Mr. Derby*). Where do you reside? *A.* I reside at 19 Chester Park, Boston.

Q. Have you made the study of chemistry a specialty more or less? *A.* Yes, sir; I have studied chemistry nearly all my lifetime, I may say, and besides that, I have undergone a course of education on that particular subject.

Q. Have you been a practical chemist more or less? *A.* Entirely so.

Q. Have you been called upon to examine these works? *A.* I was called upon by Mr. Squire about five weeks ago, to inquire into this matter, and to make a thorough investigation.

Q. Did you have an occasion to make a suggestion as to the use of charcoal before you made this investigation? *A.* It was adopted at my suggestion. I drew the matter of disinfecting his works to Mr. Squire's attention, and suggested the use of charcoal, and he adopted it.

Q. Will you now have the kindness to submit your report and its results? *A.* I have made the examination, the result of which I will submit in writing.

The Chairman. Whether you could not present the results without taking so much time as to read a report? It is hardly worth while to have a repetition of facts.

Mr. Derby. I have read a portion of his report, and I think it could be read in one half the time that it would take to bring out the facts by an examination of the witness.

Mr. Avery then read as follows: —

The hogs are bedded on charcoal; the passages of the hog-house strewn with it. This is perfectly effectual. I have taken it from under a herd and found it still had the odor of fresh charcoal. I have followed them up the inclines, driving them before me, yet the odor of swine was slight. I have covered a pile of animal matter, in intense decomposition, with one inch of charcoal powder. Casual visitors were asked the nature of the heap, and on close inspection presumed it to be all charcoal. This power

of destroying odors lasts indefinitely. It is self-renewing. If witnesses testify that the hog odor out of doors is as bad as when no disinfectant was used, it proves that the odor complained of does not originate in the hog-house.

The hogs are driven, a few at a time, into a pen, strung up by the heels, by a clip resembling a pile-driver, killed, and passed into the scalding-tank.

The blood is carried away in carts. These are not disagreeable in smell. The faintest trace of putrid blood would be discernible.

The scalding-water was tested with a neutral solution of permanganate of potassium, dilute and concentrated. If the water were at all rank it would be instantly browned and precipitated. The test proved the water inoffensive.

The lard-pans were sweet, the odor slight. I found a trifle of sulphide of hydrogen came off, — not enough to smell it. All fresh meat cooking gives this gas and sulphide of ammonium. (See Watt's Chemical Dictionary, articles " Flesh " and " Fibrin.")

These kettles cannot give rise to any considerable odor, for this reason : *it would spoil the lard to have putrid gases generated in quantity in its midst.* Fats greedily absorb odors. Milk, cream, and butter are examples. Hence the cleanliness required about dairies, the care of the housewife to scald out the refrigerator. I refer to Piesse, " Art of Perfumery " : —

" The fat body has a strong affinity or attraction for the odorous body or essential oil of the flowers, and it therefore absorbs it by contact and becomes itself perfumed." (p. 36.)

" In the perfumer's laboratory, the method of obtaining the odor is by absorption, or, as the French term it, *enfleurage*, — that is, by spreading a mixture of pure lard and beef suet on a glass tray, and sprinkling the freshly gathered flowers all over it, leaving them to stand a day or so, and repeating the operation ; the grease absorbs the odor." (p. 90.)

" The pneumatic process consists of forcing a current of air into a vessel filled with fresh flowers, and then passed into a second vessel containing grease ; it there yields up its smell." (p. 159.)

The lard, then, is one of the most delicate means we can employ to collect odors. Were a foul odor like that complained of *evolved in the pans the lard would be worthless.* Piesse (page 54) says : " This fat being melted by a steam heat or bath, the kind of flowers required for the odor wanted are carefully picked and put into the liquid fat, and allowed to remain there from twelve to forty-eight hours ; the liquid fat has particular affinity or attraction for the otto." If an odor of such offensiveness, in quantity enough to disturb three cities, were generated in either the closed or open tanks, what would be the odor of the lard and oil ? I discharged the steam from the closed tanks into the air of the room two minutes each ; I heard a dead hog was in one. The steam had been on an hour or so, and the stench, if there be any, should then be greatest. Though I put my face in the steam jet, I could perceive nothing offensive. If four minutes will not scent a room, four years will not a city. I had before supposed that mischievous workmen might let loose foul gases, but became convinced of my error.

The soup is strained ; the solution that goes into the tide is overboiled glue, or jelly. When the tanks are discharged a smell like a hotel kitchen

is noticed, — not so strong as in many, — an odor of broth. I cannot see how the discharge of broth from a factory should pollute the basin more than the discharge of like broth and jelly after they have been through the bowels of the people of Cambridge.

The gases blown off are treated in a condenser to extract the water, with lime, then carburized with gasoline and burnt under the boilers. Simple discharge as a jet over the boiler fires would be sufficient.

I have charged meat and offal horribly putrid on the hearth of a reverberatory furnace; a lively fire was on the grate; standing at the chimney top, my face in the escaping gases to leeward, I could not tell if the furnace was empty or charged with a putrid mass. No odor except that of burnt matches from the sulphurous anhydride given off by the coal was discernible.

Besides, boiling destroys putridity. (Angus Smith, "Disinfectants," p. 56.) "If it is a dry heat it arrests putrefaction at all temperatures. Even if moisture be present the disinfecting action is powerful, perhaps all-powerful if the temperature of 140° Fahrenheit be continued long." The oil when warm and freshly let out is but slightly odorous. Three of us held a discussion as to what a hogshead filled with it contained. It stood in a dark corner. The odor given off by fats, especially rancid fats, at 140°, appears to be valeric acid and velerate of ammonium. (See article "Soap," Richardson & Watt's Chemical Technology.)

A very delicate test for the sulphides of hydrogen, etc., is found in the factory itself. These bodies combine with the red blood globules, or rather the hemætoidin thereof, in such a manner as to prevent their change from arterial blood to venous, and *vice versa*. They are useless as blood. If the factory hands were in the focus of production of great quantities of these gases, they would be pallid, thin, and miserable. They are, as a fact, ruddy and healthy. Angus Smith says: "Sulphide of hydrogen may kill like a cannon shot." If it blackens a quarter of a mile away, where would be the workmen, shut up in the room where it is generated?

The operations of the factories are continuous day by day. The odors of East Cambridge are highly capricious and intermittent. The prosecution has shown no reason for this; has omitted or rather failed to show the emission of odors, quantitatively considered. It has been said that these factories gave out gases odorless where formed, but intensely powerful by contact with air. Sulphide of hydrogen is not of this nature; oxidation destroys it. To test this theory of odorless stenches I produced the active principle of fresh air — ozone — in the room over the kettles and tanks and opening into it. No offensive odors rose from below, or I should have perceived them. No new smell was developed by the ozone, save its own.

Smoke and the gases of combustion destroy foul odors and prevent putridity unless the quantity of putrid stench overpowers them. They will not develop worse by combination. Carbonic oxide, sulphurous anhydride, and creosote are the most powerful of volatile disinfectants. Mr. Squire's *smoke preserves* his ham.

Smells of East Cambridge.

It appears from the testimony that the factory smells of sour swill, of the sulphides of hydrogen and ammonium, of mercaptan, of live hog, of

rendering, of boiling putrid meat, of frying. It smelled thus on the 31st of July. This was the odor complained of, — the usual stench.

The source of a smell cannot be inferred from its odor only. Dilute odors do not resemble that of the same body in a concentrated form. Piesse (page 171) says: "It is difficult to ascertain the reason why the same substance, modified only by the quantity of matter presented to the nose, should produce an opposite effect on the olfactory nerve; but such is the case with nearly all odorous bodies. The ottos of flowers in a concentrated form smell positively nasty." They are modified by combination with other odors. They affect the nerve of smell as a single impression, as light affects the nerve of vision. We do not see the colors of the rainbow in white light. Piesse (page 108) says: "Two distinct odors are procurable from orange-blossoms. This quality of fragrance is not peculiar to the orange-flower, but applies to many others, especially rose, — probably to all flowers."

Who ever perceived two odors to the bridal wreath or rose before the chemist separated them? Piesse (page 59) says: "Bouquets are mixtures of the extract so compounded in quantity that no one odor can be discerned as predominating over another"; and (page 219): "There are certain odors which, on being mixed in due proportion, produce a new aroma, perfectly distinct and peculiar to itself."

The testimony of the prosecution is then devoid of that precision it would be supposed to have by those not knowing these facts. *Vide* Piesse, page 46: "To the unlearned nose all odors are alike." It cannot aid the investigator.

The Sulphur Gas.

This would render the investigation difficult were it not for one thing, precise, definite, scientific, — a thing having no bias. The paint and silver of East Cambridge were blackened by a sulphur gas. We will assume it to be the gas which holds the most sulphur for its weight, which has the greatest diffusive power of any foul gas, — sulphuretted hydrogen. Subsequent facts bear us out in so doing. Sulphuretted hydrogen gives a test when present one part in 100,000. I can smell it when one part in 40,000 is present. It kills small animals when present one part in 1,000. I will assume one part in 10,000. Four square miles were affected by gases of which this was a leading one. The stratum of foul air was at least 100 feet deep. Here are 11,150,000,000 feet of air. One part in 10,000 gives 1,115,000 cubic feet of sulphuretted hydrogen required to give the stench.

Now, this amount could n't possibly come from Squire's factory. The hogs killed in East Cambridge per day are, say, 2,500. These weigh about 250 pounds each. We will suppose them to have no fat, which holds little sulphur, no bones; that they are all readily putrescible matter. Three fourths of all meat is water. We have then remaining about 156,000 pounds of pure fibrin, the matter of flesh. This holds more sulphur than albumen, about one and a half per cent. Therefore, we have 2,300 pounds of sulphur in the fibrin, which would form 25,000 feet of sulphuretted hydrogen gas. Since putrefaction is sensibly constant in the amount of gas evolved for short periods, this would be five seventeenths of a cubic foot per second. I have made here no allowance for the destruction of gas by oxidation after it got into the air, nor for the free sulphur and

fixed sulphides formed. If all the meat received in the factories in one day went into gas by putrefaction during that day, it could not produce the effects observed, not even were it all discharged at once. On Mr. Squire's premises of twenty acres, allowing a stratum of air thirty feet deep to be mixed with it, that would be one tenth of one per cent.

Where the Sulphur Gas comes from.

These gases come from the reduction of the sulphates in the mud and sea-water to sulphides by contact with fermenting and putrefying matter. The oxygen of the sulphates oxidizes the carbon of the body, which reduces it to carbonic-acid gas ; and this, combining with the base of the sulphate in presence of water, releases the sulphide of hydrogen.

I took mud from the sewers and basin, filtered off the water in it. It gave an instantaneous test for sulphides. I then added dilute acid, — hydrochloric. Bubbles of gas were given off, which proved to be sulphuretted hydrogen. Free sulphur was set free, — milky sulphur.

I have had this sample of mud analyzed, to find quantity of sulphur present in various states of combination. There is about $1\frac{1}{4}$ per cent. There is about 10.2 per cent of organic matter present to assist in the reduction of the sulphates. Here is an adequate source of sulphur. Twenty acres would hold about 1,750,000 pounds of sulphur, which could make, say, 19,000,000 feet of sulphuretted hydrogen ; and this is subject to renewal by fresh mud by the sulphates in the sea-water.

The Intermittency and Intensity.

Finely divided and porous bodies, like mud, clay, charcoal, etc., store up gases and condense them. The mud of Miller's River and the soil about there store these gases. If there comes a fall of pressure of air, or an increase of heat, these are given off. A rising tide assists by displacing the gas mechanically held in the mud and soil. So these flats give off their odors capriciously and with extraordinary intensity.

Ferment and Putrid Gases.

Yeast is always going down Miller's River from houses and the distillery, if I mistake not. The flats lie open to the air, which, as every lady knows who puts up preserves, of itself starts fermentation from the seeds it carries. This, on exposure to the air and heat, runs into putrefaction. I knew the mud must ferment. James D. Dana ("System of Mineralogy," p. 725), the first authority in that science perhaps, says : "The conditions favorable to the formation of naphtha are the following : 1. The diffusion of organic material through a fine mud or clay. 2. The material in a very finely divided state. 3. The material excluded from the atmosphere.

"There is reason to believe that no more heat was required than what was afforded by the natural temperature of the region and the process of *fermentation.*"

I knew ferment oils were volatile and powerfully odorous. So I put a trifle of yeast in a bottle of mud from the Squire Basin.

I took it down to Professor Babcock's office to open it. It blackened a test paper. He took out thirty to forty grains on a spatula and put it in another bottle for analysis. It remained exposed perhaps four minutes. The odor was diffused through a large suite of rooms, all of them containing, maybe, 25,000 cubic feet of air. The symptoms produced in me

were faintness, dizziness, oppression of the chest, and constriction of the throat. I had to lean against a bench to sustain myself. Professor Babcock asked me in surprise if I felt it as much as that, and without my speaking alluded to the odd feeling about the throat; since then the mud has putrefied and this has lost its force.

The mud fermenting from yeast in presence of air, it would naturally form acetic acid. The mud was acid by test and smelled of acetic acid. Hence probably the odor of sour swill of Dr. Shaw.

Sulphuric acid comes from the bleachery being non-volatile, dilute solutions concentrate themselves on exposure to air and sun. Weak acid will destroy clothing. There is lactic acid in household refuse. Acetic acid is generated by the mud, also carbonic acid; acids come in from the distillery, from sour, peaty soils, and tan-yards. *The action of these acids on the putrid mud gives the smell of rendering or boiling putrid meat.*

Angus Smith (page 94) says: "Acids and acid metallic salts such as chlorides of zinc and iron send out a very disagreeable fatty acid, which seems to be the same that comes over with ammonia when putrid matter is distilled. For this reason chemicals such as these ought never to be poured on strong or slightly diluted putrid matter."

I have hitherto shown that grease readily absorbs odors to give them off on a pure air. Various witnesses testify that the odors were strongest at Miller's River: "After it entered a room it was difficult to get it out; that the smell hung to clothing with extraordinary tenacity."

Had Mr. Squire's factory been absolutely new and clean, fresh from the carpenter's hand, but smeared with grease and lard, all absolutely pure and sweet, it would, situated as it was in the focus of the stench, have undergone enfleurage and retained the scent next morning. The only surprising thing, to those who know the attraction of lard for an odor, is that the smell has gone away yet.

A very large manufactory of perfumery exposes a surface of 18,000 feet of absorptive fat during two or three months of the year (Piesse, p. 57). There are only a few houses as large as this. Mr. Squire's factory exposes a much greater greasy surface than this. The smell about the factory after a night of stenches proves nothing.

Note the Parallel.

About the year 1854 strong smells began to disturb the Houses of Parliament and bench of judges; the evil grew worse the next year and the next. At first the trouble was laid to an old graveyard; then to the bone-factories, which were *suppressed*. The smell grew worse and the sewers were accused. They were flushed, purged, and purified by chemicals; they were trapped at the outlet and ventilated through sieves filled with charcoal, — a precaution still used. The evil grew intolerable in 1856. Committees were appointed to report to the House of Commons on the cause of the nuisance. Able chemists were employed for two years to investigate the matter. The odor was nightly intermittent, — as one report says, "The entire surface of the river became *pestilential* in less than twenty minutes."

The copper coal-scuttles of the citizens, scoured bright one day, were black the next. They were thrown out of use, — placed in the lumber-room. Silver was black as the kettle; paint was discolored, and lead test-paper blackened far from the river. The members of Parliament and

judges were nauseated, seized with vertigo, faintness, irritation of the throat, and oppression of the chest. They were forced to discontinue their sittings. The chemists employed were August Hoffman and Edward Frankland, the highest names in Germany and England ; Henry Letheby, perhaps the best expert or specialist on these matters of sewage, William Odling, Spencer, and Witt, all chemists of high repute. They reported that the smell came, not from fresh sewage, which was comparatively clear ; not from Thames water, which was but little fouled ; but from dock or river *mud*. The smell was not a dock smell, but one peculiar, intense, and terrible.

The gas was not all hydric sulphide or ammonium sulphide, but came from a compound of iron, carbon, and sulphur, and was probably its vapor.

The evolution of the smells seemed to be determined by a rise in the temperature of the water above 60° Fahrenheit, a change in barometric pressure, by incoming tide, and other causes not so clearly made out.

Competent engineers reported as follows regarding the sewers and sewage. In fine weather the solid matter sinks to the bottom of the sewers, especially where the fall is slight, and *there* remains. The effluent matter *then* is not very unpleasant. Rain follows, and the sewer contents are flushed into the river. Once there, the solid excreta sink along the shores, in the eddies and back currents. Even in brisk currents they sink one foot in a minute. The sewer-water is fresh, and is lighter than salt. Sewage-products peculiar to the drains of lower London were carried by the incoming tides up stream, to form shoals. The sewage of Boston may and must enter Miller's River, whilst in that sluggish basin little or none can ever get out. The English reports say "the filth has accumulated for centuries." Finally, the Thames was dredged ; the shores embanked and lined with quays to form a great park or driveway ; all the sewers of London were intercepted by main sewers following the river's bank, leading into vast reservoirs far down stream, at Barking. Here the sewage was disinfected, and at low tide led in pipes way under the sea, and there discharged.

The sewers alone cost $ 15,000,000, but the trouble was gone forever. From testimony here presented, these odors begin to appear in the second week in June, and end quite late in the season ; that they come from Miller's River or its vicinity ; that those basins are shallow.

At 54° putrefaction in air ceases (Angus Smith, p. 55). When the air rises to 54° or above it begins. When the temperature exceeds 60°, according to the investigations, it begins under water and in mud-banks.

Any putrid scrap, then, will get in bad condition as soon as the temperature gets up to 56°, anyhow. If these odors are produced by any body in contact with air or surrounded by it, they must begin when the temperature gets up to 56°, and end when it falls below it. If they come from mud-banks, they will begin when the temperature of the water gets up to 60° – 61° Fahrenheit, and end when it fall slower. I submit the mean heat for the weeks ending on certain days for 1872 – 73, as obtained from the observer of the United States, and the reports of Professor Weir Mitchell on the monthly temperatures of the tidal lower Mystic Pond and the non-tidal upper Mystic Pond.

It appears from the exhibit that shallow waters are warmer than deep ; that the tidal pond in summer is as warm or warmer than the fresh-water

pond. That if the material giving the putrid odors is in contact with air, the strong odors should begin in April, and end about November 1. That if the material giving the odors is in contact with shallow tidal water in our harbor it will begin in June to emit them, and end in October. Reminiscences of the odor may occur at any time under a very low barometer, but are less likely in the spring, as the reservoir is then nearly empty.

You have been already told that on the 31st of July, 1873, at the time of the smell there was a low barometer, — the odor occurred from ten to four at night, — the time when the daily fall takes place. There was an in-flowing tide displacing the gases mechanically held in the soil and mud. The smells are nocturnal to a considerable extent. The water is cooler in the day than the air; the latter, charged with vapors from the still warmer soil, passes over the water, is cooled, — cannot hold so much vapor. We say it is "moist from off the water." It takes up little vapor in its passage. In the night, as Professor Mitchell's observations show, the water is warmer than the air, often warmer than the water in the day-time. The cool air has dropped its moisture, as dew on the grass and leaves, or as mist or rain. Passing over the warm water it becomes itself warmer, can hold more vapor, and greedily sucks up the foul water of the flats and their noxious vapors. The vapor of the water aids the escape of the imprisoned gases; it carries them with it. The observed nuisance corresponds in every respect with the stench from putrid sewage-mud, as developed by experiment and observation, and it is a physical impossibility that it should come from the factory.

Mr. Derby. I shall confine my examination to the written report unless Mr. Avery wishes to make some further statement.

Mr. Avery. I would state with regard to sewer gases at the South End, that when the wind blows from the east we people at the easterly end are troubled with sewer gases coming up into our dwellings. My friends on the westerly side are not troubled then. When the wind is west they make the same complaint. I will show the action of the so-called sewer traps by a model which I will bring you. It is professed that the trap will keep a level of water, so that the gases will not get by it into the house. In fact, however, the water siphons over it by a peculiar action, and nearly all runs away, leaving a free passage for the gases.

Cross-Examination.

Q. (*by Mr. McIntire*). I understand you to say, Mr. Avery, that you turned off the cocks from the close tanks and put your head in the steam and did not perceive any bad odor? *A.* I smelt nothing, except a slight odor, such as one would perceive at the dinner-table.

Q. Do you know how long these dead hogs had been in the tank? *A.* I visited his establishment very soon after the steam was let on, because everybody knows that the most odious gases from putrid meat are evolved very soon after heat is applied.

Q. I do not think you understood the testimony of Dr. Sharples. He testified that his mercaptan smell came from these same hogs. He opened the same tank that you opened and smelt it there. *A.* Well, it is smelt in different senses. The natural mercaptan smell is like a strong smell of garlic or onions.

Q. I understand you also to say that these odors are changed when

they are diluted largely? *A.* It changes the odor itself. In some cases it makes so large a difference that the original offensive odor is changed to a very pleasant one.

Q. Might they not be so changed that they would be quite disagreeable? Would not the converse of your proposition be true? *A.* The converse case is never known except in direct chemical combination.

Q. I also understood you that if different odors were mingled together, if there has been a mixture of odors, that the predominant odor would still predominate? *A.* It destroys the others and modifies that, or you may say that it masks it.

Q. So might not the rendering odor mingle with others, and produce a disagreeable odor, whereas, if you smelt the rendering odor by itself, it would perhaps be agreeable to the nose? *A.* The mixture would not become any more disagreeable than the original odor.

Q. It is not probable that the rendering odor could be mingled with other odors and increase its disagreeability? Well, suppose you have a rendering odor very strong, and in the same room we should let loose some sulphuretted hydrogen? Would it be as agreeable as the smell of the rendering odor alone? *A.* There would be in that case, if these two odors met, a new body formed, which is much less volatile than either of the others. It would be a viscid oil, which is evaporable. There would be a new odor unlike either of its constituents.

Q. You state as an abstract fact that a commingling of odors produces an entirely new odor? And if I understand you, you say that the new odor will be more agreeable to the smell? *A.* I did not say that. I said that the new odor would probably be more disagreeable than its constituents. Although a supposable case might make the odor more agreeable.

Q. In this case you say that if you mixed several odors you would form a new odor; that is, a simple odor, and not a mixed one? That is one position; the other position is, that if you get several distinct odors mingled, one being more intense than the other, you would retain the impression of that odor alone? *A.* It is that odor modified; you get the impression of a single odor just as you would get the impression of a single light by a combination of lights.

Q. (*by Mr. Newhall*). If I understand you, you said that two disagreeable odors united might produce an agreeable odor? Is not the converse of that true, that two agreeable odors united might produce a disagreeable odor? *A.* It might be so, but it is unlikely.

Q. Well, why should n't it be so? *A.* Because where two bodies join, as a general thing, they form a body that is less volatile, that is more condensed than the original primary bodies, and since it is more condensed it is less volatile and less likely to be noticed. If you go on you will reach, finally, a solid combination.

Q. (*by Dr. Derby*). The question is with regard to agreeableness. Do you mean to say that an odor depends on its volatility? *A.* I do not mean to say that.

Q. (*by a member of the Board*). Whether or not two odors may not commingle and form a disagreeable odor? *A.* It is not a chemical fact. It is merely a supposition that any chemist or anybody else might make. I do not know of any such case.

Q. But you do say that two disagreeable odors may unite and form an agreeable odor. I think you so stated? *A.* I say that may be the case,

but that is equally a supposition. I stated that when you did combine them, you formed something less volatile, and therefore something less likely to smell disagreeably.

Q. You merely state that volatility is an attendant element to odor? *A.* Yes, sir.

Q. Would it be the case that the odor from the rendering of lard would take up other odors and diffuse them? *A.* I do not understand that the odors from lard are lard itself. I spoke of the lard absorbing odors; lard itself does so.

Q. Is it true that the odors from boiling lard will not take up other odors? *A.* When the vapor passes off it usually carries with it a certain proportion of any volatile thing that may be along with it.

Q. Do the odors of boiling fat or lard smell of the substance itself? *A.* They contain valeric acid, valeric ammonia, mercaptan, and glycerine.

Q. I understood your inference to be that this house could not be the source of these gases; because, if it were so, the meat itself would absorb them and be unfit for the market? Suppose that in the room in which the rendering is carried on there is an escape, to some extent, of gases, so that the room becomes greasy. Then at certain conditions of the atmosphere that grease would take up the odors and confine them; that at certain other conditions of the atmosphere, that grease would give off gases which would be diffused about the room. Then the room would smell very badly, would it not? *A.* It would smell strongly to persons not acquainted with it.

Q. Suppose that the lard should absorb, in the course of manufacturing, some of the gases that might be circulating in the atmosphere? *A.* The lard, after it is rendered, is put into casks, so that it is not in a position to return anything that it has absorbed.

Q. It would be likely to absorb something that would injure it, and it would be carried away with the lard when it left the establishment. Suppose a large amount of lard to be manufactured during one of those very bad periods for the evolution of those gases which are supposed to come from the dock. If that were barrelled up holding such an amount of this offensive gas, would n't it be likely when it was cold to have a very offensive odor? *A.* If it were merely the lard that had been in contact with the air, in the kettles, the surface exposed is only a few square feet, and the absorption would be so slight that it would not amount to anything. If you were to scrape up the grease off the floor, which would expose so great a surface to the stench, as compared with the lard in the kettles, it would be badly charged with the odor.

Q. (*by Dr. Derby*). You were speaking confidently in regard to the various odors, including the smell of the dock, the smell of the hog, and the smell of the rendering. I ask you, as a chemist, whether you are able to distinguish chemically between these different odors; or, to put it another form, whether you can chemically distinguish between the odor of a rose and the odor of a hog, dead or alive? *A.* It would be impossible so to do, because the amount of some odors is so very small that you cannot catch hold of it. Then, too, the formulary or combination is such that some materials may be combined with but small changes in their molecular construction, and form very different odors. For instance, the oil of lemon and the oil of rose smell very differently, but have almost the same chemical formulary.

Q. Can you express in chemical formula the difference between the smell of a rose and the smell of a hog? *A.* If I could collect vast quantities of the odors of the rose, I should be able to test it; but no one, so far, has made such an investigation.

Q. Do not chemists admit that they are unable to distinguish between such odors? *A.* I detect the hog odor by the sulphur odor, while the odor of the rose is composed of carbon, hydrogen, and oxygen. I think that I could readily distinguish between the two. I could test the fact of sulphur being present in one and not in the other.

Q. Can you express by chemical formula the difference between the smell of a rose and the smell of a hog? *A.* We cannot express chemically with any certainty any of these delicate odors. They puzzle the ablest chemists to-day. I might be able to distinguish them chemically, by being able to detect something in one that I could not in the other, but it seems to me no one can tell what it is.

Q. (*by the Commission*). I suppose you could show that the element which forms the dock smell was chiefly sulphuretted hydrogen? *A.* I know that sulphuretted hydrogen is the principal agent in these gases, and in the London gases. It is one of the principal gases in quantity, though not in odor, while the excessively small quantities of these other gases will produce tremendous effects.

Q. (*by Mr. McIntire*). I understand you to say that this gas from the rendering tank don't rise? *A.* They probably rise, but as they have no odor to speak of, you would not smell them.

Q. Well, you spoke of going up stairs with your ozone, and being unable to distinguish any there. I only want to know whether you mean to have us so understand it. The chemists on our side testified that this odor did rise. I only wanted to know whether you differ with them? *A.* I do.

Q. You have carried out certain calculations about the gas that would arise from the mud. How much mud do you calculate it would take, such as there is in Miller's River basin, to fill the area that you calculated to the extent that it would nauseate? *A.* I took twenty acres for the calculation, and presumed there would be two feet of mud upon the surface, and I calculated seventy pounds per cubic foot of mud. I showed that the sulphur of those twenty acres of mud would make nineteen million feet of gas, — enough to produce that smell about eighteen times over.

Q. What was the percentage at which you detected it? *A.* I detected it at one part in 40,000.

Q. You say that that number of acres of mud at that estimated depth would fill the atmosphere eighteen times over with one part in 10,000. Well, when this gas passes out of the mud, you cannot get it out of it again? *A.* No, sir; but it is perpetually renewed.

Q. You don't mean to say that the acids that come in at one portion of the dock or basin are spread completely over the whole basin, and that the gases arise from the whole surface? *A.* At the same time that the action is going on, the action of the sulphuric acid upon the mud, there is carbonic-acid gas resulting from the reaction of the basin whenever the sulphates is reduced to sulphur. Suppose that on the night you speak of, the 31st of July, these acids affected the whole of the basin, I think that to a certain extent these would flow into the atmosphere and

fill. I think that probably gave rise to some of the putrid odor. I think the mud had been stirred up, and the sulphuretted hydrogen set free, and it was then given off all at once.

Q. How long do you think it would take to give off all this gas? *A.* It might take a longer or a shorter period. It would depend on the atmosphere, on the intensity to which it was charged, and a thousand other things.

Q. You heard Professor Horsford testify that these gases would be carried by the wind in a certain direction from which the wind blew. Do you think you were perfectly fair in that computation, when you took an area of four miles that would be saturated by these gases? *A.* The testimony was that when the wind blew, the gases affected buildings or people a mile and a quarter away. Furthermore, I understood from various testimony that these smells were smelled at the same time on Charles Street, on Back Bay, at the Observatory in Cambridge, and very strongly in the houses at Miller's River. I based my calculation upon those statements. I was not calculating on Professor Horsford's testimony.

Q. About the oil, are you familiar with the process of rendering oil at the establishment? *A.* I examined it. I think I am familiar with the particular process in this case. The lard is put into bags or cloths and piled in tiers from the floor up to the ceiling, eight or nine feet high. Then it is pressed and the oil runs out into pans, from which it runs into hogsheads. I examined one hogshead of it in the dark, and I was unable to say what it was.

Q. Did you smell anything from it? *A.* I smelled a slight smell, but I did n't know what it was.

Q. Well, now some of this oil is very sweet. I don't know but that it is sold for sweet oil. Take such a stench as there was on the night of the 31st of July to have pervaded the whole atmosphere and the factory itself, would not that oil in these pans as it runs off take up these smells? *A.* It would not take it up very fast.

Q. What would be the thickness of the oil which is on the bottom of these pans? *A.* I could not testify, for I don't know.

Q. Well there is a broad surface, — almost the whole of it is surface. Would not that oil take up these gases, and if run into the tank or hogshead would it not be almost completely filled with the foul odor, so that it would be almost unmarketable? *A.* How long would it be exposed to the air?

Mr. McIntire. As I understand it, the method of pressing out the oil is a very slow method. The oil simply drips out, and is caught in these pans. It is collected in these large open pans and runs off very slowly indeed. Now it must be exposed ; a large quart of oil would be exposed for half an hour at least, we will say for an hour, to that excessive stench.

Mr. Derby. Which excessive stench?

Mr. McIntire. That which was smelled upon the outside.

Q. (*by Mr. McIntire*). I ask you whether the oil would not take up those odors, and would not be almost unmarketable on account of it?

A. It would become unmarketable if sufficient surface was exposed. If the depth was one inch, one one-hundredth of it would be surface and absorb; but if you mixed it with the rest, the odor would not amount to anything.

Q. Did you read thoroughly that report in regard to the smell which pervaded the Parliament building? *A.* I examined all the books I could get, and I took extracts from such as the "London Spectator," "Times," "Saturday Review," and the monthly magazines. I made it a study for a week. The smell was attributed first to a graveyard, and that was removed. Then it was supposed to be a sewer, and finally they came to the conclusion that it came from the mud of the river. It was next supposed to be a rendering-smell or a bone-factory.

Q. In regard to the sewage; you told us about its filling up the river. Your idea is that a large amount flows into Miller's River? *A.* I am informed that nearly all the dead dogs and cats of Boston float up there. I saw some of them going up myself.

Q. It would be the same thing in Charles River? *A.* Undoubtedly it would. I know it is, because I am familiar with Charles River.

Q. Well, should you think that it would be a proper place to build a sewer down Bridge Street and drop it right under the bridge there, and pour out all the sewage of these manufactories, — forty-five thousand gallons of acid matter going into it from one establishment in a day, — both on account of the sewage filling up the place and on account of the effect which the acid would have upon the flats? Do you think it would be proper to allow this establishment to enter into such a sewer? *A.* If it were discharged into deep water, I should say it would. If it were discharged into shallow water, I should say it would create a great difficulty.

Q. You state that the sewage floats up the river and fills up the shallow places. You don't mean to say otherwise than that you would take the sewer down the river to the mouth of it? *A.* It ought to be carried out as far into the Atlantic Ocean as you can get it; therefore, the nearer you get it to the mouth of the river or the deep running water, the better it is decidedly.

Q. In regard to the traps you speak of. You say that these traps, though well enough in theory, are poor in effect? Therefore, would n't you say it would be a bad plan to pour such matters as come from these establishments into the sewer? *A.* I should think that whoever suffered from these things, it would be their own fault. Every place should have a ventilator and a cesspool.

Q. So that it would be dangerous to have the factories of this kind running into such a sewer without such a ventilator and cesspool, would it not? *A.* It would be no more dangerous to have the factories run into it than to have the sewage drained in there, because these sulphates do not become sulphides until fermentation takes place.

Q. Wait a moment. Professor Horsford said that under certain circumstances the fermentation takes place when it is in the drain, when the mouth is covered with water and the gases are driven up through the traps and cesspools. Now, if such is the case, the fermentation would of course be increased a great deal with the increase of the sewage, would it not? *A.* I merely say that the greater amount of sulphuretted hydrogen is to be found in the fermentation of the flats and

not directly in the sewer. The sewer gas will blacken, but it is in small quantity.

(*A bottle of mercaptan exhibited.*)

Q. What is in this bottle? *A.* I should think it was mercaptan. I would be very much surprised from its effects upon me, if it were not.

Mr. McIntire. Mr. Sharples says he has smelled the same odor at the close tanks.

The Chairman. I don't think this is relevant to this case.

Mr. McIntire. I think it is relevant with regard to the sewers, — whether these liquids shall be poured into the sewer.

Re-direct Examination.

Mr. Derby. I will ask one question with regard to the sewer. I would ask you, Mr. Avery, whether there is anything in the soup or in the scalding-tub which is so obnoxious that it would be impossible to carry it through the sewer to deep water? *A.* I will answer that question in this way. I cannot see, for the life of me, why a little pure gelatine should be worse when run into the sewer than the same gelatine after it had passed through the bowels of any person in Cambridge. It seems to me it is worse after it has passed through that operation than when merely pure gelatine.

Q. You see no difficulty in carrying it through the sewer? *A.* I see no serious difficulty in carrying it through the sewer, though I should prefer a smaller sewer than I understand they are building there.

Q. Is the pressure of the oil in a limited space? *A.* Yes, sir.

Q. Whether you can say that enough of any odor would be absorbed by the oil so that there would be a possibility of its emanating from the oil while it is in the factory, so as to produce a vapor which will be noticed outside? *A.* The commercial oil has a slight odor; but still, in the dark I could not tell a hogshead of oil from anything else.

Q. How often have you examined the Squire establishment? *A.* I have not examined the factory except in October and November, so I cannot say what might have been the state of affairs there in the hotter months.

Testimony of Charles A. Goodrich.

Q. (*by Mr. Derby*). You are foreman, I think, in the works of Mr. Squire, having general charge there? *A.* Yes, sir.

Q. Have you been requested at any time to take a carriage and go around over Cambridge and ascertain where the deleterious smells originated? *A.* I have, sir.

Q. When were you so requested? *A.* About the 26th of June I first remember.

Q. Can't you refer to your book and see the date of your first entry? *A.* I went once on the 17th; that was voluntary, however.

Q. That was previous to the systematic visits you made? *A.* Yes, sir. The 24th is the first entry.

Q. Who went with you when you made these examinations? *A.* Sometimes I went alone, and sometimes Mr. Graves, Pike, or Lowell went with me.

Q. What was your duty and where did you go on these explorations? *A.* My duty was to ascertain where those smells came from.

Q. How far did your investigations extend? A. Through Cambridge, — East Cambridge and Cambridgeport, — portions of Somerville, Charlestown, and Boston.

Q. How far in Boston did you come? *A.* Along the Milldam, up to Parker Street, and through Charles Street.

Q. Before you come to these places, begin at Charlestown and state what places there you had occasion to inspect? *A.* In Charlestown, mostly on Canal Street.

Q. Is that the street that runs along by the water, sir? *A.* Along by what is called the Mill Pond, I think.

Q. Was there filling going on there? *A.* Yes, there has been, last summer, some.

Q. Was there any place along there where refuse from the city was carried out? *A.* Yes, sir, a great deal of refuse matter of various kinds has been deposited there.

Q. Daily or frequently? *A.* Yes, almost daily; decayed fruit and vegetables of various kinds.

Q. Have you noticed decaying oranges or anything of that kind? *A.* Yes, sir.

Q. Are there not many teamsters, who do business in Boston, who go out at night and stable their horses on the Charlestown side? *A.* Yes, sir, I think so.

Q. Now, come over, if you please, to Cambridge, upon Prison Point Bridge. Has there not been filling going on there? *A.* There has been, sir.

Q. I will ask you if, at any time during the past summer, you have noticed offensive odors coming from these places? *A.* I have.

Q. I will take you now over to the basins of Miller's River, and ask you whether there have been smells there? *A.* There have been, sir, at low tide, almost invariably.

Q. Now, sir, in its vicinity there are several — six or eight — rendering establishments, where putrid tallow and where rancid fat and grease from the houses of Boston are brought out and rendered? *A.* There are.

Q. How many places can you particularize, giving the place where they are situated? *A.* O'Neil's, situated between Milk Street and the Fitchburg Railroad.

Q. Are there vats where the grease is brought and where it is rendered? *A.* There are, I believe.

Q. There is another place in the rear of Cambridge Street, above the distillery, to the west of Mr. Squire's? *A.* Yes; that is Reardon's.

Q. What other places are there? *A.* There is one near Boynton's works.

Q. You have spoken of three; is there or has there been any other? *A.* There is one on Pearl Street, Cambridgeport, and there are more or less soap-works in the vicinity.

Q. There are some places there where at times you get smells. Can you put your finger upon any of these? *A.* There are four.

Q. One was purchased by Mr. Squire? *A.* Yes.

Q. What other place is there? *A.* There is one in the rear of Medford Street.

Q. You have in the course of your visits been to Broad Canal? *A.* Yes, sir.

Q. You have found offensive smells there? *A.* Yes, at low tide.

Q. And on the West Boston and Craigie's Bridges? *A.* Yes, at low water.

Q. On Charles Street? *A.* On Charles Street likewise.

Q. At times in the night? *A.* Yes, sir.

Q. How far up toward the South End did you go? *A.* As far as Parker Street and the Stony Brook sewer.

Q. Have you kept a record-book of your journeys? *A.* Yes, sir.

Q. What did you enter on the 17th of June? *A.* I first noticed the smells before I commenced my regular trips. I was passing down Cambridge Street and I got a horrid stench as I went by Reardon's place; the worst I think I have any record of.

Q. What was that smell? *A.* I should call it rendering old, putrid, rancid grease; sickening in the extreme. This was from Mr. Reardon's on Cambridge Street, East Cambridge, west of Mr. Squire's establishment.

Mr. McIntire. There is no such place in East Cambridge. The one referred to, doubtless, is nearly half a mile from East Cambridge.

Q. (*by Mr. Derby*). It is defined on the map. It is in Cambridge? *A.* Yes, sir.

Q. Very well, now please tell us what you found there where the smell came from? *A.* I had my wife with me. I went to the house and left her, saying to myself, "I am going to find where that comes from." I drove back to the place and all around it, as nearly as I could, and finally I got out and went up to the building. There was one or more men there at work.

Q. What hour was that? *A.* I think between half past ten and eleven o'clock.

Q. Now describe that smell, and state whether you had smelt it previously? *A.* I had and have since.

Q. What did you observe there? *A.* I found that they were at work there, to all appearances, blowing off their tanks, I should judge.

Q. How offensive were the odors? *A.* I could not describe them. They made me sick.

Q. I think you are foreman at Mr. Squire's? *A.* Yes, sir.

Q. Have you ever been made sick in the course of your work? *A.* No, sir.

Q. (*by the Board*). Did you vomit? *A.* Yes, sir.

Q. (*by Mr. Derby*). You walked all around the building? *A.* Yes, as near as I could.

Q. Have you any doubt as to where that smell came from? *A.* No, sir; none at all.

Q. Was it perceptible at a distance? *A.* I perceived it when I got near the Grand Junction Railroad.

Q. How far from the works was that? *A.* Nearly a quarter of a mile, I should judge.

Q. A quarter of a mile? *A.* Very nearly that.

Q. What kind of a smell was it? *A.* A nauseating, sickening smell, as of putrid, rancid grease. I have not language to describe it.

Q. Did you have occasion to go back to the works afterwards? *A.* I went there the Friday night following.

Q. What did you find or see there? *A.* They were blowing off their tanks then.

Q. Who went with you? *A.* Mayor Bradford, Aldermen Kendall, Woodbridge, and Brine, of Cambridge.

Q. At what hour? *A.* Not far from eleven o'clock on the evening of the 20th.

Q. What did you notice then? *A.* I noticed a very bad smell, though not near as bad as on the 17th. Still it was very offensive.

Q. Did you enter the works? *A.* Yes, sir.

Q. And noticed this very bad smell? *A.* Yes.

Q. What was going on? *A.* They had been, or at the time they were, blowing off their tanks.

Q. They had some blowing apparatus? *A.* They had a cistern, but I could n't see it on account of the steam. It did n't seem to be large enough.

Q. What is it they rendered? *A.* Such grease as was picked up by the workmen.

Q. Did you see the grease put in? *A.* No, sir, I did not.

Q. You saw it in the tanks? *A.* No, sir. I took the foreman's word for it. He said he had a tank of grease.

Q. Do you know whether they carry grease there from the city? *A.* I don't, positively. I have heard so.

Q. But the foreman on this occasion said it was old grease? *A.* Yes.

Q. You say that on the 20th there was a bad smell; now turn to your record at a later period. What is the next time? *A.* On the 24th of June.

Q. I would simply ask you if you reported what you discovered to Mr. Squire? *A.* I did, sir, on the morning of the 18th. I told Mr. Squire we had a tremendous smell the night before, and said they would probably lay it to him, but I had found where it came from. He requested me to go and notify Alderman Brine, he being a member of the Board of Health.

Q. That led to the visit on the 20th? *A.* Yes.

Q. Now refer to your record book, please, and give the dates. *A.* The 24th is the first date I have.

Q. (*by a member of the Board*). You commenced to keep a regular record, under the direction of Mr. Squire? *A.* I did.

Q. (*by Mr. Derby*). A complaint was made to Alderman Brine the morning after you first visited Mr. Reardon's, and that same day a letter came from Dr. Derby? *A.* Yes, sir; and furthermore, I went from Mr. Brine's office in Boston to the Boston and Albany Railroad. One of the men there asked me what I was doing out at Cambridge last evening. He lived at the West End, he said, and there was a horrible stench.

Q. Now, what is your first entry? *A.* The first entry is on the 24th.

Q. On the 24th of June. State what you did. *A.* On the 24th of June I went to Reardon's, in the rear of Cambridge Street; the Reardon's, on Pearl Street; and O'Neil's.

Q. What was going on at O'Neil's? *A.* I did n't go inside.

Q. You found an offensive smell at these places? *A.* Yes.

Q. Did you find it usually on the leeward side? *A.* Yes, it went with the wind.

Q. At what hour in the night? *A.* I could not give the exact hour. I usually started from nine to ten, and got back from eleven to half past one.

Q. Go on to June 30, and say what you found then? *A.* O'Neil's was rather bad that night.

Q. On July 1? *A.* I found it very bad at O'Neil's, and Reardon's, on Pearl Street.

Q. The 2d of July? *A.* On the 2d of July at O'Neil's and Charlestown Neck, — I mean Canal Street.

Q. State whether you found anything at Barry's on the 2d of July? *A.* Yes; it was very strong on Prospect Street.

Q. How was it at Charlestown? *A.* It was very bad, — the dock and sewer smell. Whenever the tide is out the air is dreadful.

Q. Was there a smell on the Prison Point Bridge also? *A.* There was some smell, but nothing as bad as some nights.

Q. That night it was about O'Neil's and Barry's, and upon the river near Charlestown, very bad? *A.* Yes, sir.

Q. Come to the 21st of July. What did you do that night? *A.* I went to Reardon's, on Pearl Street. There was a horrid smell.

Q. A horrid smell, you say? *A.* Yes, a horrid smell.

Q. Did you perceive that at a great distance? *A.* Yes.

Q. How at O'Neil's? *A.* It was horrid likewise.

Q. How was it at the places in Charlestown and Cambridge visited? *A.* There was a strong dock and sewer smell, which is almost overpowering when the weather is warm and the tide is out.

Q. A very strong smell? *A.* A very strong smell, particularly at Charlestown, where the sewers empty.

Q. (*by the Board*). You passed by Sunday the 6th. Will you please tell us if you observed anything on that night? *A.* Nothing very bad on July 6.

Q. There was a smell complained of. *A.* I did n't notice anything very bad.

Q. How late were you out? *A.* I cannot say. I was usually out from eleven to half past one. If I found anything very bad I would take more pains to trace it out.

Q. (*by Mr. Derby*). July 24 and 25, did you find on these nights anything? *A.* Reardon's on Pearl Street was horrid.

Q. What night was that? *A.* That was on the 22d. O'Neil's was strong, likewise at Prison Point and Charlestown Neck.

Q. On the night of the 24th? *A.* On the 24th there was a horrid smell at Reardon's, on Pearl Street.

Q. How was it in other places? *A.* At O'Neil's it was very bad, — a strong dock smell; likewise at Charlestown, and all around wherever I came upon the dock.

Q. On the 25th, sir? *A.* On the 25th there was a strong smell at Pearl Street, and a very bad smell at Charlestown.

Q. Well, now come, sir, to the 31st day of July. Where were your explorations? *A.* They extended round Cambridge, — my usual route,

— to Charlestown, across Craigie and West Boston Bridges, and up as far as the Stony Brook sewer.

Q. Tell us whether at that night the rendering smell was very bad? *A.* There was no rendering smell that was very offensive from any one of the establishments.

Q. Now describe the smells from the docks. You started from Mr. Squire's. How was it at the basin there? *A.* The basins were very strong of dock and sewer.

Q. Which way was the wind? *A.* It was east-southeast, variable and very light.

Q. When you say variable, did it go around? *A.* Yes, from east to southeast.

Q. But it did n't go west or north? *A.* No, sir.

Q. Were you out late that night? *A.* Till about half past one.

Q. You found a very bad smell in the Miller's River basins. Did you go to Charlestown? *A.* I did.

Q. How were the basins there? *A.* Very strong.

Q. How would the smells of the docks and basins compare with anything you had met before? *A.* I don't know. It was so much stronger.

Q. Stronger than anything you had smelt before? *A.* Yes, decidedly.

Q. You came down from the basins through East Cambridge. Did the smell permeate the atmosphere? *A.* I did n't notice it in East Cambridge till I got above Fifth Street, coming this way.

Q. You noticed smells then? *A.* Yes, but not in the early part of the evening.

Q. What time did you cross the bridge to come into Boston? *A.* It was midnight, or past.

Q. State what you found at Broad Canal? *A.* Broad Canal was horrid. I cannot describe it in any way but by that word.

Q. How was it on the West Boston Bridge? *A.* About in the same ratio. A dock and sewer smell.

Q. You went on into Charles Street? *A.* Yes, sir.

Q. Did you perceive anything there? *A.* Yes, there was a smell, but not so bad as on the bridge.

Q. When you came to an opening leading down to the water, then you would get it? *A.* Yes, sir.

Q. You went on to the South End. How were the smells there? *A.* Very bad, horrid. I don't know as there was much difference between the smells there and Cambridge, except that Broad Canal was the worst of the lot.

Q. Was there a light wind blowing, sir? *A.* Very light.

Q. And what there was, was from the east? *A.* East and southeast.

Q. You went back about one or two o'clock to Squire's establishment? I will ask you, sir, if in the Squire establishment you have at any time experienced such smells as these? *A.* I never have.

Q. You are there every day at work. I will ask you, sir, whether by night or by day you have known any offensive smells to come from Squire's establishment? *A.* I don't know that I have. The only smell we get is the dock smell from the outside. We get no smell from the rendering.

Q. You don't consider what goes up from the factory offensive? *A.* No, sir, it is not to me.

Q. You are not disturbed by the smell of the pigs? *A.* No, sir.

Q. They are kept on charcoal? *A.* Yes, sir.

Q. The pens are cleaned out daily? *A.* Yes, sir.

Q. You have given us now the 31st of July. Will you give us the record of other nights? *A.* August 1st there was a strong smell at Reardon's, on Pearl Street.

Q. How at O'Neil's? *A.* A very strong smell there of grease. The dock was very strong, at Charlestown particularly.

Q. (*by a member of the Board*). Were you out on the night of August 8? *A.* Yes, I was.

Q. Give the results of that, please. *A.* A very strong dock smell.

Q. Any rendering smell? *A.* I think not.

Q. (*by Mr. Derby*). Did you go into Boston that night? *A.* Yes, sir.

Q. Did you find any bad smell in Boston? *A.* Nothing more than the dock smell.

Q. Where did you find this? *A.* Round near the water's edge, on the bridge, and some on Parker Street.

Q. There were several nights through August, but I will not detain the Board with them all. Through the month there were repeated bad smells from these grease-boiling places and from the dock. Come down, if you please, to the 3d of September. *A.* September 3, Webster Avenue, opposite Barry's, was very strong; likewise on Canal Street, Charlestown, and Prison Point Bridge, very bad.

Q. (*by a member of the Board*). What was the nature of those smells? *A.* The nature of the odors on Canal Street and at Prison Point was of a dock and sewer smell.

Q. How on Webster Avenue? *A.* That was a rendering smell.

Q. (*by Mr. Derby*). From whose place? *A.* It was near Barry's. I suppose it came from there by the direction of the wind.

Q. As you passed near Barry's place you smelled this? *A.* Yes.

Q. How near were you? *A.* I don't know exactly; I should judge not more than a couple of hundred feet. I may mistake the distance.

Q. The wind was blowing from it? *A.* Yes.

Q. On the 4th? *A.* It was terrible on Pearl Street. At O'Neil's there was a fearful smell.

Q. These were strong pungent smells? *A.* Yes.

Q. You could perceive a quarter of a mile or more? *A.* Yes.

Q. (*by a member of the Board*). Did you ever smell that smell in Boston? *A.* Not the trying smell, but have the dock smell.

Q. You never smelt these smells you get from Reardon's? *A.* No, sir.

Q. You have smelt it half a mile off? *A.* I have, I think.

Q. Have you any record of a later day? *A.* October 2d I got a very strong smell at Cambridgeport from Pearl Street. It reached to Main Street.

Q. What was that date? *A.* October 2.

Q. And that was from what place? Reardon's, on Pearl Street? *A.* Yes, sir.

Q. (*by another member of the Board*). September 6th did you smell anything? *A.* I don't know of going round that night.

Q. It lasted from late on the night of September 6 to the early morning? *A.* I was not out that night.

Q. What night were you out, sir? *A.* On September 3, 4, 5, and 6 I was not out.

Q. Was anybody else out? *A.* Mr. Pike was out.

Q. Did n't I understand you to say you were out on the 4th? *A.* Mr. Pike was out. He made the record. I thought, as I read it, that it was mine.

Q. September 21st and the early morning of the 22d, have you no record? *A.* I have not.

Q. (*by Mr. Derby*). Have you a record of the number of hogs that arrived killed on the way down? *A.* I have not.

Q. With regard to the purification of the water in which the pigs are scalded, is it purified before it goes into the water? *A.* Yes.

Q. (*by a member of the Board*). Do you pursue the plan of cleansing by blood regularly? *A.* Yes, sir. We have been shifting the place about, and have n't got fairly settled.

Q. It is successful? *A.* Yes, sir.

Q. How often do you draw off this water? *A.* We purify it every day, sir. We draw it off every three or four days.

Q. (*by Mr. Derby*). With regard to the apparatus for consuming the gas, is that successfully accomplished? *A.* I believe it is.

Q. It does n't escape to do any harm? *A.* No, sir.

Q. (*by a member of the Board*). How long do you retain the water? *A.* I don't know how long we could. We retain it for a week sometimes, and then purify it and let it run. I don't know, but the gentleman who invented it says we can keep it weeks and months.

Q. (*by Mr. Derby*). You have used it for a week? *A.* Yes, sir.

Q. But usually it is drawn off in a less time than that? *A.* Yes, sir.

Q. You don't know precisely how long? *A.* No, sir.

Cross-Examination.

Q. (*by Mr. McIntire*). How long have you been at Mr. Squire's? *A.* I think I went there in April, 1860.

Q. Thirteen years ago? *A.* Yes, sir.

Q. During that time there have been improvements made from time to time, in order to render the place and the business carried on less offensive? *A.* Yes; there have been improvements to accommodate the increase of business.

Q. And also to take away the deleterious vapors and gases? *A.* Yes, sir.

Q. The latest improvements have been placed there from time to time, have they not? *A.* Yes, sir.

Q. And still the people complain? *A.* Yes, sir.

Q. When you first went there, did they have any close tanks? *A.* No, sir; I believe not.

Q. All open kettles? *A.* Yes.

Q. What did you put your whole hogs into? *A.* I could not say.

Q. How long since the close tanks have been in use? *A.* I think some ten or twelve years since we got the first one in.

Q. What is the method of disposing of these hogs that die in the cars? *A.* We put them into a tank.

Q. Immediately? *A.* Immediately.

Q. And whole? *A.* Some have to be cut, they are so large.

Q. How many have you put into a tank at one time? *A.* I could not say.

Q. How many have you known to be put in? More than two or three? *A.* I presume there have been four or five in at one time.

Q. Was that in hot weather or in cold? *A.* Perhaps in hot, and perhaps in cold.

Q. What is your part of the business? *A.* My part has been to look after the slaughtering.

Q. Are you familiar with the apparatus that is put in there to do away with the gas that arises from the tank? *A.* No, sir; I am not.

Q. Now, Mr. Goodrich, did you make all the entries in that book? *A.* No, sir.

Q. Those that you read in answer to the questions of Mr. Derby, were these all put in by you? *A.* I think one or two Mr. Pike entered.

Q. How many of these which you read did n't you put down yourself? *A.* September 3 and 4 Mr. Pike entered.

Q. And you don't know anything about these? *A.* No.

Q. The 17th of June, will you return to that place? Did you make an entry then? *A.* I did, sir.

Q. Tell us just what is your entry? *A.* My entry is, "Passed Reardon's. The smell was horrid; the worst I ever smelt."

Q. What does Reardon do his rendering in, — in a close tank, does he not? *A.* I should judge so.

Q. He has a tank, as I think I heard you say, that he was blowing off into the cistern of water? *A.* That is what I understood. There was so much smell that I could not tell.

Q. You don't testify that as a fact, now, do you; because I understand that Mr. Reardon's close tanks are fitted with apparatus which carries the gas into the fire, where it is consumed? *A.* I think that has been introduced recently.

Q. How recently? *A.* Since the 17th of June, I think.

Q. When you first put in your close tanks was it the method to blow off into the water? *A.* I could not tell you as to that. My attention was called to some other part of the establishment, and I know as little about the tank, perhaps, as most any one.

Q. Well, now, on the Friday night after the 17th of June, you say you went there yourself with Mayor Bradford and Aldermen Kendall, Woodbridge, and Brine. What was he doing that night? *A.* He was blowing off that night.

Q. What time was it? *A.* Somewhere in the neighborhood of eleven.

Q. Were you alone on these occasions when you went about? *A.* Not all the time, sir.

Q. Did n't you go with Professor Munroe one night? *A.* He might have gone; I have no entry of the fact.

Q. You don't remember? *A.* I don't remember.

Q. Without going over the whole ground with you, if I understand you, you found these smells, the rendering from Reardon's, Barry's, and O'Neil's; the dock smell from Canal Street in Charlestown; from Prison Point Bridge; from Broad Canal, Cambridge; from sewers which empty into Charles River, and up as far as Stony Brook. There is where you found the principal dock smells?

Mr. Derby. Miller's River?

Mr. McIntire. I left that out purposely. I asked where the strongest smells were, and he has testified that these were worse than at Miller's River. Is not that so? *A.* There is one basin which is very bad.

Q. Which one is that? *A.* The one between the Fitchburg Railroad and Medford Street, the North Basin.

Q. That, you think, is as strong as Broad Canal? *A.* No, sir; I don't think it is quite. Still, it is very strong.

Q. Which is the strongest of those you mentioned,—Broad Canal, Canal Street, Stony Brook, Charles River, or Prison Point Bridge? *A.* I don't know as I am able to judge correctly, which is the strongest. There is not a very great difference between them. Either is strong enough. At one time one would be stronger than another; perhaps it was on account of the wind and tide.

Q. Would you compare the smell from what is termed the Squire Basin with the smells which arise from these several places you speak of in Boston? *A.* I should hardly think it was as strong as the Broad Canal or Stony Brook; no stronger, certainly.

Q. You say the North Basin is not as strong as Broad Canal, and that is stronger than the Squire Basin. Then you put the Squire Basin as less in intensity than the North Basin? *A.* Yes.

Q. Then of course it does not compare with the others. Do you ever get that smell of the basin in the factory or in the enclosure? *A.* Very seldom, and not as bad inside as we do outside.

Q. Were you here the other day when Dr. Sharples and Mr. Boardman and Mr. Derby testified? *A.* No, sir.

Q. They testified that when they went out near the smoke-house they smelt a strong smell. Can you tell what it was? *A.* No, sir; I cannot.

Q. Do you attend to the slaughtering part of the business? Do you smell anything when the hogs are triced up and the insides taken out? *A.* Nothing disagreeable to me.

Q. Are the scalding-tubs offensive? *A.* No, sir; nothing there that is disagreeable to me.

Q. Are there any odors about the place which are at all disagreeable to you? *A.* No, sir.

Q. (*by the Board*). Is not the smell of live hogs disagreeable? *A.* There is nothing about it, sir, except what you would smell in any farmer's in New England. I have smelt a pen, where not more than half a dozen hogs were kept, smell stronger.

Re-direct Examination.

Q. (*by Mr. Derby*). I omitted to ask you the question, whether you have seen any dead putrid sheep carried up to these rendering establishments above you? *A.* I have not seen them, sir, but a man came along last summer with some to peddle at our place. He went up toward O'Neil's, and that night I smelt the trying of old mutton very strongly.

Q. Can you tell the night? *A.* I could not; it was during last summer.

Q. Where did you smell it? *A.* As I turned off from Milk Street to go to Charlestown, near O'Neil's.

Q. You thought you distinguished the flavor of mutton? *A.* I think I did.

Q. (*by Mr. McIntire*). There was no dock about that? *A.* No, sir.

Q. (*by Mr. Derby*). They were rotten, — putrid? *A.* They were so far gone that they were green.

Q. (*by a member of the Board*). Near what establishment was that? *A.* I think O'Neil's.

TESTIMONY OF EVERETT L. COLSON.

Q. (*by Mr. Derby*). Mr. Colson, where do you live? *A.* East Cambridge.

Q. What part of it, sir? *A.* Near Gore Street, in one of Mr. Squire's houses.

Q. Is it nearly opposite the factory? *A.* Directly opposite.

Q. Were you out on the 17th of June, sir, with your wife? *A.* I was, sir.

Q. What is your occupation? *A.* I have charge of Mr. Squire's stables.

Q. Attend somewhat to the teaming or only the stables? *A.* I only have charge of the stables.

Q. You were out with your wife, were you, sir? *A.* Yes.

Q. Where did you go? *A.* To Charlestown, — Bunker Hill.

Q. And returned late in the evening? *A.* Yes, sir.

Q. On your way home you noticed a very bad smell? *A.* I did, sir.

Q. Where did you notice it, and what was it? *A.* The first I noticed of it was in crossing the Fitchburg Crossing, in Somerville; and as I went up Webster Avenue I smelt what I called rotten meat of some kind boiling. When I got along opposite Reardon's, which is right close by Webster Avenue, they were at work there then.

Q. How far from Reardon's was it when you first noticed it? *A.* Probably about a quarter of a mile.

Q. Was the smell pungent and strong? *A.* A strong one, sir! Yes, it was indeed. The strongest I ever smelt in my life. Right out loud.

Q. Did your wife observe it? *A.* Yes, sir.

Q. Did she have occasion to use her pocket-handkerchief? *A.* I think she did.

Q. You passed near this establishment? *A.* Yes.

Q. You perceived it as you passed the establishment? *A.* After I got out into Cambridge Street, going down toward home we lost the scent then, the wind blowing from the southeast.

Q. Were you out any farther that night to examine it? *A.* No, sir.

Q. But you recall distinctly the occasion? *A.* Yes.

Q. The hour? *A.* Yes; between nine and ten.

Q. And the place? *A.* Yes.

Q. Now pass from that to some excursions you made. You have a memorandum-book; can you see any entries you have made? *A.* I have not made any entries in this book.

Q. There are one or two in your handwriting? *A.* (*by Mr. Squire*). It was Mr. Pike.

Q. You were out several times, please state when. Were you out most every night? *A.* No, sir, not most every night. There were some few nights when I was not out.

Q. Were you in company with Mr. Goodrich on the night of the 31st of July? *A.* I was, sir.

Q. Will you state where you went and what you observed? *A.* I think it was about half past eleven or a quarter of twelve, we started

from the office, passing over Prison Point Bridge through Canal Street, Charlestown ; then back across Craigie's Bridge, through Charles Street, and out by the Milldam.

Q. And now, as you go along, describe the smells. *A.* Over Craigie's Bridge and Charles Street I observed a strong smell of flats. The strongest we got was on Charles Street near the church or Chestnut Street. We observed it before we got into Boston, out on the bridge.

Q. And in Charles Street? *A.* Yes.

Q. When you got in the vicinity of the church, did you perceive it then very strong? *A.* We did. We then went over to Cambridgeport.

Q. Did n't you go farther than the church up to the South End? *A.* We went up the Milldam and got a strong smell from the flats above the Milldam, near Parker Street.

Q. Anything like the smells you experienced at Charlestown and Cambridge? *A.* Yes, only a great deal stronger.

Q. Now state, sir, how the Stony Brook smell compared with the smell in Charlestown and Cambridge? *A.* It was a great deal stronger.

Q. You crossed into Cambridge. Did you pass one of those bridges above? *A.* Cottage Farm Bridge into Pearl Street, Cambridgeport, I think was the next place we went to.

Q. Now describe any smells you encountered on the way. *A.* The worst smell we got that night was the dock smell which I have spoken of. We then passed through Prospect Street into Union Square, Somerville. We got a smell from Reardon's.

Q. Which Reardon's was that? *A.* The one near Webster Avenue.

Q. (*by Mr. McIntire.*) Where were you when you got Reardon's smell? *A.* On Prospect Street.

Q. (*by Mr. Derby*). Which way was the wind? *A.* Southeast, I think it was.

Q. A little breeze, or a calm? *A.* Not very heavy.

Q. What did you notice in Charlestown? *A.* We went along Canal Street and found a pretty strong dock smell. It was right near the State Prison.

Q. You got a strong smell there? *A.* We did, sir.

Q. How will that compare with the dock smell at Cambridge and Miller's River? *A.* It was pretty near the same, only not quite as strong till we got pretty well down the street. On the left-hand side there was a large pool, about eight feet square and eight feet deep, I should think. There was a large pile of rotten oysters that smelt very bad. The water in this place was all green, and a thick scum covered it.

Q. Well, sir, how far did you go, and what further did you do? *A.* Then we went across Prison Point Bridge into East Cambridge, and up by the sugar-house, along Bridge Street, till we came to Medford Street, and along by the basins there. We then smelt pretty freely of the dock smell.

Q. Did you notice any sugar-house smell that night? *A.* We did.

Q. State that please. *A.* That is a sort of burnt smell.

Q. Was it unusually strong that night? *A.* Yes, it was very strong.

Q. Well, take the night altogether, the experience of dock smells you met with, how would it compare with ordinary nights? Was it greater or less? *A.* That beat anything I had ever experienced. I never smelt anything like it.

Q. You live, I think, very near Mr. Squire's works? *A.* Yes, right opposite.

Q. Do your family have good health? *A.* My family? I have only a wife, and she enjoys better health than she has had for years. She has always been an invalid, very sickly and weak. She now enjoys better health than she has enjoyed for six years.

Q. How is it with regard to the men at the establishment. Are they, as respects health, strong, — they and their families? *A.* They are as strong and rugged a set of men as you can find in the world.

Q. Hear any complaints of sickness among the children? *A.* No, sir.

Q. Do they live near the factory? *A.* Yes, sir.

Q. Are you ever wakened in the night by any smells? *A.* I don't know that I have been disturbed.

Q. You live near the factory, let me ask you if the paint on your house is discolored? *A.* Nothing at all to speak of. There is a very little discoloration right under the eaves. There were three houses right in front of Mr. Squire's, newly painted before the 31st of July. These are now just as white as any houses in Cambridge.

Q. When you got home to your house on the 31st of July, when you had experienced those smells, how did the vicinity compare with the rest of the country you had visited? *A.* I remarked that we were in the sweetest climate we had been in during the night.

Cross-Examination.

Q. (*by Mr. McIntire*). How long have you been employed by Mr. Squire? *A.* Four years.

Q. Did you ever, in the factory or yard, or near it, smell any odors disagreeable to you? *A.* I don't know that I ever have.

Q. What do you think in comparing the smell from Squire's basin and the smell from Broad Canal? Which is the more intense? *A.* I think that at Broad Canal.

Q. Do you ever smell in the enclosure of the buildings anything from the basin? *A.* I think we have.

Q. How strongly? *A.* We have got it pretty strong there.

Q. (*by Mr. Derby*). The dock smell? *A.* Yes, sir.

Q. (*by Mr. McIntire*). What is the color of your house? *A.* I think it is a buff color.

TESTIMONY OF JOHN M. GRAVES.

Q. (*by Mr. Derby*). Where do you reside? *A.* East Boston.

Q. Last summer and autumn you were in the employ of Mr. Squire? *A.* Yes, sir.

Q. In what capacity? *A.* Night watchman.

Q. You are still? *A.* Yes.

Q. Was it a part of your duty, and has it been, to keep a record of the wind? *A.* No, sir, not my duty.

Q. Has it been your practice? *A.* Yes.

Q. State when you commenced it and how you keep it? *A.* More than a year ago.

Q. Did you keep it on a card? *A.* On a card; the first of it.

Q. Well now, sir, did you keep a record from any time to any time? *A.* From the 31st of July to the present time.

Q. You are there during the night. Have you weather-cocks where you could tell the direction of the wind? *A.* Yes.

Q. Have you been a seafaring man? Yes, for twelve or thirteen years.

Q. So that you can judge with regard to winds, and tell their course? *A.* Yes.

Q. Now, sir, with regard to your record, refer to July 31, and read? *A.* "Seven P. M., July 31, east-southeast; light air. Ten P. M., southeast."

Q. Anything with regard to the strength of the wind? *A.* "Light air." At seven there was a little more than at ten; then it gradually died away.

Q. How was it now, sir, at eleven or at twelve? *A.* Light air, south-southeast. At six it was still south-southeast. That was the last record before I went home. "At seven o'clock P. M., August 1, southwest," is the next record I have.

Q. With regard to the strength of the wind; describe it? *A.* Light air.

Q. Not a dead calm, but a light air? *A.* Yes; enough to distinguish its direction, and to keep the trees moving.

Q. You can state, sir, whether, on any occasion recently, you have observed any smells at Cambridge coming from any rendering establishment? *A.* On the 29th of June I rode out with Mr. Goodrich.

Q. State what you observed. *A.* Some smell in Pearl Street and also in Milk Street.

Q. From which establishment? *A.* I am not acquainted with the locality, so I could not tell.

Q. Anything beyond what is smelt from fresh lard? *A.* It was a smell of putrid lard.

Q. Any other time, sir? *A.* August 27.

Q. What was it on the 27th of August? *A.* No bad smells in places where I went.

Q. You need not refer to any night unless you noticed anything. *A.* That is all, sir: I have not been around since.

Q. (*by Mr. McIntire*). Why did you commence this record? *A.* About a year ago, Mr. Squire or the foreman used to ask me how the wind was the previous night. So I put it down on a card, and after Mr. Squire had asked me I used to throw the card into the waste basket. On the night of the 31st of July, Mr. Crowe came into the building and said there had been a very bad smell on Cambridge Street. A bundle of blank books were lying close by, and I said, "I will keep a record of the wind," and I have from that day since.

Q. (*by Mr. Derby*). Was there any offensive smell in the establishment that night? *A.* I smelt nothing except a little gas from the tanks, which I did n't smell more than fifteen minutes.

Cross-Examination.

Q. (*by Mr. McIntire*). Did you make the original record? *A.* Yes.

Q. You did n't take it from any card? *A.* I copied it from the card on the morning of August 1.

Q. You kept it because there was a smell outside, and one of Mr. Squire's employees came and said there was a smell outside and you thought it was safer to keep it recorded in a book? *A.* Yes.

Q. How long have you been employed there? *A.* Two years ago the 13th of last October.

Q. Do you distinguish any strong odors inside of the building? *A.* I distinguish a dock smell, at low water.

Q. But from the different processes of the work? *A.* No, sir, nothing offensive to me.

Q. You don't distinguish any smell? *A.* No, sir.

Q. (*by Mr. Derby*). You are there through the entire night? *A.* Yes, regularly.

Q. (*by Mr. McIntire*). You make a record about every two hours? *A.* Yes.

Q. Why don't you look between two and three? *A.* I have no particular reason.

TESTIMONY OF EDWARD BURNHAM.

Q. (*by Mr. Derby*). Where do you reside? *A.* No. 68 Inman Street, Cambridgeport.

Q. What is your occupation? *A.* Auctioneer in the real-estate business.

Q. In the employment of Mr. Squire? *A.* No, sir.

Q. Are you in the habit, sir, of going from Cambridge to Boston at a very early hour in the morning? *A.* I was, sir, last fall. Used to go frequently.

Q. How early? *A.* Well, from half past four to half past five in the morning.

Q. Crossing Cambridge Bridge? *A.* Yes, sir.

Q. The West Boston Bridge? *A.* Yes, sir, always.

Q. At these early hours in the morning when you crossed that bridge, have you ever noticed any offensive smells from the docks? *A.* I have, very many mornings.

Q. How often, and where? *A.* I could not say how many times. I have noticed them after crossing the railroad crossing till I got in nearly to the drawbridge; very strongly all the way.

Q. After passing the Grand Junction crossing you have noticed them? *A.* Yes, sir.

Q. You would go on the bridge and notice them there? *A.* Yes, sir.

Q. Till you got nearly to the draw? *A.* Yes; when I got there they seemed to cease and would not be so strong.

Q. Did you notice them usually, sir? Was it more common than otherwise, or only occasional? *A.* I never noticed them except at low tide, when the flats were bare.

Q. They were at times quite offensive? *A.* Very, at times. I remember, in September, one Friday morning, that it was awful, — fairly sickening. My son was with me, and he had to cover up his face.

Q. The smell began after you had passed the Grand Junction crossing and continued till you got to the draw. Did you perceive them on the Boston side? *A.* No, sir, not after getting into Boston. We did not notice them there at all.

Q. How many times can you speak of, with confidence, during the last fall that you noticed these smells? You went in every day? *A.* No, sir, frequently, — three or four times a week. I should think, six or eight times I noticed the smell very strongly.

Q. You have been at Squire's basin? *A.* Yes, a number of times.

Q. Have you noticed the same smells in these basins? *A.* In driving from Somerville, up on the railroad side, I have noticed the Miller's River

smell very strongly, but nothing as strong as those on the West Boston Bridge.

Q. The smell on the bridge was stronger than from Miller's River? *A.* Yes, stronger.

Q. You drove on that side of Miller's River more than once? *A.* Yes, quite a number of times.

Q. This was not in the night or early morning? *A.* No, sir; by daylight or just on the edge of the evening.

Q. In comparing the two places, you would say that the Cambridge bridge in early morning was much more offensive? *A.* I never experienced anything so offensive as the smell in going across the West Boston Bridge into Boston in those early hours of the morning.

Cross-Examined.

Q. (*by Mr. McIntire*). Have you ever been to Squire's works? *A.* A great many times.

Q. Why did you go there? *A.* I believe the first time I went in for curiosity, to look over the works. Perhaps I went for that reason two or three times.

Q. Why have you been there since? *A.* Since then I have had occasion to buy meat.

Q. For your family? *A.* No, sir, for the market in Cambridgeport.

Q. Are you interested in the market? *A.* No, sir.

Q. Did you do this as a sort of commission business? *A.* No, sir, I was doing it for my son.

Q. Is he in the business now? *A.* No, sir, he is not.

Q. Did you never find anything offensive in the works at all? *A.* No, sir, nothing that would strike me as offensive in going about the works. In the hog-pens there was the smell of hogs, as in any farm-yard.

Q. Was it not more offensive than the number of hogs usually kept in the farm-yard? *A.* I think I have seen a good many hog-pens that smelt more offensive than Squire's house.

Q. How many hogs have been in there? *A.* A great many. I could not tell. Large droves of them.

Q. Did you ever follow up the smells? *A.* No, sir.

Q. You did n't know from whence they came? *A.* I knew the wind was blowing from the Boston side.

Q. From the Boston side? *A.* Yes, and I supposed it came from there.

Q. When you got to the draw you did n't perceive them? *A.* No, sir; you would most always lose them after getting close up to the draw.

Adjourned.

EIGHTH DAY.

December 12, 1873.

RECORD OF WINDS AT EAST CAMBRIDGE.

John M. Graves, being recalled, presented the following record of winds at East Cambridge, which had been kept by him by request of Mr. Squire: —

7 P. M.,	July 31,	E. S. E.	Light Air.
10 P. M.,	"	S. E.	"
Midnight,	"	S. S. E.	"
3 A. M.,	Aug. 1,	S. S. E.	"
6 A. M.,	"	S. S. E.	"
7 P. M.,	"	S. W.	"
10 P. M.,	"	S. S. W.	"
Midnight,	"	W. S. W.	"
3 A. M.,	Aug. 2,	S. W.	"
6 A. M.,	"	W. by S.	"
7 P. M.,	"	N. E.	"
10 P. M.,	"	S. S. W.	"
Midnight,	"	S. W. by W.	"
3 A. M.,	Aug. 3,	S. W. by W.	"
5 A. M.,	"	S. W.	"
7 P. M.,	"	S. W.	"
10 P. M.,	"	N. W.	"
Midnight,	"	N. W.	"
3 A. M.,	Aug. 4,	N. W.	"
6 A. M.,	"	N. W.	"
7 P. M.,	"	E. S. E.	"
10 P. M.,	"	N. W.	"
Midnight,	"	N. W.	"
3 A. M.,	Aug. 5,	N. W.	"
6 A. M.,	"	N. W. by N.	"
7 P. M.,	"	S. S. E.	"
10 P. M.,	"	S.	"
Midnight,	"	S. W.	"
3 A. M.,	Aug. 6,	S. W.	"
6 A. M.,	"	S. S. W.	"
7 P. M.,	"	S. W.	Moderate Air.
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Aug. 7,	S. W.	"
6 A. M.,	"	S. W.	"
7 P. M.,	"	S. W.	Fresh Breeze.
10 P. M.,	"	S. W.	"
Midnight,	"	W. S. W.	Mod. Air.
3 A. M.,	Aug. 8,	W.	Light Air.
6 A. M.,	"	W. by S.	"
7 P. M.,	"	E. N. E.	"
10 P. M.,	"	N. E.	"
Midnight,	"	N. N. W.	"
3 A. M.,	Aug. 9,	N. N. W.	"
6 A. M.,	"	N. N. W.	"
7 P. M.,	"	S. E. by E.	"
10 P. M.,	"	N. E. by E.	"
Midnight,	"	N.	"
3 A. M.,	Aug. 10,	N. by E.	"
5 A. M.,	"	N. by W.	"
7 P. M.,	"	E. S. E.	"
10 P. M.,	"	S.	"
Midnight,	"	S. W.	"
3 A. M.,	Aug. 11,	N. E.	"
6 A. M.,	"	N. N. E.	"
7 P. M.,	"	S. E.	"
10 P. M.,	"	S. S. E.	"
Midnight,	"	E.	"
3 A. M.,	Aug. 12,	S. E.	"
6 A. M.,	"	N. N. E.	"
7 P. M.,	"	E. by S.	"
10 P. M.,	"	E. S. E.	"
Midnight,	"	N. E.	"
3 A. M.,	Aug. 13,	N. E.	"
6 A. M.,	"	N. E. by E.	Fresh Air.
7 P. M.,	"	N. E. by N.	Mod. Air.
10 P. M.,	"	N. E.	"
Midnight,	"	N. E.	"
3 A. M.,	Aug. 14,	N. E.	"
6 A. M.,	"	N. E.	"
7 P. M.,	"	N. E. by E.	"
10 P. M.,	"	N. E. by E.	"
Midnight,	"	N. E.	"
3 A. M.,	Aug. 15,	N. E. by N.	"
6 A. M.,	"	N. N. E.	"
7 P. M.,	"	E. S. E.	"

10 P. M.,	Aug. 15,	S. E.	Light Air.
Midnight,	"	S. E.	"
3 A. M.,	Aug. 16,	S. E.	"
6 A. M.,	"	S. S. W.	"
7 P. M.,	"	S. S. W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Aug. 17,	W. S. W.	"
5 A. M.,	"	W. by S.	"
7 P. M.,	"	S. E.	"
10 P. M.,	"	S. E.	"
Midnight,	"		Calm.
3 A. M.,	Aug. 18,	N.	Light Air.
6 A. M.,	"	N.	"
7 P. M.,	"	E. by S.	Moderate Air.
10 P. M.,	"	E. S. S.	"
Midnight,	"	E. by S.	"
3 A. M.,	Aug. 19,	E. N. E.	"
6 A. M.,	"	N.	"
7 P. M.,	"	E. by S.	Light Air.
10 P. M.,	"	S. E. by E.	"
Midnight,	"	N. E.	"
3 A. M.,	Aug. 20,	N. E.	"
6 A. M.,	"	N. N. E.	"
7 P. M.,	"	E. by S.	"
10 P. M.,	"	E.	"
Midnight,	"	N. E.	"
3 A. M.,	Aug. 21,	N. E.	"
6 A. M.,	"	N. E.	"
7 P. M.,	"	E.	"
10 P. M.,	"	E. by S.	"
Midnight,	"	E. S. E.	"
3 A. M.,	Aug. 22,	E. S. E.	"
6 A. M.,	"	E. S. E.	"
7 P. M.,	"	E.	"
10 P. M.,	"	E.	"
Midnight,	"	E. by N.	"
3 A. M.,	Aug. 23,	E. by N.	"
6 A. M.,	"	E. by N.	"
7 P. M.,	"	N. N. W.	"
10 P. M.,	"	N. N. W.	"
Midnight,	"	N. N. W.	"
3 A. M.,	Aug. 24,	N. W.	Fresh Air.
5 A. M.,	"	N. W.	"
7 P. M.,	"	N. N. W.	"
10 P. M.,	"	N. N. W.	"
Midnight,	"	N. N. W.	"
3 A. M.,	Aug. 25,	N. N. W.	Light Air.
6 A. M.,	"	N. W.	"
7 P. M.,	"	W.	"
10 P. M.,	"	W.	"
Midnight,	"	W. by S.	"
3 A. M.,	Aug. 26,	W.	Light Air.
6 A. M.,	"	W. N. W.	"
7 P. M.,	"	E. by S.	"
10 P. M.,	"	E. by S.	"
Midnight,	"	S. W.	"
3 A. M.,	Aug. 27,	N. N. W.	"
6 A. M.,	"	N. E.	"
7 P. M.,	"	S. S. W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Aug. 28,	W. S. W.	"
6 A. M.,	"	N. by W.	"
7 P. M.,	"	S. by W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Aug. 29,	W. S. W.	"
6 A. M.,	"	W.	"
7 P. M.,	"	S. W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Aug. 30,	S. W.	"
6 A. M.,	"	S. W.	"
7 P. M.,	"	S. W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Aug. 31,	W. S. W.	"
5 A. M.,	"	W. S. W.	"
7 P. M.,	"		Calm.
10 P. M.,	"	N. N. W.	Light Air.
Midnight,	"	N. N. W.	"
3 A. M.,	Sept. 1,	N. N. W.	"
6 A. M.,	"	E.	"
7 P. M.,	"	S. W.	"
10 P. M.,	"	S. W.	Moderate Air.
Midnight,	"	W. S. W.	"
3 A. M.,	Sept. 2,	W. S. W.	"
6 A. M.,	"	W.	"
7 P. M.,	"	W.	"
10 P. M.,	"	W. S. W.	"
Midnight,	"	W. S. W.	"
3 A. M.,	Sept. 3,	W.	"
6 A. M.,	"	W.	"
7 P. M.,	"	W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Sept. 4,	S. S. W.	"
6 A. M.,	"	S. W.	"
7 P. M.,	"	S. W.	"
10 P. M.,	"	S. W.	Fresh Air.
Midnight,	"	S. W.	"
3 A. M.,	Sept. 5,	S. W.	"
6 A. M.,	"	S. W.	"

7 P. M., Sept. 5,	S. W.	Fresh Air.	
10 P. M., "	W.	"	
Midnight, "	N. W.	"	
3 A. M., Sept. 6,	N. W.	"	
6 A. M., "	N. W.	"	
7 P. M., "	W.	"	
10 P. M., "	W.	"	
Midnight, "	N. W.	"	
3 A. M., Sept. 7,	N. W.	"	
5 A. M., "	N. N. W.	"	
7 P. M., "	S. E.	"	
9 P. M., "	S. by E.	"	
10 P. M., "	S. by E.	"	
Midnight, "	S.	"	
3 A. M., Sept. 8,	S.	"	
6 A. M., "	S. S. W.	"	
7 P. M., "	N.	"	
9 P. M., "	S. E.	"	
10 P. M., "	N. E.	"	
Midnight, "	N. W.	"	
3 A. M., Sept. 9,	N. W.	"	
6 A. M., "	N. W.	"	
7 P. M., "	S. E.	"	
9 P. M., "	S. S. E.	"	
10 P. M., "	S. by E.	"	
Midnight, "	S. by W.	"	
3 A. M., Sept. 10,	N.	"	
6 A. M., "	N. by E.	"	
7 P. M., "	N. E.	"	
9 P. M., "	N. E.	"	
10 P. M., "	N. E.	"	
Midnight, "	N. E.	"	
3 A. M., Sept. 11,	N. E.	"	
6 A. M., "	N. E. by N.	"	
7 P. M., "	S. E.	"	
9 P. M., "	S. E.	"	
10 P. M., "	S.	"	
Midnight, "	S. W.	"	
3 A. M., Sept. 12,	S. W.	"	
6 A. M., "	W. by S.	"	
7 P. M., "	S. W.	Moderate Air.	
9 P. M., "	S. W.	"	
Midnight, "	S. W.	"	
3 A. M., Sept. 13,	S. W.	"	
6 A. M., "	S. W.	"	
7 A. M., "	S. W.	"	
9 A. M., "	S. W.	"	
10 A. M., "	S. W.	"	
Midnight, "	S. W.	"	
3 A. M., Sept. 14,	W.	"	
5 A. M., "	N. W.	"	
7 P. M., "	N. W. by N.	"	
9 P. M., Sept. 14,	N. W. by N.	Mod. Air.	
10 P. M., "	N. N. W.	"	
Midnight, "	N. W.	"	
3 A. M., Sept. 15,	N. W.	Light Air.	
6 A. M., "	N. W.	"	
7 P. M., "	N. W. by N.	"	
9 P. M., "	N. W. by N.	"	
10 P. M., "	N. W.	"	
Midnight, "	W. N. W.	"	
3 A. M., Sept. 16,	W.	"	
6 A. M., "	S. W.	"	
7 P. M., "	W.	"	
9 A. M., "	W.	"	
10 A. M., "	W.	"	
Midnight, "	N. W.	"	
3 A. M., Sept. 17,	N. N. W.	"	
6 A. M., "	N.	"	
7 P. M., "	S.	"	
9 P. M., "	S. by W.	"	
10 P. M., "	S. S. W.	"	
Midnight, "	S. S. W.	"	
3 A. M., Sept. 18,	S. S. W.	"	
6 A. M., "	S. by W.	"	
7 P. M., Sept. 19,	S. by W.	Fresh Air.	
9 P. M., "	S. W.	"	
10 P. M., "	W.	Moderate Air.	
Midnight, "	W.	"	
3 A. M., Sept. 20,	N. W.	"	
6 A. M., "	N. W.	"	
7 P. M., "	N. W.	"	
9 P. M., "	N. W.	"	
10 P. M., "	N. W.	"	
Midnight, "		"	
3 A. M., Sept. 21,	N. W.	"	
5 A. M., "	N. W.	"	
7 P. M., "	N. W.	"	
9 P. M., "	N. W.	"	
10 P. M., "	N. W.	"	
Midnight, "	N. W.	"	
3 A. M., Sept. 22,	N.	Light Air.	
6 A. M., "	N. by E.	"	
7 P. M., "	E. by S.	"	
9 P. M., "	E. S. E.	"	
10 P. M., "	S. E.	"	
Midnight, "	S. E.	"	
3 A. M., Sept. 23,	N. by E.	"	
6 A. M., "	N. by E.	"	
7 P. M., "	E.	"	
9 P. M., "	E.	"	
10 P. M., "	E. by S.	"	
Midnight, "	N. E.	"	
3 A. M., Sept. 24,	N. E.	"	

6 A. M.,	Sept. 24,	N. E.	Light Air.
7 P. M.,	"	E.	"
9 P. M.,	"	E.	"
10 P. M.,	"	E.	"
Midnight,	"	E.	"
3 A. M.,	Sept. 25,	E. N. E.	"
6 A. M.,	"	N. E.	"
7 P. M.,	"	E.	"
9 P. M.,	"	E. S. E.	"
10 P. M.,	"	E. S. E.	"
Midnight,	"	S.	"
3 A. M.,	Sept. 26,	S. W.	"
6 A. M.,	"	S. W.	"
7 P. M.,	"	W. by S.	"
9 P. M.,	"	W. by S.	"
10 P. M.,	"	W.	"
Midnight,	"	W.	"
3 A. M.,	Sept. 27,	W. by S.	"
6 A. M.,	"	W. by S.	"
7 P. M.,	"	S. W.	"
9 P. M.,	"	S. W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Sept. 28,	W. S. W.	"
5 A. M.,	"	W. by S.	"
7 P. M.,	"	S. W.	"
9 P. M.,	"	S. W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Sept. 29,	S. W.	"
6 A. M.,	"	S. W.	"
7 P. M.,	"	S. W.	Fresh Air.
9 P. M.,	"	S. W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	W.	Light Air.
3 A. M.,	Sept. 30,	N. W.	"
6 A. M.,	"	N. W.	"
7 P. M.,	"	N. W.	"
9 P. M.,	"	N. W.	"
10 P. M.,	"	N. W.	"
Midnight,	"	N. W.	"
3 A. M.,	Oct. 1,	N. W.	"
6 A. M.,	"	N. W.	"
7 P. M.,	"	S.	"
9 P. M.,	"	S.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W. by W.	"
3 A. M.,	Oct. 2,	S. W.	Moderate Air.
6 A. M.,	"	W. S. W.	"
7 P. M.,	"	W. N. W.	"
9 P. M.,	"	W. N. W.	"
10 P. M.,	"	N. W.	"
Midnight,	Oct. 2,	N. W.	Moderate Air.
3 A. M.,	Oct. 3,	N. W.	Light Air.
6 A. M.,	"	N. W.	"
7 P. M.,	"	N. E.	"
9 P. M.,	"	N. E.	"
10 P. M.,	"	N. E.	"
Midnight,	"	N. E.	"
3 A. M.,	Oct. 4,	N. E.	"
6 A. M.,	"	N. E.	"
7 P. M.,	"	S. S. E.	Moderate Air.
9 P. M.,	"	S. S. E.	"
10 P. M.,	"	S. S. E.	"
Midnight,	"	S. E. by S.	"
3 A. M.,	Oct. 5,	S. E. by S.	"
5 A. M.,	"	S. E. by S.	"
7 P. M.,	"	S. W.	"
9 P. M.,	"	S. W.	"
10 P. M.,	"	W. S. W.	"
Midnight,	"	W. S. W.	"
3 A. M.,	Oct. 6,	S. W.	"
6 A. M.,	"	S. by W.	"
7 P. M.,	"	S. S. E.	"
9 P. M.,	"	S. S. E.	"
10 P. M.,	"	S. E.	"
Midnight,	"	N. E.	Fresh Air.
3 A. M.,	Oct. 7,	N. E.	"
6 A. M.,	"	N. E.	"
7 P. M.,	"	N. by E.	"
9 P. M.,	"	N. by E.	"
10 P. M.,	"	N.	"
Midnight,	"	N.	"
3 A. M.,	Oct. 8,	N.	"
6 A. M.,	"	N.	"
7 P. M.,	"	N. E.	"
9 P. M.,	"	N. E.	"
10 P. M.,	"	N. E.	"
Midnight,	"	N. E. by N.	"
3 A. M.,	Oct. 9,	N. E. by N.	"
6 A. M.,	"	N. E.	"
7 P. M.,	"	N. E.	Light Air.
9 P. M.,	"	N. E.	"
10 P. M.,	"	N. N. E.	"
Midnight,	"	N. N. E.	"
3 A. M.,	Oct. 10,	N. N. W.	"
6 A. M.,	"	N. N. W.	"
7 P. M.,	"	N. N. W.	"
9 P. M.,	"	N. N. W.	"
10 P. M.,	"	N. N. W.	"
Midnight,	"	N. by W.	"
3 A. M.,	Oct. 11,	N. by W.	"
6 A. M.,	"	N. by W.	"
7 P. M.,	"	E. N. E.	Moderate Air.

9 P. M.,	Oct. 11,	N. E.	Moderate Air.
10 P. M.,	"	N.	"
Midnight,	"	N.	"
3 A. M.,	Oct. 12,	N. N. W.	Light Air.
5 A. M.,	"	N. N. W.	"
7 P. M.,	"	N. W.	Fresh Air.
9 P. M.,	"	N. W.	"
10 P. M.,	"	N. W.	"
Midnight,	"	N. W.	Moderate Air.
3 A. M.,	Oct. 13,	N. W.	"
6 A. M.,	"	N. W.	"
7 P. M.,	"	N.	Light Air.
9 P. M.,	"	N.	"
10 P. M.,	"	N. N. W.	"
Midnight,	"	W.	"
3 A. M.,	Oct. 14,	S. W.	"
6 A. M.,	"	S. W.	"
7 P. M.,	"	S. W.	"
9 P. M.,	"	S. W.	"
10 P. M.,	"	W. S. W.	"
Midnight,	"	W.	"
3 A. M.,	Oct. 15,	N. W.	"
6 A. M.,	"	N. W.	"
7 P. M.,	"	S. S. E.	"
9 P. M.,	"	S. S. E.	"
10 P. M.,	"	S. by E.	"
Midnight,	"	S. by W.	"
3 A. M.,	Oct. 16,	S. W.	"
6 A. M.,	"	S. W.	"
7 P. M.,	"	S. W.	Moderate Air.
9 P. M.,	"	S. W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Oct. 17,	N. W.	"
6 A. M.,	"	N. W.	"
7 P. M.,	"	N. W.	"
9 P. M.,	"	N. W.	"
10 P. M.,	"	N. W.	"
Midnight,	"	N. W.	"
3 A. M.,	Oct. 18,	N. W.	Light Air.
6 A. M.,	"	N. W.	"
7 P. M.,	"	S. E.	"
9 P. M.,	"	S. E.	"
10 P. M.,	"	S. S. E.	"
Midnight,	"	S. by E.	"
3 A. M.,	Oct. 19,	S.	"
5 A. M.,	"	S. S. W.	"
7 P. M.,	"	S. S. E.	"
9 P. M.,	"	S. S. E.	"
10 P. M.,	"	S.	"
Midnight,	"	S. S. E.	"
3 A. M.,	Oct. 20,	S. S. E.	Moderate Air.
6 A. M.,	Oct. 20,	S. S. E.	Moderate Air.
7 P. M.,	"	S. S. E.	"
9 P. M.,	"	S. S. E.	"
10 P. M.,	"	S. S. E.	"
Midnight,	"	S. by E.	"
3 A. M.,	Oct. 21,	S. by E.	"
6 A. M.,	"	S. by E.	"
7 P. M.,	"	S. S. E.	"
9 P. M.,	"	S. S. E.	"
Midnight,	"	S. by E.	Light Air.
3 A. M.,	Oct. 22,	S.	"
6 A. M.,	"	S. by W.	"
7 P. M.,	"	S. S. E.	"
9 P. M.,	"	S. S. E.	"
10 P. M.,	"	S. by E.	"
Midnight,	"	S	"
3 A. M.,	Oct. 23,	S. S. W.	"
6 A. M.,	"	S. W.	"
7 P. M.,	"	S. by W.	"
9 P. M.,	"	S. by W.	"
10 P. M.,	"	S. S. W.	"
Midnight,	"	S.	"
3 A. M.,	Oct. 24,	S. by W.	"
6 A. M.,	"	S. S. W.	"
7 P. M.,	"	S. W.	"
9 P. M.,	"	S. W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	"
3 A. M.,	Oct. 25,	W.	"
6 A. M.,	"	N. W.	"
7 P. M.,	"	N. W. by N.	"
9 P. M.,	"	N. W. by N.	"
10 P. M.,	"	N. W. by N.	"
Midnight,	"	N. N. W.	"
3 A. M.,	Oct. 26,	N. N. W.	Mod. Air.
5 A. M.,	"	N. N. W.	"
7 P. M.,	"	S. E.	"
9 P. M.,	"	S. E.	"
10 P. M.,	"	S. E.	"
Midnight,	"	S.	"
3 A. M.,	Oct. 27,	S. W.	"
6 A. M.,	"	S. W.	"
7 P. M.,	"	N. W.	"
9 P. M.,	"	N. W.	"
10 P. M.,	"	N. W.	"
Midnight,	"	N. W.	"
3 A. M.,	Oct. 28,	W.	Light Air.
6 A. M.,	"	W.	"
7 P. M.,	"	S. by E.	"
9 P. M.,	"	W.	"
10 P. M.,	"	W.	"
Midnight,	"	W.	"

3 A. M.,	Oct. 29,	W. by S.	Light Air.
6 A. M.,	"	W. by S.	"
7 P. M.,	"	W. by S.	Moderate Air.
9 P. M.,	"	W. by S.	"
10 P. M.,	"	W. by S.	"
Midnight,	"	W.	"
3 A. M.,	Oct. 30,	W. N. W.	"
6 A. M.,	"	W. N. W.	"
7 P. M.,	"	E.	"
9 P. M.,	"	N. E.	"
10 P. M.,	"	N. E.	"
Midnight,	"	N. E.	"
3 A. M.,	Oct. 31,	N. E.	"
6 A. M.,	"	N. E.	"
7 P. M.,	"	N. E.	"
9 P. M.,	"	N. E.	"
10 P. M.,	"	N. E.	"
Midnight,	"	N.	"
3 A. M.,	Nov. 1,	W. N. W.	"
6 A. M.,	"	W.	"
7 P. M.,	"	N. W. by W.	"
9 P. M.,	"	N. W. by W.	"
10 P. M.,	"	W. N. W.	"
Midnight,	"	W.	Light Air.
3 A. M.,	Nov. 2,	W. by S.	"
5 A. M.,	"	W. by S.	"
7 P. M.,	"	S. W.	"
10 P. M.,	"	S. W.	"
Midnight,	"	S. W.	Moderate Air.
3 A. M.,	Nov. 3,	S. W.	"
6 A. M.,	"	S. W.	"
7 P. M.,	"	N. W.	"
9 P. M.,	"	N. W.	"
10 P. M.,	"	N. W.	"
Midnight,	"	W. N. W.	"
3 A. M.,	Nov. 4,	W.	"
6 A. M.,	"	W. by S.	"
7 P. M.,	"	W. S. W.	"
9 P. M.,	"	S. W. by W.	"
10 P. M.,	"	S. W. by W.	"
Midnight,	"	W. S. W.	"
3 A. M.,	Nov. 5,	W. S. W.	Light Air.
6 A. M.,	"	W. S. W.	"
7 P. M.,	"	N. by E.	"
9 P. M.,	"	N. by E.	"
10 P. M.,	"	N. by E.	"
Midnight,	"	N. by E.	"
3 A. M.,	Nov. 6,	N.	"
6 A. M.,	"	N.	"
7 P. M.,	"	E. S. E.	"
9 P. M.,	"	N.	"
10 P. M.,	"	N.	"
Midnight,	Nov. 6,	N.	Light Air.
3 A. M.,	Nov. 7,	N.	"
6 A. M.,	"	N.	"
7 P. M.,	"	S. E.	Fresh Air.
9 P. M.,	"	S. E.	"
10 P. M.,	"	S. E.	"
Midnight,	"	E. N. E.	"
3 A. M.,	Nov. 8,	E. N. E.	"
6 A. M.,	"	E. N. E.	"
7 P. M.,	"	W. N. W.	Moderate Air.
9 P. M.,	"	W. N. W.	"
10 P. M.,	"	W.	"
Midnight,	"	W.	"
3 A. M.,	Nov. 9,	W.	"
5 A. M.,	"	W.	"
7 P. M.,	"	N. W.	"
9 P. M.,	"	N. W.	"
10 P. M.,	"	N. W.	"
Midnight,	"	N. W.	"
3 A. M.,	Nov. 10,	N. W.	"
6 A. M.,	"	N. W.	"
7 P. M.,	"	N. W.	"
9 P. M.,	"	N. W.	"
10 P. M.,	"	N. W.	"
Midnight,	"	N. W.	"
3 A. M.,	Nov. 11,	N. W.	"
6 A. M.,	"	N. W.	"
7 P. M.,	"	N. W.	"
9 P. M.,	"	N. W.	"
10 P M.,	"	N. W.	"
Midnight,	"	N. W.	"
3 A. M.,	Nov. 12,	S. E.	Fresh Air.
6 A. M.,	"	S. E.	"
7 P. M.,	"	S. E.	"
9 P. M.,	"	S. E.	"
10 P. M.,	"	S. E.	"
Midnight,	"	S. E.	"
3 A. M.,	Nov. 13,	W.	Moderate Air.
6 A. M.,	"	W.	"
7 P. M.,	"	N. W.	"
9 P. M.,	"	N. W.	"
10 P. M.,	"	N. W.	"
Midnight,	"	N. W.	"
3 A. M.,	Nov. 14,	N. W.	"
6 A. M.,	"	N. W.	"
7 P. M.,	"	N. W.	"
9 P. M.,	"	N. W.	"
10 P. M.,	"	N. W.	"
Midnight,	"	N. W.	"
3 A. M.,	Nov. 15,	N. W.	"
6 A. M.,	"	W.	"
7 P. M.,	"	N. W.	"

10 P. M., Nov. 15, W.N.W. Moderate Air.
Midnight, " W. N. W. "
3 A. M., Nov. 16, N. N. E. Light Air.
6 A. M., " N. N. E. "
7 P. M., " N. N. E. Fresh Air.
9 P. M., " N. E. "
10 P. M., " N. E. "
Midnight, " N. E. "
3 A. M., Nov. 17, N. E. "
6 A. M., " N. E. "
7 P. M., " E. N. E. "
9 P. M., " E. N. E. "
10 P. M., " E. N. E. "
Midnight, " E. N. E. "
3 A. M., Nov. 18, E. N. E. Strong Air.
6 A. M., " N. E. by N. Light Air.
7 P. M., " N. W. Moderate Air.
9 P. M., " N. W. "
10 P. M., " N. W. "
Midnight, " N. W. "
3 A. M., Nov. 19, W. "
6 A. M., " W. S. W. "
7 P. M., " W. N. W. "
9 P. M., " W. N. W. "
10 P. M., " N. W. "
Midnight, " N. W. "
3 A. M., Nov. 20, N. W. "
6 A. M., " N. W. "
7 P. M., " N. by W. "
9 P. M., " N. by W. "
10 P. M., " N. by W. "
Midnight, " N. N. W. "
3 A. M., Nov. 21, W. "
6 A. M., " W. "
7 P. M., " N. E. "
9 P. M., " N. E. "
10 P. M., " N. E. "
Midnight, " N. "
3 A. M., Nov. 22, N. W. Light Air.
6 A. M., " W. "
7 P. M., " W. N. W. "
9 P. M., " W. N. W. "
10 P. M., " W. N. W. "
Midnight, " W. N. W. "
3 A. M., Nov. 23, W. "
6 A. M., " W. "
7 P. M., " W. N. W. "
9 P. M., " W. "
10 P. M., " W. "
Midnight, " S. E. "
3 A. M., Nov. 24, S. E. Moderate Air.
6 A. M., " S. E. "
7 P. M., Nov. 24, E. N. E. Moderate Air.
9 P. M., " E. N. E. "
10 P. M., " N. E. Light Air.
Midnight, " N. E. "
3 A. M., Nov. 25, N. E. "
6 A. M., " N. E. "
7 P. M., " N. W. Moderate Air.
9 P. M., " N. W. "
10 P. M., " N. W. "
Midnight, " N. W. "
3 A. M., Nov. 26, N. W. "
6 A. M., " N. W. "
7 P. M., " N. W. "
9 P. M., " N. W. "
10 P. M., " N. W. "
Midnight, " N. W. "
3 A. M., Nov. 27, N. W. "
6 A. M., " N. W. "
7 P. M., " N. W. "
9 P. M., " N. W. "
10 P. M., " N. W. "
Midnight, " N. W. "
3 A. M., Nov. 28, N. W. "
6 A. M., " N. W. "
7 P. M., " N. W. "
9 P. M., " N. W. "
10 P. M., " N. W. "
3 A. M., Nov. 29, N. W. "
6 A. M., " N. W. "
7 P. M., " W. "
9 P. M., " W. "
10 P. M., " W. "
Midnight, " W. "
3 A. M., Nov. 30, N. W. by W. "
5 A. M., " N. W. by W. "
7 P. M., " N. N. W. "
9 P. M., " N. N. W. "
10 P. M., " N. N. W. "
Midnight, " N. by W. "
3 A. M., Dec 1, N. by W. "
6 A. M., " N. N. W. "
7 P. M., " N. by W. "
9 P. M., " N. by W. "
10 P. M., " N. by W. "
Midnight, " N. "
3 A. M., Dec. 2, N. by W. "
6 A. M., " N. by W. "
7 P. M., " N. "
9 P. M., " N. "
10 P. M., " N. "
Midnight, " N. "
3 A. M., Dec. 3, N. "

6 A. M.,	Dec. 3,	N.	Moderate Air.	7 P. M.,	Dec. 6,	N.N.W.	Moderate Air.
7 P. M.,	"	S. W.	"	9 P. M.,	"	N. N. W.	"
9 P. M.,	"	S. W.	"	10 P. M.,	"	N. N. W.	"
10 P. M.,	"	S. W.	"	Midnight,	"	N. N. W.	"
Midnight,	"	S. W.	"	3 A. M.,	Dec. 7,	N. N. W.	"
3 A. M.,	Dec. 4,	S. W.	Fresh Air.	6 A. M.,	"	N. W.	"
6 A. M.,	"	S. W.	"	7 P. M.,	"	N. by E.	Light Air.
7 P. M.,	"	S. W.	"	9 P. M.,	"	N. by E.	"
9 P. M.,	"	S. W.	"	10 P. M.,	"	N. by E.	"
10 P. M.,	"	S. W.	"	Midnight,	"	N.	"
Midnight,	"	W. S.W.	Moderate Air.	3 A. M.,	Dec. 8,	N. W. by N.	"
3 A. M.,	Dec. 5,	W. S. W.	"	6 A. M.,	"	N. W.	"
6 A. M.,	"	N. W.	"	7 P. M.,	"	S. E.	"
7 P. M.,	"	N. W.	"	9 P. M.,	"	S. S. E.	Moderate Air.
9 P. M.,	"	W. N. W.	"	10 P. M.,	"	S. by E.	"
10 P. M.,	"	W. N. W.	"	Midnight,	"	S. by E.	"
Midnight,	"	W. N. W.	"	3 A. M.,	Dec. 9,	S. by E.	"
3 A. M.,	Dec. 6,	W.	"	6 A. M.,	"	S. S. W.	"
6 A. M.,	"	N. W.	"				

TESTIMONY OF JOSEPH S. PIKE.

Q. (*by Mr. Derby*). What is your occupation? *A.* I am shipping clerk at the establishment of J. P. Squire & Co. in East Cambridge. I have charge of all the exports.

Q. Have you experienced any offensive smells in or about the establishment? *A.* I have not. I live opposite the factory and have smelt the trying of fresh lard, but the odor has been no more offensive than ordinary kitchens.

Q. Have you experienced any other offensive odors at your house? *A.* I have many times been troubled by the dock smell; it has been very bad. The smell of fresh lard is not offensive to me at all.

Q. Please state whether you have visited other localities in the vicinity, for what purpose, and by whose direction? *A.* By the orders of Mr. Squire some of us used to go about the neighborhood at night to notice the condition of things. Sometimes I went alone; sometimes with Mr. Goodrich or Mr. Colson.

Q. Have you kept a record of your visits? *A.* I have.

Q. Have you it with you? *A.* I have.

Q. What have you discovered during these visits? *A.* I have been to Reardon's place on Pearl Street and to O'Neil's place. I have experienced the grease smell in a very great degree.

Q. What memoranda did you make of this visit? *A.* "Sept. 4. Pearl Street, fearful stink; O'Neil's, horrid smell."

Q. Have you experienced offensive odors in other localities? *A.* Yes, sir. On Canal Street, Charlestown, on two occasions, I experienced the worst smell I ever smelt. I was driving on that street, between the mill and the Prison, — on a new street. There was a pile of clams near the opening of a sewer, and it looked as if they had been filling in.

Q. Concerning the visit to O'Neil's place, what kind of an odor was that? *A.* O'Neil's was a grease smell; we drove over quite a large ter-

ritory that night, and went all around O'Neil's place. We could not smell the odor when we were to windward of his place.

Q. Have you the record of the 10th of August? *A.* I have. "Pearl Street, not bad; Canal Street, bad smell."

Q. Look at the 9th, sir.

Mr. McIntire. Are you now reading your own record? *A.* Yes, sir; my own record.

Q. (*by Mr. Derby*). Read the record of August 9. *A.* "Pearl Street, some smell, — pretty rough." That is what I have here.

Q. Anything further, sir? *A.* "O'Neil's, some smell."

Q. What is the description, — the adjective that you have? *A.* "Bad."

Q. Where were you that night, sir? *A.* Here is my signature to what I did.

Q. Were you driving through the street? *A.* Yes, sir.

Q. Will you take the 31st of July, — have you a record of what you did? *A.* I have no record of it.

Q. Have you any recollection of what you did on that day? *A.* I was in the works till about eleven o'clock that night.

Q. Did you make any experiments that night? *A.* We had visitors that night, — the City Government of Cambridge, — and they were shown about the works.

Q. Did you note any occurrence that took place, — whether a pipe was opened or discharged? *A.* There was a cock turned for a short time, at the request of the visitors.

Q. When you went out during that night, what did you encounter? *A.* When I went out of the works, I went directly to my house.

Q. Did you make any excursion that night? *A.* No, sir.

Q. Did you perceive any offensive smell at the works on the night of the 31st, except that from turning the cock? *A.* No, sir.

The Chairman. Do I understand you that you did n't smell anything except from this cock? *A.* Yes, sir.

Q. (*by Mr. Derby*). Did you smell it at your house? *A.* No, sir, I did n't smell it at my house.

Q. Have your family, your wife, been injured at your house by these smells? *A.* We have perceived the dock smells.

Q. Not sufficiently to change paint or affect health? *A.* No, sir.

Q. You live directly opposite the factory? *A.* Directly opposite.

Q. There is one commercial question, your reference to the shipping of exports?

The Chairman. Pardon me, but that is a question that is not admissible

Mr. Derby. I have nothing further.

Cross-examined.

Q. (*by Mr. McIntire*). What part of the works do you have charge of? *A.* I am from one end of the building to the other, — mostly in the packing-house.

Q. Have you anything to do with the slaughtering? *A.* I have no business with the slaughtering-house.

The Chairman. Are you superintendent? *A.* No, sir.

Q. (*by Mr. McIntire*). You are acquainted with Loring E. Wheeler the boss slaughterer? *A.* Yes, sir.

Q. Is he not sick now with typhoid fever? *A.* I think he is; at least he has been, but I think he goes out.

Q. Where does he live? *A.* In Charlestown, I think.

Q. Has he not had two attacks of typhoid fever? *A.* He had two attacks, I believe, but got out.

Mr. Derby. We shall call the physician presently, — he is a witness in the case.

Q. (*by Mr. McIntire*). Do you know where that pipe led that was opened when the Mayor and Aldermen were present, — I mean the pipe that carried the water up? *A.* I never saw it.

Q. You don't know whether there is any other pipe open than that out into Miller's River basin? *A.* I never saw where that pipe goes to, if there is any.

Q. Did you, in your nocturnal rambles, go into these establishments that you speak of, — O'Neil's and Reardon's? *A.* No, sir, I did not.

Q. Have you examined the establishment of John Reardon, on Columbia Street, — or what street is it? *A.* I don't know the name of that street.

Q. It is Winsor Street, I think. Did you ever examine his apparatus? *A.* I never was in his works.

Q. Why did n't you, instead of riding by, — why did n't you get out and follow up the smells to the kettles and tanks? Your object was to find the source of these smells? *A.* Yes, sir.

Q. Why did n't you get out and try the kettles? *A.* I went on one side and smelt it strong, and became satisfied that it could not come from any other way. On one side I got it very strong, tremendously strong, very strong. Then I went on the other side and did n't get it.

Q. Well, some of these streets are very long and the smell would be quite easy to get to the other side. How wide is it? *A.* I should think some of them might be the length of this room.

Q. (*by Mr. Derby*). How many feet? *A.* I should say about one hundred feet.

Q. (*by Mr. McIntire*). Now, O'Neil's place is situated on the other side of the basin from Boynton's, is it not? *A.* Which side do you mean?

Q. I mean that he is on the north side. *A.* I am talking about Reardon's place, — as you go down to Boynton's.

Q. But I have left Reardon's. You spoke of O'Neil's smelling badly, and I ask you if O'Neil's place is n't opposite, on the north side of the basin? *A.* As I understand it, it is O'Connor's place.

Q. We have left Reardon's place, and are going down to O'Neil's (*pointing it out on the map*). Can you get to the back of O'Neil's place without going to the front? *A.* I never went round O'Neil's place, but went on three sides of Reardon's.

Q. Tell us what streets you went through. *A.* I went down towards the Boynton Packing Company in Winsor Street. Then I drove back and went down Webster Avenue, up Cambridge Street and towards Somerville; then I went down the other way and stopped my horse there.

Q. Did you go round the other Reardon's place, and round Pearl Street? *A.* I used to go down the other way, back by Brookline and Pearl Streets.

Q. Are you satisfied that the smell came from Reardon's place? *A.* I am satisfied that the smell came from that building.

Q. What kind of a smell? *A.* Very offensive, — a greasy smell, a rendering smell.

Q. A very offensive smell. Did you get any other smell from Reardon's place? *A.* Yes, sir, very offensive.

Mr. McIntire. I am glad of it; you will make a good witness for us by and by.

Q. (*by Mr. McIntire*). Whether you knew who had charge of the closed tanks on the night of the 31st of July? *A.* I don't know.

Mr. McIntire. That is all, sir.

Testimony of Dr. Hezekiah C. Bickford.

Q. (*by Mr. Muzzey*). Does the range of your practice extend into Cambridge and toward Brighton? *A.* A very little.

Q. Have you occasion to traverse the territory embraced within East Cambridge, and Cambridgeport, as well as Charlestown? I have, sir.

Q. At night? *A.* No, sir. Not outside of Charlestown at night. But in the course of the twenty-four hours I visit patients outside.

Q. Be good enough to state whether in the course of travelling about you have encountered disagreeable odors in Charlestown, East Cambridge, and Cambridgeport? *A.* I have, sir.

Q. Will you describe the locality or the source from which these odors have come as you have met them, and with some detail? Begin with Charlestown. *A.* A very offensive odor arises from the Mill Pond at Charlestown at low tide; also, from open sewers and stagnant water. The odor is very bad about Canal Street.

Q. What is the odor on Canal Street caused by? *A.* Principally by the Mill Pond.

Q. Well, when you come to Prison Point Bridge, along towards the Boston and Lowell Railroad location where they are filling, what is the trouble in that locality? *A.* I don't know much about it. I have frequently been in the vicinity of Miller's River, and the stink was very bad in the afternoon, towards night.

Q. Well now, as to the kind of odor, whether it is possible to distinguish it in one way or another, and where do you think it comes from? Take the Miller's River odor that you have perceived. *A.* I could not describe the smell, but it was very offensive.

Q. State whether or not it differs from the odor along by Prison Point and the State Prison? *A.* I should think it did.

Q. In what way? *A.* It is a more intense smell than that which you get from the Mill Pond.

Q. Well now, are there any places in the general vicinity that you can point out as the source of the odors? *A.* At the Neck, in Charlestown, in the vicinity of a factory there, Mr. Furbush's factory, a bone-boiling place.

Q. How far from that place have you ever detected the odors? *A.* Within fifty rods or less of Main Street.

Q. Have you noticed any difference in the foulness of the atmosphere in Charlestown within a few years from what it used to be?

A. No, sir. I don't know that I have, excepting that it has grown more intense. The air is more foul.

Q. Do you know of anything that will explain the cause of the increase in the foulness of the air there? *A.* I think it was increased by the putting of water into Charlestown.

Q. What was the effect of that? *A.* Before the water was put in, a large proportion of the houses in Charlestown had outhouses; and since then water-closets have been put into nearly all the houses, and the greater part of what was taken out of vaults and carried away is now carried off by the sewers.

Q. Then do I understand you that there is an increase in the amount of sewage by the introduction of Mystic water? *A.* Yes, sir.

Q. Is there any other cause for it? *A.* There may be.

Q. Where do you reside in Charlestown? *A.* On Main Street, at the corner of Green Street.

Cross-Examination.

Q. (*by Mr. McIntire*). On what side of the basins have you had occasion to pass? *A.* On the side next to Charlestown.

Q. You say you have distinct odors from that locality which you have mentioned. I am speaking of the basins that compose Miller's River. You say you cannot describe these smells except that they are more intense. Don't you find them different from those which you describe at Canal Street and at Prison Point Bridge? *A.* Yes, sir. I think the odor is somewhat different.

Q. Would you describe it as the rendering odor? *A.* Well, sir, I cannot say that I have smelled anything of that kind.

Q. Can you give any better description of that smell than you have given? *A.* No, sir, I don't know that I can. It is a mixture of everything.

Q. Did you distinguish any fat or pork in it? *A.* No, sir, I don't think I did.

Q. At your house on Main Street, have you ever got any rendering smell? *A.* No, sir, I don't think I have smelled anything like the rendering smell.

The Chairman. Do you know what the rendering smell is, sir? *A.* Yes, sir; I have been at Mr. Squire's establishment.

Q. When were you there? *A.* I think some time in September.

Q. What was the occasion of your going there? *A.* I went there merely out of curiosity. I had heard a great deal about his establishment and the offensive odors that came from there, and so one afternoon I went there to see.

Q. Were they in operation? *A.* They were.

Q. What were they doing? *A.* Slaughtering and rendering.

Q. Did you examine the kettles, and go into the rendering establishment? *A.* I did, sir.

Q. Did n't you find anything there that smelled at all? *A.* Yes, sir.

Q. What was it? *A.* All the offensive odor I noticed was that of the rendering establishment.

Q. From the open kettles, or from the close tanks? *A.* From the open kettles.

Q. Did you go into the pen where the hogs were kept? *A.* Yes, sir; I went all over it.

Q. Did you smell any odor of gas there? *A.* Nothing to amount to anything. I should not say it was offensive. It was not offensive to me.

Q. (*by Mr. Muzzey*). You speak of the smell as arising from open kettles. What were they trying in those kettles? *A.* Fat.

Q. Was that an offensive smell to you? *A.* The odor was very slight, and not very offensive.

Q. Was it the odor that would arise from trying fresh fat? *A.* Yes, sir; that is all.

Q. Do you reside near Canal Street? *A.* Yes, sir; within fifty rods.

Q. Can you smell the Canal Street odors at your house? *A.* We can smell the odors that arise from all this flat territory very distinctly at our house when it is still.

Q. Have you ever traced it to that place? *A.* No, sir, I have never traced it to any particular place.

Q. Have you ever noticed it when you have been on the other side of Canal Street on the road to Cambridge, — Milk Row, I think it used to be called, — leading from Charlestown by the Eastern and Boston and Maine Railroads? *A.* No, sir, I don't think I have noticed it very much there.

Q. Do you get at your house any stench that is very offensive to you? *A.* Yes, sir, we do.

Q. To your senses what is it? A greasy or rendering smell? *A.* No, sir; I cannot say that I smelled anything like that. The odor is very offensive. It is occasional when the air is still.

Q. You never traced it? *A.* No, sir.

Q. Does it make any difference, Doctor, which way the breeze comes from, if it is pretty still, in regard to these odors that you get there? *A.* I cannot say that it does.

Q. Does it make any difference about the odors whether the tide is in or out? *A.* Yes, sir, it makes a great deal. When the tide is out is when we get the most offensive odor.

Q. Is there any difference between the day and the night? When are the odors the strongest? *A.* Along toward morning, in the night.

Q. Well, Doctor, from your familiarity with our establishment (I did n't know you had entered it before), — judging from all you saw there and smelled there, and with your knowledge of the general region, I would ask you whether you think that the unpleasant odors that are perceptible in the general region are traceable to this establishment? *A.* I met nothing and saw nothing that would lead me to suppose that they could be traced to this establishment.

Testimony of John S. Lyon.

Q. (*by Mr. Derby*). Where do you reside? *A.* On Webster Avenue, Cambridgeport.

Q. Is there any establishment near you that renders grease? *A.* Yes, sir.

Q. Whose is it? *A.* It is conducted by Mr. Reardon.

Q. How far from your dwelling-house? *A.* I should say from 200 to 225 feet.

Q. How long have you lived in that house? *A.* Eleven years, sir.

Q. Whether at any time during the past summer you have experi-

enced any offensive smells coming from Reardon's establishment? *A.* Yes, sir, several times.

Q. State what they were, how strong and how offensive. *A.* They were very strong and very offensive. I have had to shut down my windows at night.

Q. Do you know whether they came from that place? *A.* I am satisfied that they did.

Q. Were they at all sickening on their effect upon you? *A.* They were, sir.

Q. Very sickening in their effect? *A.* Yes, sir. They affected my boy and wife so that they complained of the headache and sick stomach.

The Chairman. It seems to me if you could bring us —

Mr. Derby. We want to show that no such smells come from Mr. Squire's, and that these are the places from which they do come.

Q. I understand you that you fix it definitely upon this building? *A.* I do, sir.

Q. What is carried there, sir? Is there any grease carried there? *A.* I have seen grease carried in at the back yard, sir.

Q. Was the smell that of the rendering of grease? *A.* It was the smell of putrefied meat, grease, tallow, or something of that kind.

Q. (*by Mr. Newhall*). What is Reardon's business? *A.* The trying of these articles.

Q. (*by Mr. Derby*). Have you had occasion to bring the police there? *A.* I brought Mr. Jones, the Health Officer, there some time this last August. The smell was more or less offensive during last summer. It was never so offensive before. I never suffered on account of it before this last season.

Q. How often did it occur? *A.* I don't know, it has been so often; every time he would fire up in the night, about every night, or every night except the week or eight days after the Health Officer was there.

Q. At what time has he lighted up? *A.* I should say between eight and nine o'clock.

Q. Did he keep it up during the night? *A.* I expect that he did.

Cross-Examination.

Q. (*by Mr. McIntire*). How long have you lived in East Cambridge? *A.* Twenty-two years, sir.

Q. I will ask you whether fifteen or seventeen years ago, in the region back of you, along in Somerville and the lowlands, there were not a great number of men who collected their grease, made their soap, and tried it out there? *A.* I believe they did, sir, but I was never much acquainted with that locality. They do at the present day, some of them.

Q. I know; but whether at that time almost every man did n't collect the grease and make his own soap? *A.* That I don't know.

Q. Well, do you know now that there are only three establishments and that each one has a great many collectors out? *A.* I believe there are not so many establishments as that there.

Q. Well, did you ever go into the establishments fifteen or twenty years ago? *A.* No, sir; I did nine or ten years ago.

Q. Did you see any close tanks there then? *A.* No, sir, they were open kettles.

Q. Well, you say the strongest and most intense smells you got the last summer? You never got, in all your experience in Cambridge, such a smell as you got there last summer? *A.* No, sir; we always got a little.

Q. Well, now, when did you begin to perceive the smells of rendering? *A.* I should say we had smelled them ever since I lived there; some eleven years.

Q. When Mr. Conlon carried on the soap-works in the same place that Reardon is in now?

The Chairman. It seems to me that all the direct examination of this witness has proved nothing in reference to one particular point. We admit that the trying of this bad-smelling grease and meat must, to a certain extent, make a bad smell; but not one single point is brought out with regard to Mr. Squire.

Mr. Derby. There has been evidence to show that people a quarter or a half mile from this establishment do not distinguish the rendering or scrap smell from others. The examination with regard to Mr. Squire's establishment does not point you to him for anything more than the rendering of fat. We bring you to the places where the rancid tallow and grease are rendered, and show you where the smells do come from.

Mr. Newhall. I don't wish to prejudge any case so far as Mr. Reardon is concerned. What we mean is, that an old-grease rendering establishment is offensive, and when it is in operation offensive odors will arise from it. Well, now, how far they go is another question. To what extent this man carries on business is another question. How often his establishment is in operation is another question. It seems to me to be conceded all around that when it is in operation it gives off offensive odors, and that it is not necessary to go on to show that.

Mr. Derby. I propose to take up ten or fifteen minutes to locate the origin of these odors.

Mr. McIntire. With regard to my cross-examination, I cross-examine upon the evidence put in. In justice to Mr. Reardon, I don't wish to injure him by any evidence I may adduce. Of course he and others are entitled to their defence when they come in; but I think the evidence, and the method in which I have cross-examined, is rather against this establishment, as I think Mr. Reardon himself will show that he has the most improved apparatus, far ahead of Mr. Squire, for he superheats his steam and turns everything under the boiler. Therefore, I say that none of these close tanks can be made so that the establishment can be anything better than a nuisance.

Mr. Derby. I will ask this witness one or two more questions. One is, whether this gas is so effectually burned at Reardon's as to destroy the smell, or whether it improves the establishment.

A. I don't know whether it improves it or not. I know it is very bad. I don't know how much worse it might be.

Q. Have you traced it any distance from the works? *A.* I have, sir, as far as Prospect Street.

Q. How far would that be, sir? *A.* I should say about an eighth of a mile.

Q. (*by Mr. McIntire*). Whether you have smelled these smells within six weeks? *A.* No, sir, not within the last six weeks.

Q. Do you know whether within the last five or six weeks he has put in a new machine? *A.* That I could not say.

Q. (*by Mr. Muzzey*). How far is Reardon's place from Prospect Street? *A.* An eighth of a mile, sir.

Testimony of Obadiah George.

Q. (*by Mr. Derby*). Where do you reside? *A.* At the corner of Cambridge and Winsor Streets, Cambridgeport.

Q. How far from Reardon's? *A.* About one hundred feet, or a little more.

Q. Have you at any time, sir, experienced any acrid or strong smell or burning that came from that direction or that place in the last year? *A.* Yes, sir.

Q. State to the Commission; give an account of it. *A.* It seemed to be the smell of nasty, greasy filth or fat, or something of that kind, — something that smells very badly.

Q. How often have you experienced it? *A.* All along last summer. Sometimes every day; sometimes it would not be so bad. We had it nights a great deal.

Q. Were the fires usually lighted in the evening or night? *A.* I was never there in the evening, but I suppose they were by the smell.

Q. You have smelled it more by night than by day? *A.* I went down last summer one night when it came very strong, and I thought that I would just walk down to it and go in. I went to the building, and there seemed to be an odor there of trying or rendering. They asked me to walk in. I told them I guessed I would not.

Q. How near did you go? *A.* I went near to the steps. It smelled very disagreeably. They wanted to know if I came down to see what I could smell. I told them I did in part. "Walk in," they said. I told them I guessed I would not. I stopped there a few minutes, and then walked off.

Q. Why did n't you go in? *A.* Well, I got enough of it outside. I thought there would be something said that would not be so pleasant. I thought it would be better to walk off.

Q. Will you describe to the Board how strong and how offensive it was? *A.* It was pretty tedious sometimes, and especially so in the night. Sometimes when I felt badly I would get up and walk about an hour or two, and then go back to the house. My folks used to be routed up in the night, and could not sleep.

Q. Frequently during the past summer? *A.* Yes, sir.

Cross-Examination.

Q. (*by Mr. McIntire*). Have you ever noticed which way the wind

was when you have smelled these odors? *A.* The building is just north of where I live, on the corner. When the wind is right it brings the odor to my house.

Q. You are between Mr. Reardon's and Mr. Squire's? Mr. Squire's establishment is southeast from you, and Mr. Reardon's northeast. You never noticed which way the wind came from which brought you the most offensive odor? *A.* I know that is where the greater part of this odor came from at my place. I can smell it when the odor comes up from the trying.

Q. You can distinguish the rendering smell? You never got up out of your bed when you smelled this odor, and went up to Reardon's establishment? *A.* No, sir, but when I have got up I have been out of doors to see if I could get a little place where it did n't stink.

Q. Well, don't you know that the prevailing winds in summer are from the southeast? *A.* I suppose they are.

Q. Do you think you get this odor from Reardon's when the wind is from the south or southeast? *A.* I don't know.

Q. Do you get them two or three times during the week? *A.* More than two or three times.

Q. How far are you from Mr. Squire's establishment? *A.* I should think it was half a mile. It may be a little more or less.

Q. Did you ever get any smell when the wind was directly north? *A.* I don't notice the winds.

Q. Do you know whether Mr. Reardon tries out in open kettles or close tanks? *A.* I do not.

Q. (*by the Chairman*). How great distance can you smell from Reardon's? *A.* I should say a quarter of a mile or more.

Q. How much more? *A.* I could not say.

Q. Have you ever been down to East Cambridge, and is there any particular place that you smell it there? *A.* I have been there; there is no place in particular that I could say.

Q. Have you ever been at Mr. Squire's establishment? *A.* Yes, sir.

Q. Did you ever smell anything there? *A.* I have smelled the hog smell there. It was a smell that was not very pleasant and agreeable.

Q. (*by a member of the Board*). Did you ever get at Mr. Squire's the same smell that you got at Mr. Reardon's? *A.* No, sir.

Q. Did you in East Cambridge? *A.* I have smelled very disagreeable smells in the streets of East Cambridge, but I could not tell what kind they were.

Q. (*by Mr. McIntire*). Did you get the same smell at East Cambridge that you got at Mr. Reardon's? *A.* Well, I don't know as I could tell exactly whether it was the same. It was a very unpleasant, disagreeable smell.

Q. Have you ever detected the smell from Reardon's at any considerable distance from home? *A.* I have smelled it more than a quarter of a mile.

Q. Might it not have been half a mile? *A.* I should sooner think it was half a mile than less.

Q. Might it possibly have been a mile? *A.* I think not. I think it was not strong enough to be smelled as far as that.

Q. Have you been to church in East Cambridge? *A.* Yes, sir, at the Methodist Church.

Q. Well, in coming out of the church at night, have you smelled these disagreeable smells? *A.* I have, sir.

Q. Could you say where they came from? *A.* I could not, sir.

Q. (*by the Chairman*). Did they increase or diminish as you went home? *A.* Well, sir, I don't know. Sometimes they might increase, and sometimes they might diminish. It depended upon where they came from.

Q. Could you tell the direction? *A.* I have thought sometimes that it came from the direction of Mr. Squire's; and then, when I would get along up, it would smell a little different.

Q. (*by the Chairman*). You are quite sure that on certain occasions you have smelled this smell coming out of church, and it has diminished as you left East Cambridge? *A.* It might have diminished. I could not say.

Q. (*by Mr. Webster*). If I understand you, the most of your smells come from Reardon's? What is the reason? *A.* Because I know that there is a great deal of trying done there, and it is right close by where I live. I could tell by that.

Q. (*by Mr. Derby*). Do you perceive at any time the dock smell? *A.* Yes, sir.

Q. Well, when you come up from the church at Second Street, what street do you come out upon, sir? *A.* Right out on the main street, — Cambridge Street.

Q. Do you know of any other small establishment for rendering grease in the vicinity? Do you know of Spelman's? *A.* I have heard that there were some on the way; but I don't know where they are.

Q. Have you in any part of East Cambridge perceived any smells stronger, or as strong, as those which were in the vicinity of your house? *A.* I think I have.

Q. There have been times when they were as strong as at Reardon's at some other point? *A.* Yes, sir.

Q. More than once? *A.* I have only experienced it a few times as bad.

Q. If I understand your evidence, sir, it is that you very often — several times a week during the summer — have experienced these bad smells on your street; and you have sometimes — a very few times — experienced them in other parts of East Cambridge quite as bad, but not of so frequent occurrence? *A.* I think I have received more from Reardon's than from anywhere else, although I have smelled very bad smells in that vicinity.

Q. Well, have you experienced more smells of rendering than of anything else? *A.* I think I have, sir.

Q. (*by Mr. McIntire*). Are you going to swear that none of these rendering smells that you get at your house, and that you did n't trace, have come from Mr. Squire's establishment? *A.* No, sir; I don't wish to be understood in that way, because I don't know whether they did or not.

Q. Whenever you smelled these smells, did you trace them at all in the direction of Mr. Squire's, or were you near Mr. Squire's? *A.* No, sir. I have smelled these smells of bad grease at home; and when I have been on the streets of East Cambridge, I have smelled very bad smells there.

Q. You live near the line of East Cambridge? *A.* It is about an eighth of a mile away.

TESTIMONY OF SAMUEL W. BURPEE.

Q. (*by Mr. Derby*). What is your occupation? *A.* I am a teamster.

Q. Are you an independent teamster, or do you team for any particular party? *A.* I do general jobbing; although I have Mr. Sortwell's distillery to attend to, and that keeps me pretty well occupied.

Q. You are not in the employment of Mr. Squire? *A.* No, sir.

Q. Where do you reside? *A.* At the corner of Cambridge and Columbia Streets.

Q. How far from the trying-place of Mr. Reardon? *A.* It might be a little farther than Mr. George, but there is not much difference.

Q. What is the direction from you to Mr. Reardon's? *A.* North or northwest.

Q. What street are you on? *A.* Columbia Street.

Q. Now give us some account, if you please, of Mr. Reardon's establishment, as to the frequency of firing and trying there? *A.* They try grease and tallow.

Q. Is there any considerable amount of grease tried, sir? Do you ever cart it into the city after it is tried? *A.* Not from Mr. Reardon's.

Q. You do cart for some of them? *A.* I cart some for Mr. O'Neil.

Q. Any considerable quantity, sir? *A.* Yes, sir.

Q. How many tons? *A.* I could not tell you. We cart it by the hogshead. I never take any account of the weight.

Q. Do you cart several hogsheads in a week? *A.* Some weeks quite a number, and at other times not so much.

Q. When you say quite a number, how many do you mean? Twenty-five hogsheads, or may it be fifty? *A.* It might be as many; but it would be a month before I should carry in any more.

Q. Whether the smell from Reardon's is at all offensive? Whether you have had to close your windows when the fire has been lighted? *A.* I have often experienced some very bad smells there during the last summer.

Q. Has it been in the night principally? *A.* Yes, sir.

Q. Between what hours? *A.* After supper I usually walk out upon Cambridge Street from six to half past; and a great many nights when I have been out I have found the smell from this rendering establishment. I don't know that I have smelled it for three or four weeks past.

Q. Well, prior to that? *A.* I should think we had had it five or six times a week.

Q. How strong is it, sir? *A.* It is pretty strong; pretty tough work to get through it.

Q. How far from the works have you experienced it? *A.* I don't know that I could say how far.

Q. Have you experienced it at a considerable distance? Could you smell it for half a mile in the course of the wind? *A.* I should think it could be smelled half a mile.

Q. How often have you been disturbed by it, and had to close your windows? *A.* There were a few nights that we were obliged to close our windows.

Q. Were your wife and children sick? *A.* I remember of no instance, except that they complained of the smell.

Q. (*by the Chairman*). You don't know how far you can smell it, sir? *A.* I don't know.

Cross-Examination.

Q. (*by Mr. McIntire*). Do you do any teaming for Lincoln & Chamberlin or Boynton? *A.* I do a very little for Boynton, and have a little for Lincoln & Chamberlin.

Q. Do you do more for them than for O'Neil? *A.* No, sir; I guess I do more work for O'Neil.

Q. Don't you do some right along every week for these men? *A.* No, sir. It is a number of months since I have done a job for Lincoln & Chamberlin.

Q. How long since you have done anything for Boynton? *A.* Some three or four days.

Q. Well, on these nights you were obliged to close your windows, did you get up and go out? *A.* I had been; but when I got home the people told me there was a bad odor, and asked me where it came from, and I told them it came from Reardon's.

Q. Do you know which way the wind was? *A.* It blew towards my house.

Q. What direction? *A.* That would be north or northeast.

Q. Well, the wind don't often in summer come from the north or northeast to your house, does it? *A.* I have known it to do so.

Q. Does it often? *A.* When it blows from anywhere it blows to my house.

Q. But I ask you if in the summer time you got many north or northeast winds? *A.* We get them when they come.

Q. I ask you if during the summer at your house you experience many north or northeast winds? *A.* If there are any blowing we get them.

Q. That is not my question. I ask you if during the summer — take the past summer — you get many north or northeast winds at your house? *A.* I cannot answer that question any differently from what I have.

Testimony of General Samuel E. Chamberlain.

Q. (*by Mr. Muzzey*). You are the Warden of the State Prison at Charlestown? *A.* I am, sir.

Q. Had you formerly experience in trying, ham-curing, and business of that character? *A.* Yes, sir.

Q. You are familiar with the odors that emanate from the business? *A.* I am, sir.

Q. In the vicinity of the State Prison are you troubled by unpleasant odors, and if so, will you give their source? *A.* We are troubled there with a variety of smells. The first is that arising from the dock itself; the dock of the State Prison is very offensive. This last summer we were troubled, very much troubled, by an odor from the dump at the end of Prison Point Bridge, on the land owned by the Boston and Lowell Railroad Company, where it was partially filled in with refuse vegetable matter, which came from the cesspools. It was very offensive.

Q. Now let me ask you if you have personally seen the carts of the city of Boston dumping offensive matter in that place?

Mr. McIntire. That is what we admit.

Mr. Muzzey. The Boston Board of Health are looking after us pretty sharply, and we shall be obliged to look after them.

Witness. It was carried in tight-bottom wagons; it was a sort of fluid, and looked like mud.

Q. You say vegetable matter was put in? *A.* I have seen loads of rotten oranges taken there in dump-carts.

Q. Now the whole mass, you say, is very offensive. What was the odor? *A.* The odor of decayed vegetable matter.

Q. What surface did they cover in that way? *A.* I could not state. They have been filling in there for three or four months. There are ashes and such stuff mixed in with it.

Q. They began about what time in the summer? *A.* I have not any definite opinion about that. I noticed it in the spring.

Q. Well, now you have spoken of the dock of the Prison and of the place where this foul stuff is dumped. Will you give any other localities, and describe them? *A.* North of the Prison, which I think is nearly if not quite filled in now, there was a place near the old burying-ground of Charlestown that was filled with stagnant water. There is a large space there filled with all manner of impurities.

Q. That, you think, is filled, or in process of being filled? *A.* Yes, sir. In the night-time, during hot weather, when the wind was west or northwest or northerly, the smells were very offensive indeed. They seemed to be of that sort of gaseous nature that would turn gilt picture-frames black in one night. That effect was produced in my house in a northerly or northwesterly wind. It was so offensive that it would make persons sick. I have been made sick myself.

Q. You had a yacht laid up in the dock? *A.* I had a small, cat-rigged vessel, painted white.

Q. What was the effect of leaving her there in the dock mud? *A.* In twenty-four hours it turned her as black as mud.

Q. When was that done? *A.* The first week in October.

Q. How near your residence within the Prison grounds is the place where that effect was produced? *A.* I should say about one hundred yards.

Q. You are familiar with the smells from the Miller's River basins. Let me ask you, speaking of the irritating gas which is borne to you on the winds, whether the odor of it is of a vegetable or animal nature? *A.* It always struck me as being of a vegetable nature; that is, as being different from the smell of carrion or dead-animal matter.

Q. Have you been within Mr. Squire's works? *A.* I have.

Q. Are you pretty familiar with them, and does the smell which you get at your house and which produces this blackening effect and the irritation of the mucous membrane resemble any smell that is to be distinguished in Mr. Squire's establishment? *A.* I should say not.

Q. Have you noticed any bad odors prevailing in the neighborhood of Reardon's and Barry's places? *A.* I don't know where they are located.

Q. Get into your buggy and take a straight line across the bridge, follow along up here by the basins, make your way around these bone-boiling places, and tell us what you have seen. *A.* In afternoons, when

I have sometimes with my family driven across from Prison Point to Cambridge, my family would have to put their handkerchiefs to their noses while we passed this dump. As we got up over the hill and commenced the descent, we would be saluted with a smell, apparently of lard. My wife remarked somebody was frying doughnuts.

Q. Did you go beyond Mr. Squire's, or did you get the smell of trying doughnuts at Mr. Squire's? *A.* I have smelled it after we got half down the hill, until we got past the Grand Junction Railroad.

Q. (*by Mr. McIntire*). The top of the hill is about at Fourth Street. Then you began from Fourth Street and passed the Grand Junction Railroad, going west? *A.* Yes, sir.

Q. (*by a member of the Board*). Were you able to identify the point where you got this smell? *A.* Well, we generally understood it came from Mr. Squire's. I always understood there were other works.

Q. Was this an offensive smell? *A.* Not to me. In the vicinity of the Grand Junction Railroad, and farther on toward the distillery of Sortwell, we received smells of rancid meat, different entirely, which were very offensive.

Q. (*by Mr. Muzzey*). You say you got the smell of rancid meat? *A.* Yes, sir, mixed up with sour molasses and rum.

Q. How is that as to offensiveness? *A.* It is very offensive.

Q. Was the smell which you got when passing Mr. Squire's comparatively sweet and inoffensive? *A.* I should say it was. It might have been the trying of lard in good condition.

Q. Did this other smell come from burnt animal matter? *A.* Yes, sir, it was similar to what I have smelt before in burning dead horses.

Q. Well, when you got to this point you were in the vicinity of Sortwell's. Did you go beyond that, or have you observed any other bad smells beyond that? *A.* Not to speak of.

Q. (*by Mr. Frothingham*). Did you get anything like the smell of dead horses at Reardon's? *A.* No, sir.

Q. Do you ever have the smell of dead horses on Bunker Hill, or anywhere else in Charlestown? *A.* No, sir.

Q. (*by Dr. Derby*). I understand you to say that the rendering smell has never reached the Prison, or your house? *A.* Not to my knowledge.

Q. That is, the sweet smell? *A.* Or any other.

Q. What you do get there is the vegetable odor? *A.* Yes, sir.

Q. (*by Mr. Muzzey*). Suppose you start from Union Square in Somerville, and describe what is encountered in travelling toward Boston through Milk Street to Prison Point? *A.* I will say that this route I have always avoided.

Cross-Examination.

Q. (*by Mr. McIntire*). You are not troubled with catarrh? *A.* Yes, sir, I have it somewhat.

Q. Do you think that injures your sense of smell in any degree? *A.* Considerably.

Q. Dr. Hooker is the physician of the Prison, is he not? *A.* He is.

Q. How long was your experience in curing hams? *A.* Three years.

Q. You say that the odor of lard and the odor of pork are not disagreeable to you? *A.* Not to me.

Q. Do you know, General, whether there has been any report by the Committee on Prisons in regard to the smells that have pervaded the Prison? *A.* They mention it in their report.

Q. Well, was there not something said in regard to the rendering smells? *A.* I could not say. I don't recollect that there was.

Dr. Derby. I think it very important to know whether the smells of cooking, which are described as travelling over here to Boston and Charlestown, have or have not been perceived at the State Prison. I should be very glad if in some way it could be ascertained, for the benefit of this Board, whether or not these smells of cooking, whether coming from one establishment or another, — I won't say where they come from, — whether they do or do not come to the State Prison. I confess that to me it would be a most astonishing fact if it should prove that they have never reached the State Prison, knowing, as I do, how they traverse long distances, and are perceived as distinctly as it is possible for anything to be perceived miles away.

Mr. Muzzey. I wish, General, you would select any officer of the Prison, who has a perfect sense of smell, and be good enough to let us release you and have him sent in your place.

Dr. Derby. It does not depend upon one individual, because these smells may occur when that officer may be sound asleep. The testimony of one individual may not be enough. At the Prison there are six hundred or seven hundred men. If the inmates of that establishment have not received that smell I would like to know it.

Mr. McIntire. Dr. Lattimer is there usually, and hears the complaints of all the occupants of the Prison. Will you, General, be kind enough to send Dr. Lattimer?

General Chamberlain. I should be happy to oblige you.

Q. (*by Mr. Muzzey*). I have not yet heard you say that you have not the power of smell. *A.* My sense of smell is very much impaired, but I have no difficulty in detecting the dock smell at the Prison. Some of the smells there have affected me very powerfully.

Q. It may be difficult for you to smell, but does that difficulty prevent your distinguishing between the vegetable odor you spoke of and the rancid-meat odor? *A.* Not when I smell it.

Q. (*by Mr. McIntire*). With regard to your boat; the wash of the Miller's River basin comes right down to your dock there? *A.* Yes, sir; and there is a floating substance on this water that bubbles up in gases.

Q. You would not say that it is not the wash of Miller's River that affected your boat? *A.* I think it was entirely.

Q. How long have you had charge of the State Prison? *A.* Two years.

Q. Do you keep any hogs there? *A.* We do.

Q. How many? *A.* About one hundred. They are kept within the enclosure.

Q. What are they fed upon? *A.* Upon the swill of the Prison; that sometimes is very offensive.

TESTIMONY OF HON. JONATHAN STONE, MAYOR OF CHARLESTOWN.

Q. (*by Mr. Muzzey*). I would like to have you state if the citizens of Charlestown and East Cambridge have experienced bad smells, and tell what you know of their character and source. *A.* At the commencement of hot weather last summer the people of Charlestown complained (that would apply for several years past, I believe, but it has not come so particularly under my observation), — the people complained of the very bad smells, which occurred generally from ten o'clock in the night till four o'clock in the morning. I prepared an order, and introduced it in the Board of Aldermen, asking that a petition be presented to the State Board of Health, to ascertain, if possible, the source of this nuisance and abate it. The order was passed and the petition was presented to the State Board of Health. Immediately the Secretary, Dr. Derby, came over to us and stated that it was the opinion, not of the present Attorney-General, but of the former one, that they could not act unless we definitely located the cause of the nuisance. I then, with the Chief of Police, believing that these smells came from the vicinity of Miller's River, started to see if we could locate them. We went first, I think, to North & Merriam's establishment.

Q. (*by the Chairman*). Do you know the dates? *A.* No, sir; I don't know that. It was in June, I think. We went all through North & Merriam's, and could not detect anything that seemed like the smells we had there in Charlestown. We gave it a thorough investigation. They had just dumped out one of the heaters in which they manufacture their blood into fertilizers, etc. The odor did n't appear to be anything very bad. We went all through the establishment and could not find anything. They assured us that they did nothing in the night which they did not do in the day. We then went to Mr. Squire's establishment and went all over that, and could not there detect any such thing as we detected in the night in Charlestown. We then went to a place owned by a man named O'Neil, up toward Cambridge, and as I approached that, we there detected a smell which was more like the smell we have in Charlestown than anything else we found. We went to his establishment and found that he was rendering a few scraps in the bottom of a kettle. He said that he did n't do anything more in the night than he did in the daytime. We failed to find the source of the nuisance. I came back, and within a few days I addressed a note to the Mayor of Cambridge, asking him if he had located or could locate the cause of the nuisance. I think it was some week or ten days before I received an answer from him that he had not; that their committee was about moving in the matter of investigation.

Q. (*by Mr. Muzzey*). What have you observed going on during last spring and summer on the Cambridge side of Prison Point Bridge, on the location of the Boston and Lowell Railroad? *A.* They are filling up that large area with refuse matter from Boston and elsewhere.

Q. Has that been complained of and found offensive to the citizens of Charlestown? *A.* I don't know of any direct complaint, although people speak of it in passing by.

Q. I remember that I should ask you whether you were present last winter, representing the city before the Committee on Water Supply and Drainage when the question of sewering Miller's River valley was up in the Legislature. One of the lines suggested for the sewer to deep water, through that valley, you remember, had its outlet in Tuft's Dock. Did you or not, sir, on the part of the city of Charlestown, oppose, before the Legislative Committee, the building of a sewer on that line? *A.* I did. I told the committee I should meet them there and do everything I could in the House and Senate, and if worse came to worst, I should meet them in the Supreme Court.

Q. In conference with you, after you had communicated your decision, did or did not the parties abandon that plan? *A.* They did, sir; and adopted the Craigie's Bridge course, which I favored. They asked my opinion and I stated it to them, giving my views about where it ought to go.

Q. Well now, sir, speaking of the condition of the dock and Mill Pond, what do you say about it? *A.* Well, I don't consider it very offensive. Of course at low tide we have a dock smell there, but I don't think that is the source of the nuisance which we smell at night.

Q. For how many years has there been some offence occasioned by that place? *A.* Well, when it was covered with water and used as a mill pond it was nothing at all. What now exists there has been occasioned by the emptying of waste along the shores, and there is more or less nuisance occasioned by the sewers which discharge into it.

Q. Is it not a fact that some of the sewers have emptied there with their mouths entirely uncovered, twenty or thirty feet from the water at low tide? *A.* They all empty out at low-water mark.

Q. Do you think your trouble comes from the odor of the flats? *A.* No, I hardly think there is enough to affect the atmosphere, although this smell may travel with that which has been complained of. I live on the easterly part of the city. This smell troubles people more on the westerly side of the city. I have smelled it at my house. The smell which I have smelled has resembled the odor of the emptying of vaults, together with the fatty or greasy smell, — the two combined.

Q. You went over to Mr. Squire's establishment and saw all its operations? *A.* Yes, sir.

Q. And discovered nothing there which pointed to that establishment as the source of the odor that disturbs the people of Charlestown? *A.* No, sir, nothing whatever. I am satisfied that if they don't do anything there different in the night from what they do in the day, it don't come from the Squire or North & Merriam establishments. As I said before, what we found to be the nearest to that smell was at O'Neil's.

Q. How near was this place that gave you the nearest resemblance to the smell that you suffer, to Boynton's place? *A.* I should think a quarter of a mile farther to the west and south. I will state that it is the opinion of the people of Charlestown that there is something done by somebody (they may be in error) in the night different from what is done in the day; that some things are let off, that fill the atmosphere, somewhere between twelve and four o'clock.

Q. Compare this season which has just passed with the summer of 1872. Did you suffer more or less, on the whole? *A.* Well, as I have stated, I don't smell it much myself. I have heard it spoken

of for two or three years, but of course in my official capacity I have heard more of it this year. Every one has been running to me, supposing it was my duty to ferret out and stop the nuisance. I was the Chairman of the Board of Health, and if it were in my territory it would have been my duty to have found out, if possible, the cause of the nuisance. If we found it outside, it was my idea that the State Board of Health should look after it.

Q. Has the state of the tide anything to do with it? *A.* My idea is, that it has not. No doubt there is some smell arising from the docks and sewers, and it may be more intense at low tides than at others. Although it is conceded that the odors are not smelled every night, yet I believe that they are smelled at high tide as well as low. They are intermittent smells.

Q. Where do you live? *A.* At the corner of Bunker Hill and Jackson Streets, directly east from the Monument, under the hill.

Q. Is there any bad smell that you detect there? *A.* No, sir.

A. (*by the Chairman*). How often have the smells been noticed in Charlestown? *A.* Well, I have very frequently heard people say, "We had that horrible smell again last night." These are the people on the westerly side of the city; on the easterly side of the city we don't smell them very often, — only occasionally.

Q. Have the city authorities ever taken any measures to trace out these smells when they have occurred? *A.* I don't know that they have done anything in the night.

The Chairman. It seems to me that was the only time when it could be done.

Mayor Stone. The committee of last year went about after it last season, but failed to find it. The odor was present, and they went there in the night, but failed to find it.

Q. (*by Mr. Muzzey*). Was the odor offensive in June when you and your Chief went over there? *A.* It was in the afternoon when we went out. I have been over there between eight and ten o'clock, but there was nothing to be found then.

Q. Can you describe the odors in Charlestown? *A.* I think I have. It was like the emptying of vaults and a fatty smell combined. If you have ever been around at night when the vault-carts were at work, that odor, combined with a fatty smell, was about what it was.

Q. (*by Mr. Newhall*). Have you heard any complaint about it, except in hot weather? *A.* No, sir.

Q. Do you think it possible that that smell came from any of the basins around Charlestown? *A.* No, sir; not unless there was something else with it. The people generally think it must come from some manufacturing operation. I have heard it said that the smell from the sugar refinery was fully equal to this other smell, by people who live in that vicinity.

Q. Have you smelled that? *A.* I have in passing. That is a different smell. It is sickening, and has some animal matter combined with it.

Q. Is it your impression that the smells which make up this smell come from the same source? *A.* Well, I have not formed an opinion

as to whether it all comes from one source or not. I don't know whether it could.

Q. Are there night-carts employed? *A.* Yes, sir, there are. We have a difference in the price, and have as little of that kind of work done in the summer as possible. Still they do go around.

Cross-Examination.

Q. (*by Mr. McIntire*). Mr. Muzzey assumed that it was according to the nature of things that the sewer should empty where the law made it empty. Did n't you say that the Legislative Committee and the city of Cambridge, through its Board of Mayor and Aldermen, consented not to oppose it if it passed the House and Senate? *A.* Yes, sir. I think they opposed it on the ground of expense. I don't know. I did n't follow it through after the committee assured me that it should not go through Charlestown.

Q. Well, did you describe this odor as being of a fatty nature, more like that which you smell at O'Neil's than at any other place? That is, it was the rendering odor, and not the odor from the basin or the sewers or the dock or of these sour substances which were thrown on the flats? *A.* The odor from the dock is very different, because it is salty. There is a smell which comes from the dock, but it is a peculiar smell.

Q. (*by Mr. Muzzey*). Was not the objection of Charlestown, sir, to taking the sewer through Charlestown territory and emptying it into Tuft's Dock, that the sewage would create a nuisance at that place? *A.* Yes, sir. We did n't think that they should turn the sewage of that portion of East Cambridge and Somerville through Charlestown. It was enough for us to have our own sewage to take care of. We thought they had no right to injure our property, as I had no doubt they would, by turning their sewers through our territory. Their natural course was down Miller's River, and although we should get part of it there, they had the right to go in that direction. They asked my opinion, and I said it would be better for Cambridge to run it down Bridge Street, into the swift-running water of Charles River.

Q. (*by Mr. McIntire*). You have no objection to carrying it down farther into Charles River, have you? *A.* There was some talk of extending it along under the Fitchburg Railroad, near there, but they did n't come where I saw fit to oppose them, and I don't think I should have said much if they had carried it to the swift-running waters of Charles River.

Q. (*by Mr. Newhall*). You have heard Mr. Chamberlain testify of some evil in the neighborhood of Prison Point Bridge. Are you aware that it exists? *A.* There has been some refuse matter dumped there, but we have stopped it as much as we could.

Q. Well, do you hear of it as an independent or distinct odor? *A.* Not away from the immediate vicinity.

Q. The only offensive smell at your house is the greasy smell? *A.* Yes, sir; this other smell combined with the greasy smell.

Q. What is the smell combined with it? *A.* I have described it, I believe twice, as more like the smell of a privy than anything else.

Q. That must come from the dock, must it not? *A.* It may come from the dock and the sewage; but I cannot believe that there is enough comes from the sewage anywhere about Charlestown to fill the air so full of such a smell as that.

Q. Where do you think it comes from? *A.* I cannot locate it, sir. I have followed it up pretty closely. I don't think it comes from Mr. Squire's establishment.

Q. I am speaking of the sewage smell. From whence, in your opinion, does that come? *A.* I had the impression that it must come from the working up of the offal by the slaughtering establishments; but so far as any tests which we could apply, such as putting a handkerchief into the flue which carries off the gases at North & Merriam's, we failed to find anything in these establishments which should cause it.

Q. Well, did you form any opinion as to the source of that smell? *A.* No, sir. We have our opinion that somebody lets off something at night which creates it. That is as far as we can go.

Q. Do you suppose that the whole of that comes from some manufacturing process? *A.* The greater part of it. I have not yet formed an opinion or come to the conclusion that all comes from the sewage which empties around about the city of Boston, though it may.

Q. (*by a member of the Board*). Do you ever get this privy smell disconnected with the fatty smell? *A.* Not unless you are right over it, or if a cart be right under your window.

Q. In other words, your people don't make this general complaint of this privy smell unless it is accompanied with this fatty smell? *A.* Not the rendering of pure lard, but the rendering of some rancid animal substance, — that would, I suppose, come from the burning up of the offal and refuse matter, — that, combined with the other, would create it. As I said before, we failed to find anything of that kind at North & Merriam's or at Mr. Squire's.

Q. You did n't pursue your investigations above O'Neil's? *A.* No, sir.

The Chairman. As I understand it, you have never made examinations in the night? *A.* Not this year.

Q. (*by Mr. Derby*). You were at Mr. Squire's between eight and ten o'clock one evening. What did you perceive there? *A.* There was nothing offensive in approaching the building at that time. I did n't smell anything from the building until I entered it, and then there was nothing bad.

Q. Then, sir, in your nocturnal visits you discovered nothing? *A.* There was nothing about those two establishments that was half so bad as there was in certain little private slaughtering-houses we used to have in Charlestown, where they used to conduct things more slovenly.

Q. (*by a member of the Board*). Was there any offensive odor from the hog-pens? *A.* There was a hog smell in the building, but I did n't discover it till I went in.

Q. (*by Mr. Derby*). I will ask you with regard to this point, whether in any peculiar state of the atmosphere or in any humid state of the air you have noticed this smell of which you speak more than at other times? Before a storm, when the barometer was falling, whether you have noticed more of this smell than at other times? *A.* I don't know that complaints have come particularly in such times. I think on muggy, warm nights there has been more difference than at any other time.

Q. Well, is it not possible that the vapors coming up from the drains would come in greater volume then than at others, and possibly make these offensive odors? *A.* That is the case. The winds force out the

stronger vapors and stronger smells. I suppose every man who owns a house knows that he is troubled more with the sewer gases at such times than at any other period.

TESTIMONY OF OLIVER AYERS.

Q. (*by Mr. Derby*). You are at the head of the Police Department of Charlestown? *A.* Yes, sir.

Q. What was your previous employment? *A.* In former years I have been superintendent of the running gear of the Fitchburg Railroad Company's Locomotive Works.

Q. And have had occasion often to pass over a portion of the Fitchburg Railroad? *A.* Yes, sir.

Q. You have heard the testimony of the gentleman who has just testified. How far do you agree in the statement which he has made? *A.* I very fully concur with him in what he has said in relation to the matter. I can only reiterate a part of his evidence. As Superintendent of the Health Department, I have had many complaints from our citizens in relation to this smell that we get between the hours of twelve and four o'clock in the morning.

Q. Where do these citizens reside? *A.* West of High Street, all the way from the Neck to Warren Bridge. All on this side of Bunker Hill and along the side of Canal Street

Q. Have you been able to localize these smells? *A.* We have tried our best. We have advised those who have made complaints to aid us in detecting where these smells originated, giving them our assurance — as we had had assurance of the Secretary of the State Board of Health — that as soon as they could be located they should be at once abated. The people came in with complaints, some thinking it was the Mill Pond, others that it was Miller's River, and others Mr. Squire's establishment. But they could not seem to agree that it came from one source, and the Mayor and myself thought we would go and see if we could not find out where it all originated. We went out to North & Merriam's.

The Chairman. At what time? *A.* We went out in the afternoon. It was a very warm, hot day, and we went to North & Merriam's, and went over the building from top to bottom, from the hog-pen to the sticking-pen, to the rendering-room, and to every hole and corner that we could think of. We failed to detect that peculiar smell which assaults us in the latter part of the night and towards morning. We then went to Mr. Squire's, and we went through the same examination there, from the hog-pens to the packing-house, the sticking-pen, and the slaughtering-room, and we examined everything we could find, and we failed there to detect that peculiar smell that assails us. We started from there and went out as far as Prospect Street, where the bridge crosses the Fitchburg Road. Just before we got there we thought that we smelled something which was much like what we smelled in Charlestown. It was Mr. O'Neil's place. We saw him, and went in to examine his place. He had very large kettles sitting there that were open at the top. The building was very low-studded, and it was whitewashed.

Q. (*by Mr. Derby*). Did you notice whether this was fresh whitewash, just put on? *A.* I could not say. They had drawn off their fat that they had been trying, because it was along towards six o'clock. They

told us they stopped work about six o'clock and commenced in the morning. We asked them what they were trying, and they told us they tried out the grease which they collected in all the adjoining cities. They had at times tons of it on hand. It was rancid and maggoty, and smelled very offensively before they tried it out. I learned that they started their fire some time along after one o'clock at night. They filled up the kettles at once. I thought that that was the worst-smelling place that I had been into. When I arrived at the building the smell seemed to me to be nearer the smell complained of in Charlestown than anything we had smelled elsewhere. We then went back again to the lower basin of Miller's River.

Q. How many caldrons did you see there? *A.* We did n't go in through the door. I stepped into it and saw one. Whether there were more, I could not say. I did n't go around in the building to see how many they had. It was so offensive that I did n't care to go in.

Q. Did you see much of the grease standing about? *A.* No, sir. Mr. O'Neil was very candid, and told us he bought everything he could get in the shape of grease that was collected from house to house in the different cities. Whoever came there with it he purchased it, and, consequently, at times had large quantities of it on hand.

Q. Did Mr. O'Neil tell you that he commenced trying at one o'clock? *A.* No, sir. One of his men told me that he lighted his fires at one o'clock at night.

Q. What did he go on to say? *A.* That he was preparing to render this stuff in retorts similar to those used, I think, by North & Merriam. He had got the building up and the machinery in, that is, his boilers and retorts.

Mr. Derby. But at that time he was rendering in open kettles.

Mr. Ayers. We left there and came down to the lower basin of Miller's River. It happened to be low tide. We went around the basin and examined it to see if we could detect that peculiar smell which we smelled in the morning. We certainly failed to see it, or to find anything that reminded us of the odor. We then left and went home.

Q. What attention, on that visit, did you give to Mr. Squire's establishment, sir? *A.* We gave that as thorough an inspection as we gave to North & Merriam's. I think we went into every room of it.

Q. You found nothing seriously offensive? *A.* We found a smell which was very disagreeable; but we failed to find that peculiar smell. One place, in particular, we found where it was very offensive indeed. But we tried the experiment of stepping back ten feet, and we could not smell it at all.

Q. Was that the room where they keep the entrails? *A.* Yes, sir, and where the blood is put into the cart. By going close to it, it was very offensive; and by stepping back ten feet we failed to smell it. I think that completed our investigation. I afterwards went there once in the night-time.

Q. What was the result of your night visit? *A.* It was some time during the month of July, I think. I failed, during that examination, to find anything that reminded me of the smell we get in the after part of the night.

Q. What places were visited? *A.* North & Merriam's and Mr. Squire's.

Q. Did you notice, in particular, on muggy, close evenings, a strong offal smell coming up from the side of the Mill Pond? *A.* No, sir, I don't know that I did. I don't know that we have ever got anything from any distance that our people consider very offensive. They could get over that pretty comfortably.

Q. You did perceive it along the borders? *A.* Yes, sir.

Q. Pretty strong vapors, have they not been, sir? *A.* Yes, sir.

Q. You say this occasioned a great deal of injury to the people of Charlestown? *A.* It certainly has, sir.

Q. And you have visited it once in the day-time as Chairman of the Board of Health, and once in the night-time? *A.* I have been there a great many times.

The Chairman. I understand that the evidence is that they lighted their fires at certain places at one o'clock, and your trouble came between twelve and four or five o'clock in the morning. Have you ever, as Superintendent of the Board of Health, made arrangements for thoroughly searching for the cause of the odors? *A.* I notified the Board that I would have teams in readiness, and I gave orders to our officers that when they smelled that again at any time to notify me, and we would call the whole Board of Health to go out at any time. But it was along rather late in the season, and we have not suffered so much from the stench or smell as in the earlier part of the summer.

Q. You have never been out, then? *A.* Not after twelve o'clock.

Q. (*by Mr. Newhall*). You don't describe the smell, Mr. Ayers. *A.* Well, sir, I cannot. I imagine if you should mix up assafœtida, garlic, dead horses, and that should become putrid, and should be mixed with the vaults and everything else, you might get something of the perfume that we get in the morning.

Q. How often do you get that smell? Sometimes once or twice a week. Sometimes it will go a week, and then, again, we may get it once or twice or three times the next week.

Q. Well, is there anything peculiar about the atmosphere on these occasions? *A.* When the wind happens to be right to waft it over us it may come in that direction.

Q. Do you get it when the atmosphere is moist or dry, or does it come with the wind? Do you always get the smell when the wind is from a particular quarter? *A.* Not always; but when we do get it the wind is in that direction.

Q. Did you never smell it at any other time, when the wind was southeast? *A.* I cannot say that I did. Generally the wind is blowing directly over upon us from the west.

Q. (*by Mr. Derby*). With the wind blowing from the west it would come down Miller's River and across your Back Bay. Would it not possibly have something from the basin and something from your Back Bay in it? *A.* Possibly.

Q. You speak of having been there forty or fifty times. During these visits have you experienced anything that was offensive, or that reminded you of it? *A.* I certainly have smelled nothing that to my sense of smell was very offensive. My father having been in the business for years, when I was a boy, it is not so offensive to me as to a great many. I can go into a slaughter-house and stay there by it without being sick or anything of that kind.

Q. Yes, sir; but my question was whether in your fifty visits you have experienced at these places anything that was offensive. *A.* I cannot say, sir, that I did. I was interested in the drainage question in the Legislature some two years ago, or in 1872. I was a member of the House at that time. The cities of Somerville and Cambridge wished to shift the nuisance by putting their drain through under the Boston and Lowell Railroad, and let their sewage come on to our flats, which I considered would injure the property of our people in that ward. I was opposed to the filling up of that basin from the very fact that in case they succeeded in getting their drainage through that way we should be injured by it. I had occasion to go over this territory a great many times, and that was the time when I made these visits.

Cross-Examination.

Q. (*by Mr. McIntire*). I have not understood you to say whether the tide affected this odor in any way? *A.* Well, I cannot say. We have been assailed constantly by this smell, and it has uniformly been between the hours of one and four o'clock in the morning.

Q. Well, should you say that the tide had anything to do with the smell? *A.* I have never paid any attention to the tide, and have formed no opinion in regard to its effects.

Q. Would you describe the smell as rising from the manufacturing of something? *A.* Well, I cannot say that it is. My impression is that it is an odor which comes from some animal matter, — from rendering, or something of that kind. It is a smell which I have never smelled before in my lifetime. I don't know what it is.

Q. What was the somewhat similar smell at O'Neil's? Do you mean that it was as intense as in Charlestown? *A.* The Mayor made the remark, just before we got to this establishment, and I assented to what he said, that it was the nearest resemblance to the smell in Charlestown that we had found. We seemed to go through a vein of it as it comes from this place.

Q. Was that as intense? *A.* No, sir, it was not.

Q. But you say you could not make up your mind as to where it came from? *A.* No, sir.

Q. (*by Mr. Derby*). The rendering at O'Neil's was about over that day? *A.* Yes, sir.

Q. It was not then in active operation? *A.* No, sir.

Q. You only had the relics of what had occurred? *A.* That is all.

Testimony of Zimri H. Cobleigh.

Q. (*by Mr. Derby*). What is your occupation and residence? *A.* I am a cutter of clothing, and my residence has been recently, until last Monday, No. 320 Main Street, Charlestown, very near Hancock Square.

Q. How far from Dr. Bickford's? *A.* About one half or one third of a mile farther up.

Q. During the past season were you at any time disturbed by disagreeable smells during the night-time? *A.* I have been, frequently.

Q. What kind of smells, and at what time of night? *A.* Well, I could not define them so closely as they have been defined. I think I have smelled them in the day-time and in the early part of the evening.

Q. Have you ever smelled them later in the night? Up to what time have you observed them in the morning? *A.* Well, my latest time has been about two or three o'clock.

Q. How often have you noticed them? *A.* Two or three times a week.

Q. Do you sleep with your windows open? *A.* I don't think I have had my windows open since a night in the middle of June.

Q. Have you been waked up by them while sleeping with closed windows? *A.* Yes, sir, several times.

Q. Do you know the months; whether it was in June, July, August, or September? *A.* No, sir. I got up once in June, I should say, another time in July, and I should say once or twice from the last of July to the first of August. I don't remember any occasion in September.

Q. Now, if at any time you got up and attempted to follow these smells? *A.* Yes, sir, I have.

Q. State when. *A.* My first attempt was, I should say, in last June. I could not have been in bed more than an hour when I was awakened by the smell, and I got up and went down to the foot of Lincoln Street to Canal Street. After arriving at Canal Street I turned my route and went up Canal Street to near the old mill, where a sewer comes out. I discovered that it was low water, and my curiosity was somewhat excited to know if it would smell as strong from the other side. So I went across the milldam. I did n't get it so intensely as I received it there.

Q. Take it along Canal Street and Lincoln Street; did you find it strong when you entered Lincoln Street? *A.* O yes. I crossed on this dam and went out upon the Boston and Maine Railroad. After crossing and getting past the river, I did n't smell the smell so much. After getting upon the railroad I was somewhat astonished at not smelling it at all. I had got beyond it. Then I passed along towards Prison Point.

Q. Where did you go then? *A.* Down towards Prison Point till I came to the bridge where the railway crosses over the deep-water channel.

Q. The Boston and Maine? *A.* Yes, sir. Then I turned and went back again, following the railroad up to what is called Cambridge Street; then out Canal again and down home.

Q. Did you encounter the smell again that night? *A.* I found it all the way till I went into the house.

Q. Where did you meet the smell as you went north? *A.* It was the most intense a little above Lincoln Street, at the Point, sir.

Q. And you did n't smell again, as you went up on the railroad, till you crossed over? *A.* No, sir; not till I got into Canal Street again.

Q. Then, if I understand you, it was located on the Charlestown side? You found it strong as you came down Canal Street? *A.* Yes, sir; and on Main Street, at my house.

Q. (*by a member of the Board*). When you went down towards Prison Point, you did n't smell it? *A.* Not on the westerly side of the channel.

Q. (*by Mr. Derby*). Your explorations, then, were on the western side of Charlestown and the easterly side of Somerville? On the one side you found the smell, and on the other you did n't? *A.* Yes.

Q. Now tell us if there was any other occasion when you made explorations by night. *A.* Yes; soon after.

Q. State when that was, and what you found. *A.* It was similar to the first, with the exception of crossing the dam. I went down to Prison Point, to the junction of the Boston and Maine and Fitchburg, and

went up that way. I found it so disagreeable crossing the dam the first night that I would not try it again. It was dangerous. I went down to Prison Point and followed the Boston and Maine up from the junction as far as the old milldam again.

Q. Now state what you found on that night. *A.* I found it similar, as the wind was blowing in the same direction.

Q. Which way? *A.* In a westerly direction.

Q. What did you experience on the Boston and Maine Railroad? *A.* Nothing more than what you would experience at any time of day, going along there; the smell of dock mud. Nothing of those odors we get on the other side.

Q. You walked on, then, as far as the dam? How did you get home? *A.* I came back over the same ground that I went over going up.

Q. Make a contrast, if you please, between the smells on the dam near the Boston and Maine Railroad — if there were any — and those upon Canal Street, if there were any. *A.* I don't know as I could give you a correct comparison.

Q. I want you to state whether it was very strong or not; represent it according to your recollection. *A.* My idea was that it was like a privy vault.

Q. And that you experienced on Charles Street? *A.* On Canal Street and along on Main Street; anywhere west of the basin.

Q. And that was of a nature that you did n't find on the other side or on the Boston and Maine Railroad? *A.* No, sir.

Q. You noticed these smells in your house when the windows were closed? They found their way, I think, sufficient to wake you? Were any of your family disturbed, beside you? *A.* Yes, sir.

Q. Who did they wake? *A.* My wife. Oftentimes, before we made a practice of closing the windows, she got up and closed them.

Q. On the night in question, when you went out, did it disturb your family? *A.* Yes; she got up, and I got up and went out.

Q. Did they affect you to sickness? *A.* Not particularly so. My boy asked me to go down on the wharf and fish with the other small boys. I told him I would investigate the place the first time I got out early. That night I went down with him — this was between six and seven o'clock — to the sewer I have spoken of. That is planked over where they stand and fish at high water. I experienced a smell there that I thought was pretty powerful; enough so, that my son turned away and said he was sick. I lit a cigar and went down and undertook to look in. But it was too powerful for me, and I went back to the house.

Q. Was he sick at his stomach? *A.* Not enough to vomit. He complained of its making him sick.

Q. Any other observations, sir, you have made, or conclusions you have come to with regard to it? *A.* I have observed one peculiarity at the outlet of this sewer. There are more or less of cobble-stones lying along there on the flats, for perhaps four or five rods. I noticed one peculiarity, that these stones were white, out as far as the sewer water ran. I have asked the question of several, why the stones should have been whitened.

Q. Did you ascertain? *A.* No, sir; I did n't ask any scientific man.

Cross-Examination.

Q. (*by Mr. McIntire*). You live on the low ground, don't you? *A.* On Main Street.

Q. It is a low part ; not anywhere near as high as up near the Monument ? It is a low part of the city, near Canal Street ? *A.* It runs parallel with Canal Street.

Q. You, if I understand you, have only smelt the sewer smell ? *A.* I lay it to that, sir.

Q. Have you ever smelt any odor that reminded you of rendering any fats ? *A.* I never smelt anything that had that resemblance.

Q. (*by a member of the Board*). Was the tide always low when you smelt these disagreeable smells ? *A.* One Saturday night I think the tide was, perhaps, an hour from low or flood tide. At other times at low tide.

Q. Was it very bad that night *A.* I think the most intense, or as much so as I ever smelt it.

Q. Were the flats covered ? *A.* No, sir.

Q. Was the sewer mouth ? *A.* No, sir, I don't think it was covered till there had been, well, three or four hours' flood tide.

Q. You never smelt this smell there at high tide ? *A.* No, sir.

Q. Ever been there at high tide ? *A.* Yes, sir.

Q. (*by Mr. McIntire*). You said you never smelt the rendering smell at all ? *A.* I never have.

Q. What is the name of the bone-boiling establishment on Canal Street ? *A.* I could not tell.

Q. Do you know whether there is one ? *A.* I do not.

Q. Never smelt anything from that ? *A.* I don't think I have.

Q. (*by Mr. Derby*). Were your observations made at low tide ? *A.* All but once.

Q. Was that the Saturday night ? *A.* That was on Saturday night.

Q. (*by a member of the Board*). Do you say that was the night when the smell was the worst, when the tide was coming in ? *A.* That was as bad.

Q. (*by Mr. Derby*). With regard to any change of residence, was it connected with this subject ? *A.* Yes.

Q. Why did you change ? *A.* I told the man I would not live there if he would give me a house.

Q. Have you extended your investigations so far as to go to Mr. Squire's establishment and look into that ? *A.* Yes, sir.

Q. Did you experience any such smell there as on the nights you have mentioned ? *A.* I don't think there was anything that had a resemblance to the smells we got on Main Street.

Q. (*by a member of the Board*). What led you to go there ? *A.* I went out of curiosity.

Q. Your curiosity seems to have been satisfied before ? *A.* Every one around seemed to lay it to Squire, so I thought I would investigate his place.

Q. Have you been there at night ? *A.* It was in the evening I made the visit.

Q. (*by Mr. Derby*). Recollect the state of the tide at that time ? *A.* No, sir, I do not.

Q. Do you know whether on the night you went there there was any smell on the Charlestown side ? *A.* I did n't detect any. I went from my house up Main Street. I did n't catch any smell.

Q. (*by a member of the Board*). When you visited Squire's establishment, did you visit any other ? *A.* No, sir, I never have.

Q. Did n't you suppose there were others there ? *A.* Conversation seemed to centre on this one.

TESTIMONY OF JACOB ABBOTT.

Q. (*by Mr. Derby*). You are one of the City Government of Boston? *A.* Yes, sir, one of the Common Council.

Q. In what part of the city do you reside? *A.* In the west part.

Q. On what street? *A.* I reside on Minot Street.

Q. Near Brighton? *A.* No, it runs from Leverett Street to Lowell.

Q. You are on the western side of Leverett Street? *A.* Yes, sir.

Q. Have you been connected with a wharf which runs down near the foot of Poplar Street? *A.* Yes, sir, I have a wharf there.

Q. (*by a member of the Board*). What is your business? *A.* Wood and coal.

Q. (*by Mr. Derby*). I will inquire of you, sir, whether you recollect the building of that wharf, the filling in of it? *A.* Yes, sir.

Q. As a boy you were familiar with it? *A.* Yes; I was quite young, though.

Q. Was it at that time carried out to deep water? *A.* Yes, the first time it was.

Q. What vessels at first, sir, could come to the wharf? What draught of water? *A.* When Mr. Adams owned it he never used to limit it to depth; twelve or thirteen feet.

Q. How long ago was that, sir? *A.* Well, I should say it was about twenty years ago that Mr. Adams had the wharf.

Q. What vessels can go to it now, sir? It has been extended, carried out still farther? *A.* Yes, sir. I dare n't venture to warrant over nine and a half.

Q. Whether the flats have risen out for any distance beyond the end of the wharf? Whether they come up now, sir, above the water? *A.* When the tide runs out very low, they will appear a hundred feet beyond my wharf.

Q. I will ask you, sir, whether there were any flats beyond the wharf when it was first built? *A.* No, sir, it went to low-water mark.

Q. How far has the original wharf been carried out? *A.* I could not state, sir; a number of feet.

Q. Go, if you please, to the foot of Poplar Street; did the flats rise so as to bury the sewer? *A.* They did, sir.

Q. Were they offensive to the neighborhood? *A.* Very offensive.

Q. Subject of great complaint? *A.* Those who live on Allen, Poplar, and streets in that neighborhood found great fault.

Q. Did it become necessary to change the drain, and was it done? *A.* It was first dug out by the dredging-boats we have for that purpose.

Q. Well, did it continue? *A.* I think in about two years it filled up two feet. They changed it then, and ran it down Livingston Street through Charles Street.

Q. I will ask you whether the smell had become offensive so that people coming on your wharf complained of it? *A.* Yes, very often they wanted to know what it was that smelt so.

Q. You have found this accumulation going on? *A.* Yes, all the time.

Q. Did your observations extend over the distance from Craigie's Bridge to the West Boston Bridge; you are part way between them? *A.* I never have taken much notice above Mr. Warren's wharf; that is at the foot of Allen Street, just at the Hospital.

Q. From Warren's Wharf towards Craigie's Bridge how is it? *A.* It has been increasing all the time. Mr. Warren has not so much water by two or three feet as ten years ago.

Q. Then, sir, the effect of the sewers is to raise the flats? *A.* I ascribe it to the sewers, sir.

Q. They are rising now up above the surface of the water, and are offensive to the smell, and becoming more so. It leaves a deposit there at the mouth of the sewers. It has closed one so they have had to put it into Livingston Street. How is that now, sir? *A.* It was entirely closed this morning.

Q. The mud is up to the top of the sewer? *A.* Yes, so that it bubbles up to get out.

Q. And thus it is a source of unpleasant odors, which come up from it? *A.* Yes, that is what I lay it to.

Q. (*by the Board*). Is this deposit all mud? *A.* Yes.

Q. Is it material from the sewers? *A.* That is what I should judge it came from; it is very soft.

Q. Does the keel of a vessel displace it? *A.* I should think it made a bed six feet high, when a vessel lay there with a load of coal.

Q. (*by Mr. Derby*). Is the bottom hard in that neighborhood? Was it originally? Was the wall built upon a ledge? *A.* There was a ledge some few feet below.

Q. A part of the wharf is laid upon that ledge and hard bottom? *A.* I could not tell, sir. I was too young. I know those on the wharf next to me have bored for the ledge and found it.

Cross-Examination.

Q. (*by Mr. McIntire*). Did you hear Professor Horsford testify that the tides brought in a certain amount of matter? *A.* No, sir.

Q. Have you smelt any smells on Minot Street in the night? *A.* No, sir.

Q. (*by Mr. Derby*). You are below Craigie's Bridge? *A.* Yes, sir.

TESTIMONY OF JOHN H. RAPP.

Q. (*by Mr. Derby*). You have been, and still continue, in the employ of Mr. Squire? *A.* Yes, sir.

Q. Have you undertaken and been sent to make investigations as to the killing of swine in the city of New York? *A.* Yes, sir.

Q. What is your occupation? *A.* I take charge of the bacon department.

Q. You have been in Mr. Squire's employ some time? *A.* About four years.

Q. I will inquire whether in the month of October you were sent to the city of New York to ascertain the localities and the number in which swine are killed? *A.* I went there on a little business for myself, and Mr. Squire suggested that I should look these places over, and see what I could discover as to the amount of business they did. In my travels through the city I perceived a general inclination upon the part of the proprietors of the establishments I visited to have everything kept in the cleanest and neatest possible manner, and this was apparently the chief desire of the Health Board, — if we except the necessity of having appli-

ances attached to their tanks for the purpose of destroying offensive gases or odors that might emanate from the same. In some houses there was nothing but a pipe leading from the top of the tank to the furnace beneath the boiler where the gases were said to be consumed. This was the case with Messrs. Beckstein, Kreiger, Crane, Sager, Spaulding, Cleveland, Marshall, and others, and those gentlemen represented it as answering all requirements. In other houses there was different apparatus, those principally used being Bond's Deodorizer, the Turner apparatus, and Lockwood and Everett's patent. In a number of cases the tanks were blown off either in the river, in large vats of cold water, or in the open air. Messrs. Tobey and Booth, who render about 85,000 pounds of tallow per week, have the Turner apparatus attached to their tallow-tank, but blow off their lard-tanks into the river. Mr. W. McNiel has three tanks, renders about 85,000 pounds of tallow per week, and uses the Turner apparatus. The Butchers' Hide and Melting Association have three tanks, render about 120,000 pounds of tallow per week, and exhaust and condense the steam through the application of river-water, which is showered upon it in its passage through a large close tank, from which it is conducted to a point below low-water level. I will here state that the Secretary of the Association showed me a permit from the Board of Health, in which they ordered them to exhaust and condense as above. Joseph Schwarzchild has two tanks, renders about 60,000 pounds of tallow per week, uses the Lockwood and Everett patent. The section of the city known as the Twentieth Ward has the largest number of slaughtering, rendering, and packing establishments. The area is about 512 acres, and the population 75,407, — *nearly twice that of the city of Cambridge.* In it there are eight slaughterers, who, at the time I visited them, were killing an average of 7,400 hogs per day. They use seventeen tanks, and, with the lard, render about 28,000 pounds of tallow daily. The establishments are quite close together; in fact, do not occupy a space of more than 60,000 square feet. Scattered through this same ward we find ten rendering and cutting houses, using twenty tanks, and handling from 2,000 to 2,500 hogs per day. There are also a number of open kettles, which I did not note particularly. On Miller's River there are three slaughterers, killing about 2,700 and cutting about 1,800 hogs per day, and employing but sixteen tanks and nine open kettles in the rendering process. In the Ninth and Sixteenth Wards of New York we have a population of 95,359 in about 540 acres. There are ten packing-houses, cutting 1,895 hogs per day, and using eighteen tanks. In the Tenth and Seventeenth Wards there are only about 540 acres, with a dense population of 136,778 people. Here we find ten packing-houses, cutting 1,525 hogs, and using fifteen tanks. There are other houses, scattered through the other wards, cutting from 25 to 1,000 hogs per day. With the map there is a key which will give the amount of business done by each firm. Before concluding I would like to mention the fact that there are a great number of beef slaughter-houses which I did not note.

Q. This business you say is carried on in a populous and fashionable part of the city? *A.* Fifth Avenue Hotel is near by. The St. James and Hoffmann Houses are somewhat nearer.

Q. Does Broadway touch the ward? *A.* It runs through it, sir.

Q. A great deal of tallow, beside the swine, is rendered in this ward? *A.* Yes, 120,000 pounds per week, and they do nothing more than Mr. Squire used to do. They condense the steam.

Q. Mr. Squire has given up the tallow in his establishment? *A.* Yes, long ago.

Q. Confines himself to pure lard? *A.* Yes, sir.

Q. These things are carried on in a manner that is satisfactory to the City Board of Health? *A.* I inquired about that, and they said they had not been troubled since they had got rid of the places where the putrid meat was rendered. I have been in one place where they were blowing off a tank, and not fifteen feet from the place were half a dozen women making dresses. They were blowing into the open air.

Q. Do they continue this through the summer? *A.* Yes, they do more business in the summer-time than they are doing now.

Cross-Examination.

Q. (*by Mr. McIntire*). How many feet from the place were the women when they were blowing off steam? *A.* Not more than fifteen feet.

Q. How many of them? *A.* More than half a dozen.

Q. You think they were blowing off the tank in the open air. Was there no smell? *A.* No, sir, I don't think there is any smell from pure fresh lard.

Q. (*by a member of the Board*). Where is the putrid meat and fat rendered in New York? *A.* I don't know. They stopped the New York Rendering Company from using the boat.

Q. (*by Mr. McIntire*). How long have you been in the employ of Mr. Squire? *A.* About four years.

Q. Since that time have you known them to blow off the tanks into the open air? *A.* Yes.

Q. Till when? *A.* Within two years and a half, I think.

Q. Did you never find anything offensive there? *A.* No, sir. I found the air purer there at any time than it is in this room at the present moment.

Q. How when the tanks were blown off? *A.* Nothing very offensive.

Q. Did you detect any scent at all? *A.* There is that steam scent.

Q. Within two years and a half have not they occasionally blown off in the open air? *A.* I don't know that they have.

Q. You would not swear that they had not? *A.* No, sir, I have kept no date.

Q. Since this apparatus has been connected with the close tanks, have you known them to blow off into the open air? *A.* No.

Dr. Derby. On the day of the last hearing, something having come up in the testimony of one witness with regard to the custom of slaughtering during the summer in the city of New York, and slaughtering at night, I telegraphed to the Superintendent of Health, asking what was the custom, and under what restrictions the slaughtering was carried on. His answer is as follows: —

"The slaughtering of swine is conducted by the river-side during the summer, at night, under the surveillance of the sanitary inspector."

This morning I received the following letter: —

BUREAU OF SANITARY INSPECTION, HEALTH DEPARTMENT,
No. 301 MOTT STREET, NEW YORK, Dec. 10, 1873.

DR. GEORGE DERBY: Dear Doctor, — In addition to my telegram of yesterday, I would say that the slaughtering of swine in this city is con-

fined to limits bounded by 39th and 41st Streets, and adjoining the North River. This section forms a part of what is known as the "nuisance district," a name perhaps more expressive than classical. During the summer months a special inspector is patrolling this district day and night, calling frequently at the slaughtering and rendering houses, and other places where animal matter is utilized. The slaughtering of swine during the warm weather is commenced early in the evening, and continued for two or three hours, according to the market. The animals are landed so near the places of slaughtering, that there is no necessity of driving through the streets. We are indulging the hope that before long we shall have the entire business of slaughtering and the allied occupations reduced to something like your own excellent system.

Very truly, E. H. JANES.

Adjourned.

LETTER FROM THE SUPERINTENDENT OF ST. LUKE'S HOSPITAL IN NEW YORK.

Mr. McIntire. I desire to read and file in the case the following letter from Dr. Barnard, the Superintendent of St. Luke's Hospital in New York, to Mr. A. W. Hastings, which he received yesterday. Dr. Barnard says: —

"DEAR SIR, — In reply to yours, I beg to inform you that St. Luke's Hospital is situated on Fifth Avenue, and not on Tenth Avenue, as you supposed. Yet, notwithstanding its central location, the inmates have often been disgusted by the terrible scents arising from the fetid rendering establishments upon the North River. Since they have been abolished, we have not been troubled."

NINTH DAY.

Monday, December 15, 1873.

TESTIMONY OF JOHN H. RAPP (RECALLED).

Q. (*by Mr. Derby*). You testified on the day of the last session? *A.* Yes, sir.

Q. I will inquire whether you have since been to New York? *A.* Yes, sir.

Q. Did you see Dr. Barnard, the assistant superintendent at St. Luke's Hospital? *A.* Yes, sir.

Q. Did you ascertain from him anything in regard to these offensive smells, and if so tell us what it is. *A.* I went to Dr. Muhlenburg first, and he referred me to Dr. Barnard, the assistant superintendent. He told me he judged the smells came from the other side of the establishment (St. Luke's Hospital). He also informed me that they had a bone-boiling establishment on the other side. He also told me he had smelt the rendering from putrid matter ten miles up the river.

Q. What kind of putrid matter? *A.* Dead horses and rendering-grease.

Q. Did you go to the establishments at 40th Street, where the rendering is done? *A.* It is done away with there, now.

Q. What is done with it? *A.* They sent them down to the island, ten miles away.

Q. Well, sir, has the smell been relieved by stopping that establishment? *A.* I made special inquiry, and they said no smell was there since they had been done away with.

The Chairman. They told you they had n't smelt anything at all? *A.* They could n't say when this boat had stopped trying, but they had smelt them for a long time.

Q. (*by Mr. Derby*). They did not say they had not smelt them, but that they had not for a long time experienced them? *A.* Yes, sir.

Q. And you ascertained that this establishment had been broken up? *A.* Yes, sir.

The Chairman. Do I understand that Dr. Barnard of St. Luke's Hospital said that he had n't smelt these smells for a long while? *A.* Yes, sir.

Q. How long? *A.* He said he had n't smelt them since summer.

Q. (*by Mr. Derby*). There is none of that grease-rendering done in the city now? *A.* None that I could find out.

Q. Did you ascertain in regard to the killing in summer and winter? *A.* Yes, sir, they kill summer and winter.

Q. You have been there during the summer and winter, and know that fact? *A.* Yes, sir, I have been there early on Sunday afternoon.

Q. How early in the afternoon? *A.* Between three and four o'clock.

Q. How late do they kill? *A.* That is according to the demand in the market.

Q. Do they kill into the night? *A.* If the demand requires it they kill along to twelve o'clock.

Q. I would inquire whether the rendering establishments for rendering fat are scattered about in New York in different wards in various parts of the city? *A.* Yes, sir.

The Chairman. That is admitted by all hands.

Mr. Derby. One of the witnesses stated that they were mostly in the Twentieth Ward.

The Chairman. That was explained the other day, and it is unnecessary to pursue it further.

Mr. Derby. That is all right. I won't go over it again.

Q. (*by Mr. Derby*). What is the extent of the business in New York? *A.* I found that from the 1st of May to the 30th of September, in the Twentieth Ward, they killed 444,300 hogs, and I also found out that the New York Rendering Company during the epizoötic disease rendered 2,100 dead horses.

Q. Did you ascertain any other facts, sir? *A.* I ascertained that they had twelve tanks on this rendering-boat, and when they were in operation 160,000 pounds of material were used up on the boat daily.

Q. I will ask you again if there is any fact within your knowledge? *A.* Not that I am aware of.

Q. I would inquire whether the fertilizers are manufactured in New York at these establishments? *A.* Not that I am aware of.

Q. (*by a member of the Board*). What is done with the offal? *A.* It is teamed away, given to a party to make fertilizers of.

Q. Is it teamed, or carried on the river? *A.* It is teamed.

Cross-examined.

Q. (*by Mr. McIntire*). When did you go to New York? *A.* Friday night.

Q. And you saw Mr. Barnard? *A.* Yes, sir.

Q. And he says he is not troubled with these bad smells? *A.* That is what he told me.

Q. Don't you know that this rendering-boat has not run for five months? *A.* I know that it has run within five months.

Q. That is a positive statement, is it? *A.* I know that they run it over to the Jersey shore, and they stopped it there.

Q. How long since they ceased rendering on the Jersey shore? *A.* I don't know.

Q. And they got the smell from Jersey? *A.* Yes, sir.

Q. And you know that they have rendered within five months? *A.* I know what they say.

Q. Did you go to Tobey & Booth's? *A.* I did.

Q. Did you find them killing? *A.* They don't kill on Saturdays.

Q. Was everything sweet round there? *A.* Everything was as sweet as a nut.

Q. Were there any hogs round there? *A.* They don't kill on Saturdays.

Q. What time were you there? *A.* I was there from nine to ten o'clock in the morning.

Q. Did you go to Crane's? *A.* They were doing nothing there or at Wood's place. At Tobey's they were engaged in filling tanks with tallow.

Q. Did you go to Davis & Strand's? *A.* No, sir.

Q. Or to McNeil's? *A.* No, sir.

Q. Your principal object in going to New York, then, was to ascertain the number of hogs slaughtered there, and to see Mr. Barnard? *A.* No, sir; I went to see him while there.

Q. Where these places are is surrounded by business places rather than dwellings? *A.* Not altogether; there are some dwellings on Tenth Avenue.

Q. That is after you get away some distance? *A.* No, sir.

Q. Is the space around there within three or four blocks, filled with business places, and very thickly settled? *A.* Yes, sir. The dwelling-houses begin at Eleventh Avenue, probably about seven hundred feet from the slaughter-houses.

Q. What class of dwellings are they? *A.* Mostly poor people.

Q. Within three blocks it is almost exclusively business-places? *A.* There are very few business-places around those slaughter-houses.

Q. Did you see any member of the Board of Health while you were there? *A.* I did not.

Q. Did you make any attempt to? *A.* I did not.

Q. Did you go to any other place besides those you have mentioned? *A.* I went to Charles White's, in Fortieth Street.

Q. What kind of a place is that? *A.* A slaughtering establishment for hogs.

Q. None of these places were running? *A.* They were not running Saturday morning.

The Chairman. Do I understand that none of these establishments were running Saturday morning? *A.* None of them were running. They very seldom kill on Saturdays. They kill on Sundays for Monday's trade.

Q. (*by Mr. Derby*). How large an area is occupied by these establishments? *A.* About an acre and a half.

Q. For all these establishments? *A.* Yes, sir.

Q. Does their land extend farther than that? *A.* There are hog-yards there, but that is the property of another company.

Q. So, altogether, you speak of only thirty acres devoted to this purpose? *A.* That is all, sir.

Q. Are there not some inns or hotels close to this place, where people put up at? *A.* There is the Allerton House.

Q. That is close by? *A.* Right next to them.

Q. And beyond that, one or two blocks off, commence the houses? *A.* Yes, sir.

Q. Inferior houses first, and superior houses a little way off? *A.* Yes, sir.

Q. (*by a member of the Board*). Was the rendering continued on the Jersey shore, or entirely abandoned? *A.* It is now abandoned. They broke their contract with the Board of Health somehow or other; and they used to come with the boat and get the dead horse, carry it off, and render it beyond the jurisdiction of the Board of Health.

Q. (*by Mr. McIntire*). This boat is the old *Oceanus*, that used to run to Providence, is n't it? *A.* It looks like one of those boats.

Q. They come down to the foot of Fortieth Street, and take away their stuff? *A.* They don't come there now. Other parties have contracted to take it away.

The Chairman. It seems to me this is entirely irrelevant; but I want to ask this one question, What is that matter carried down thirty miles? and why was it ordered carried away? *A.* It is dead hogs, goats, horses, and dogs, and was ordered carried away because it was a nuisance.

Q. (*by Mr. Derby*). Was it the general grease of the city? *A.* Yes, sir.

Q. (*by a member of the Board*). It is the offal of the city taken down there by team? *A.* Yes, sir.

Q. (*by Mr. Derby*). As to the difference between the smell of rendering grease and the smell of the fat, how distinct is the smell? Is it marked or not? *A.* I should say it was considerably so.

Q. As to how much difference, whether you can distinguish the smell at a distance? *A.* One of the physicians told me at St. Luke's Hospital that he could smell it at a distance of ten miles up the river.

Testimony of Michael B. Crowe.

Q. (*by Mr. Derby*). Have you been employed at the establishment of John P. Squire & Co.? *A.* Yes, sir.

Q. In what capacity, sir? *A.* Foreman of the lard and sausage department.

Q. Have you charge of the engine, or does not that extend to you?

A. It does not come under me. I only have the chopping of meat for sausages.

Q. I will ask you if your duties keep you in the factory during the night? *A.* They do not generally; but I am there very often till nine or ten o'clock.

Q. Will you state to the Board whether any offensive smells go out of the building? *A.* There are not, sir; nothing more than the lard smell.

Q. The common rendering of the lard? *A.* Yes, sir.

Q. Do you know of anything being let off from the building day or night? How late are you there, sir? *A.* I am there from seven in the morning till six in the evening; then I come back, and stay till ten or eleven o'clock.

Q. Is there any discharge of gases from that establishment which would disturb the people of the place? *A.* I don't think there is.

The Chairman. That is his opinion.

Q. (*by Mr. Derby*). This is your knowledge? *A.* Yes, sir.

Q. Is there any other fact you wish to state? *A.* Nothing more than the way in which we run the gases off.

[Witness explained the working of Turner's Tank-gas Consumer from a drawing on a blackboard, represented by the cut on page 329.]

Witness. This (1) is the rendering-tank. The gas passes from this tank to the condenser (2), where there is a coil of 11,000 feet of pipe, surrounded by water. The gas and water pass through the coil into gas receiver (3), and thence to the lime cask (4), thence to the gasoline tank (5), and thence out through a pipe at the top into the furnace (6), where it is consumed. The water passes from the gas receiver (3) through a pipe at the bottom out into the channel.

Cross-Examination.

Q. (*by Mr. McIntire*). That is the tank up at the farther end there? *A.* This is a close tank (1) into which we run the lard. When we put the lard in there, we run it about an hour before the gas is ready to be let off. Then we run the gas through a condenser (2), — eleven hundred feet of pipe, — surrounded by cold water. In passing through, it condenses; so that when it comes through here, it is water and gas. The gas passes through into a trap (3), and out at the top, passing through up into a lime cask (4). Inside the lime cask are five shelves, which are perforated with holes a quarter of an inch in diameter, through which the gas passes; and the gas passes from this cask (4) into the gasoline tank (5), and then passes through the gasoline, passing up through a perforated grate and through into the fire, directly over the blazing coals.

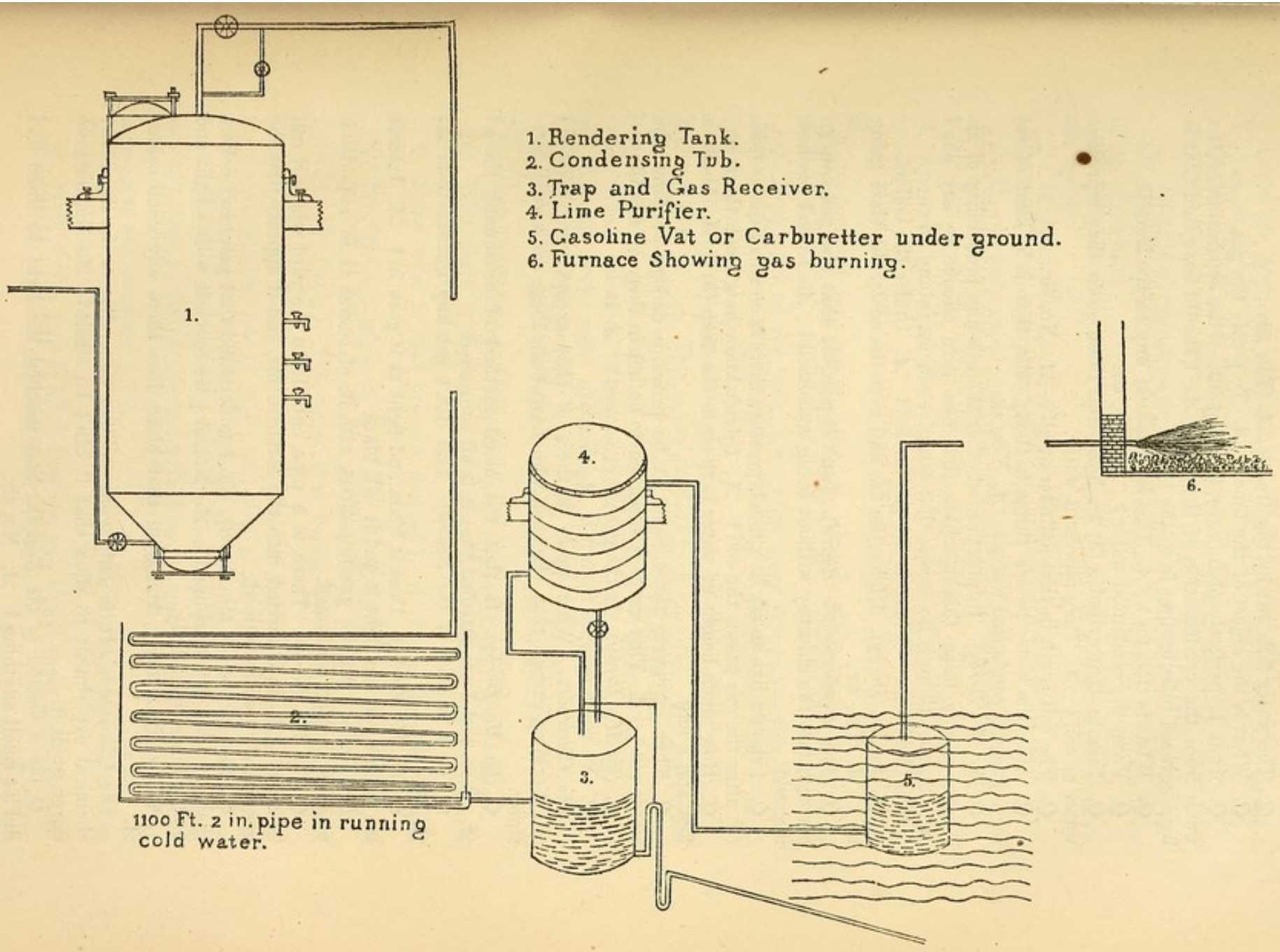
Q. (*by Mr. Derby*). Is there any escape from that? *A.* No, sir.

Q. Is it conducted carefully, and without waste or escape whatever? *A.* It is; without any waste whatever.

Q. Do you know the cost of this machinery? *A.* I do not. I have heard it cost over $ 10,000.

Mr. Derby. I learn from Mr. Squire that the cost was $ 2,000.

Q. (*by a member of the Board*). I would ask just how the water produced from the condensation of steam is carried off? *A.* Through this pipe from the bottom of the trap (3). The gas works off through an opening in the top, to pass into the lime cask.



1. Rendering Tank.
2. Condensing Tub.
3. Trap and Gas Receiver.
4. Lime Purifier.
5. Gasoline Vat or Carburetter under ground.
6. Furnace Showing gas burning.

Q. The water falls out by the trap? *A.* Yes, sir.

Q. What is the object of the lime? *A.* To purify the gas.

Q. That is perfectly plain except one point, — the separation of the water from the condensation of the gas? *A.* I should have said that is by a covered tube leading from the trap.

Q. What is that for? *A.* This is in case of any escape from it.

Q. From the condensed water? *A.* Yes, sir.

Q. Now in that cylinder (3) are horizontal lines, — do they represent water or coil? *A.* They represent water.

Q. The coil is not in that cylinder at all? *A.* No, sir.

Q. After the water passes through those coils, that is a kind of reserve gas and condensed water? *A.* Yes, sir.

Q. (*by Mr. Derby*). In practice, whether there is any probability of an escape of gas from this machine that can give offence to any one? *A.* No, sir; there is no escape that can give offence to any one.

The Chairman. Where is the gas carried? *A.* Under the boilers.

Q. (*by Mr. Derby*). Under the fire and over the coals, the blaze going up? *A.* Yes, sir.

Q. (*by a member of the Board*). Is n't it possible that the gas can go through into the chimney without being consumed? *A.* I don't see how it could.

Q. I should like to ask how much pressure there is on this circular tank (3) after the gas passes the coil? *A.* I don't know how much there is.

Q. How much height of water is there in the trap (3)? *A.* About a foot and a half.

Q. Then of course there could n't be pressure enough to force the water out? *A.* This water is supposed to be left in there all the time.

Q. (*by Mr. Derby*). Is the gas all consumed? *A.* It is.

Q. No smell escapes from it? *A.* No, sir.

The Chairman. What proof is there of that except your opinion? *A.* Nothing, except that the men who have been there can't smell anything.

Q. (*by Mr. Derby*). Is that the usual method of consuming them? *A.* It is, and I am satisfied that it is all consumed.

Q. (*by a member of the Board*). You don't get any offence from it? *A.* No, sir.

Q. (*by Mr. Derby*). Does it blaze and light as it goes in? *A.* I can't see it, but you can light it and it will blaze.

Dr. Derby. As the gasoline mixes with it, of course it is a question whether it is all consumed.

Q. (*by Mr. Derby*). There is a pipe outside in the yard where it can be seen? *A.* It is carried into the boiler-rooms, and it appears that the gas has all been consumed.

Q. (*by a member of the Board*). Do I understand that you can't collect that gas after it is consumed? *A.* No, sir; we touch it with a light and find it burns splendidly.

Q. (*by Mr. Derby*). And from that blaze does there any smell come? *A.* No, sir.

The Chairman. It is only your opinion generally, or is there any chemical experiment to show that it can't be smelt? *A.* No, sir; we never smelt it.

Q. (*by a member of the Board*). You touched the light to them and did n't smell anything? *A.* No, sir.

Q. (*by Mr. McIntire*). Did you ever smell this when it was n't burning ? *A.* Yes, sir.

Q. How did it smell then ? *A.* It smells pretty hard.

Q. Pretty rough, as it is described, is n't it ? *A.* Yes, sir.

Q. There is no burner on top of the pipe, near the boiler ? *A.* Yes, sir.

Q. Did you ever know that to be uncocked by mistake ? *A.* I know it has never been.

Q. It is so arranged that you let it off ? *A.* It is so arranged that we can try it.

Q. Do you know that these gases will burn from gasoline ? *A.* I never tried them. I understand that they will.

Q. Do you understand that they will burn by touching a light to them ? *A.* I understand that they will.

Q. Do you know how much gasoline there is in that tank there ? *A.* About half a barrel in the tank, — it would not make any difference as to a few gallons.

Q. How do you know when that is exhausted ? *A.* We try it every day.

Q. How long does it take to use it all up ? *A.* It sometimes takes three or four weeks.

Q. How much of the tank is not filled when you put in this half-barrel ? *A.* This tank holds about two barrels. We put about half a barrel into it, — sometimes a little more.

Q. Now tell us whether the gas passes through the gasoline or whether it passes over it. *A.* This is the gasoline tank here (5). The gas passes into the bottom of the gasoline tank. A perforated grate near the bottom lets the gas go up through it. We fill the tank (5) about a third full.

Q. What prevents that gasoline from coming up into the pipe ? *A.* The gas works right up through.

Q. Where is the gasoline tank ? *A.* At the bottom.

Q. Does the gasoline come into the pipe partially ? *A.* It could ; yes, sir.

Q. What is to prevent it from coming in there ? *A.* The pressure.

Q. Well, there is to be a certain amount of pressure in order to mix this gas with the gasoline ? *A.* Yes, sir.

Q. From what is that pressure derived ? *A.* From the force of the steam.

Q. But that is condensed, is n't it ? *A.* It is.

Q. The water is to be warm ? *A.* Yes, sir.

Q. (*by Mr. Derby*). The water that comes from the tank is warm ? *A.* Yes, sir.

Q. (*by Mr. McIntire*). But it is supposed to cool when it passes through the eleven hundred feet of pipe ; and now, if the water is condensed how do you get pressure to drive it through the gasoline tank ? It passes, as I understand it, through the coil into the trap, then it rises and passes through these to shelves covered with lime, — now, how do you get your pressure in order to drive it through the shelves ? *A.* I don't know that it requires any pressure.

Q. Well, does n't it fill the pipe ? *A.* We fill this pipe back here which has gasoline in it.

Q. Well, if that pipe is filled, how are you to get these gases through it ? *A.* This pressure would drive it through.

Q. I don't understand that there is any pressure to it. Is there a pressure? *A.* There is a pressure; it must be when they are blowing off steam.

Q. When those gases are passing off there, do you mean to say that there is pressure there? *A.* Yes, sir, I know there is; I have tried it.

Q. Well, now, what would be the result if you let those gases run off in the furnace when you put fresh coal on? *A.* If you light that gas it would burn right along. It burns itself.

Q. Now, what is the object of putting it over the coals? *A.* In case the gas would work off altogether there would be nothing to start it.

Q. I want to know whether, or why that is run under the boiler, if it will burn independently of itself when it is run over the fire? *A.* The reason is, that it will start right there; you don't have to be there.

Q. There are some places in the establishment where gas has to be burned all night? *A.* Yes, sir.

Q. Why is n't this gas used to illuminate those portions of the establishment if it will burn so well? *A.* They have not attempted it.

Q. Is there any place where it can be used as illuminating gas?

Mr. Derby. Suppose they were not rendering, it would go out then.

Q. (*by Mr. McIntire*). Would not this gasoline burn independently and of itself without the admixture of these gases? *A.* No, sir, it would not.

Q. It requires an admixture of other gases to make it burn? *A.* Yes, sir. I have tried it and I am sure of it.

Mr. Derby. There would be no gas coming out of the gasoline unless some pressure was upon it.

Q. (*by Mr. McIntire*). Well, what is the outlet, compared with the inlet, where it runs in and where it runs out? how do the apertures compare inside? *A.* They are the same size and about the same height.

Q. Not the height, but the size? *A.* The hole is two inches and a half in diameter.

Q. And the water keeps filling up to that neck? *A.* Yes, sir.

Q. How full will that trap get with water? *A.* About one third full.

Q. Does it never get any higher? *A.* No, sir.

Q. How do you know that? *A.* I know it will run off.

Q. Is n't there such a thing as when it gets so full the water will run off? *A.* No, sir.

Q. You never knew of that to happen? *A.* No, sir.

Q. Well, now, how long has it been since that trap was put in? *A.* That trap was put in last week.

Q. What kind of a trap did you have before last week? *A.* We had a trap about four inches in diameter.

Q. What is the size of that one? *A.* About three feet and a half high by two and a half in diameter.

Q. What did you have there before a week ago? *A.* We had a trap something similar to it.

Q. You did n't have any receiver before? *A.* No, sir.

Q. Did you have any receiver at all before that was put in? *A.* Yes, sir; we had a trap similar to that, about four and a half inches in diameter, and about two and a half feet high.

Q. Do you think that that took care of all the gases? *A.* I think it did.

Q. Well, from your own knowledge do you think that that receiver

that was there before this took care of all the gases and passed them off without trouble? *A.* Yes, sir.

The Chairman. How large is this present one? *A.* It is three and a half feet high and two and a half feet in diameter; the other one was four and a half inches in diameter and two feet high.

Q. (*by Mr. McIntire*). Was the other one made similar to this? *A.* It was made just like this, only smaller.

Q. How large was this pipe then? *A.* It was two feet then, and now it is three and a half feet.

Q. Is there any connection between this pipe and the old one? *A.* This came up so it could go right out into the air; the water had to go right from the top of this (3), — right there. It came from the top of the trap, right to the end of the tank.

Q. Where did it run into? *A.* It ran out into the air. We had it so we could try it.

Q. Is there any place where you can try it? *A.* No, sir.

Q. What was the object of putting it there? *A.* Parties would go and look at it and see it.

Q. Have you had charge of this from the beginning? *A.* Yes, sir.

Q. Did you ever try the experiment whether you could, by putting on pressure, blow off the gases through this tank so rapidly that they would not become condensed and would come down in the form of steam? *A.* No, sir; so long as you keep the water cold.

Q. Did you ever know of steam coming out from the farther end there instead of gas? *A.* Never knew of it.

Q. Do you think it is possible to have it done if you let it all on fast? Can't it be done in that machine? *A.* I don't think it could, sir, by keeping the water cold.

Q. But is it not a fact that if it goes through too rapidly, the water warms in there? *A.* We never blow it off in that way.

Q. How do you blow it off? Tell me that. *A.* We open that cock a little at a time.

Q. Well, then, when you run the machine you don't let that on in full force? *A.* Yes, sir.

Q. You have to open it gradually, just turn it a little? *A.* Yes, sir.

Q. Now can you tell us what the result would be if that was let right on in full strength? *A.* The result would be it would condense it just the same. It would blow it right through.

Q. Then you say if it was open to its full extent, the same result would happen as now? *A.* Yes, sir.

Q. How long does it take to blow off the tank? *A.* About an hour. When we blow it off we open it wide open.

Q. You do occasionally open the tank? *A.* Yes, sir, when we blow off in the morning.

Q. (*by Mr. Derby*). What time in the morning? *A.* From six to eleven o'clock.

Q. (*by Mr. McIntire*). Do those gases burn when you blow them off? *A.* Yes, sir.

Q. And you think there is no different result when you blow off as usual, and permit it to blow off with full force? *A.* Yes, sir.

Q. Who was the fireman on the night of the 31st of July? *A.* A man named Jordan had charge of it.

Q. Who is the engineer? *A.* His name is Richings.

Q. Where is he now?

Mr. Derby. At your service; you can have him if you wish it.

Q. (*by Mr. McIntire*). Was there any fireman there that evening? *A.* No, sir; not that evening.

Q. Is there any other fireman who has had charge of this apparatus who is not now employed in the works? *A.* Not that I know of.

Q. Can't you think? Would n't you know if it was so? You have charge of the apparatus, would n't you know whether there is any one not employed there now? Has n't there been some one there that there was some difficulty between him and Mr. Squire, and he has since left? *A.* Not that I know of.

Q. You would know of it if it had happened? *A.* Yes, sir.

Q. Was not there a man whom they thought burnt up too much coal? *A.* I don't know.

Q. And you say Richings had charge of it that night? *A.* Yes, sir; I think he had.

Q. When the committee were there how was that gas let off, partially or to its full extent? *A.* All that night we did not have steam enough, and we opened it clear open. We did not have steam enough to force it through.

Q. Then your idea of this apparatus is that there must be a continual pressure from the tank to the fire in order to force the gases through? Do you say that there must be a continual pressure from the tank to the apertures where the gas is consumed, in order to burn the gas or send it through? *A.* The expansion of the gas would drive it through.

Q. When cold? *A.* Yes, sir.

Q. When the gas itself is cold it will force its way through? *A.* Yes, sir.

Q. On the night of the 31st where did that refuse pipe lead to, where the water runs off? *A.* Under the slaughter-house.

Q. And then discharged on the flats? *A.* Yes, sir.

Q. Did you notice any scent that night, or could n't you tell? *A.* The scent that night was from under the tanks. It was opened every few minutes to see if the gas went through.

Q. Now, is n't there some danger of this water drawing off the gases down there, having the gas run down upon the river and upon the flats? *A.* No, sir.

Q. Is n't there danger of the siphon drawing off the water so rapidly that it would draw the gases with it? *A.* No, sir.

Q. You never knew that to happen? *A.* No, sir.

Q. Before that receiver was put in, and the smaller one was there, was there any danger from such gas? *A.* No, sir, I don't think there was.

Q. Don't think then that the water would draw off the gas? *A.* Yes, sir.

Q. And you don't know why this large receiver was put in? *A.* Merely because they would have more body of gas. It was an improvement on the other one.

Q. On that night of the 31st of July you say you let on the steam in full force? *A.* Yes, sir.

Q. How long was it before it was closed on that evening? When was the cock closed, if you remember? *A.* That evening we were running

one of those tanks. Mr. Turner spoke to me to hold back the gas until the gentlemen of the Board came there. I was running off gas at the time, and come to hold it back it threw the steam into those two. Therefore we did n't have any gas there.

Q. I asked you how long that cock was turned on that night so as to let the gas through? *A.* We left it on till we got steam enough to run it.

Q. After that what did you do? *A.* We closed it partially.

Q. How long was it open partially that night? It was open all night.

Q. Was n't the burner put out before the committee left? *A.* No, sir.

Q. It was burning there when they left? *A.* Yes, sir, it was burning all night as long as there was any gas.

Q. Have n't you known the water to get hot about this coil? *A.* It got hot that night when they were there. That was on account of the tide being low. Since that we use Fresh Pond water.

Q. Have you ever known it to get hot since then? *A.* Yes, sir.

Q. How many times? *A.* Twice.

Q. What is the effect when the water does get hot? *A.* It don't condense as well when it is hot.

Q. Well, what is the effect on the fire when the water is hot, — what is the effect at the opening of the pipe under the fire? *A.* It blows through the steam.

Q. Then you have seen the steam blow through? *A.* No, sir; I should judge that it was so.

Q. Well, the twice that it did get hot, what was the effect? *A.* We shut it off.

Q. How do you know that the water is hot? *A.* Simply by testing it.

Q. And you did n't discover any change by the working of the apparatus, — that the water was hot? *A.* No, sir.

Q. I ask you again what is the effect over the fire at the end of the pipe when the water in this tank is hot? Of course, the water is condensed in the steam-pipe; what is the effect over the pipe? *A.* It does n't burn so much gas.

Q. Does it burn at all? *A.* Yes, sir.

Q. Don't you know that the water is hot by this flame going out? Ain't your attention drawn to it by the fact of the flame's going out? Ain't that a fact? *A.* No, sir. I look after that myself and have a man to look after it.

Q. Did you ever know of the flame going out at the end? *A.* No, sir.

Q. On the night of the 31st of July it did n't burn at all? *A.* I was only running this tank. I was told to save three tanks against when they came. That was the reason that we did n't get any flame.

Q. What time was that? *A.* About half past eight o'clock.

Q. At that time you were not making any gas? *A.* We were making only one.

Q. Well then, there was no flame at that time? *A.* No, sir.

Q. Have n't you known that thing to occur since then? *A.* No, sir. It will occur when we don't have steam enough on the tanks. The way it occurred that night was, it drew steam from the tank and drew them back into the other tanks.

Q. Now don't you know that when that water becomes hot the steam does n't condense? *A.* I know it can't condense.

Q. Yet, with the pressure that you have in the tank, driving it

through this tank, won't it drive the steam right through this apparatus? *A.* No, sir.

Q. The steam would pass right off through this pipe rather than through this pipe? *A.* Of course, if we get pressure enough it would pass right through.

Q. Did you ever know of this getting clogged there? *A.* No, sir.

Q. Did you ever know of any clogging of this pipe here? *A.* No, sir.

The Chairman. Do you ever notice the fire with reference to that establishment? Is the fire ever influenced by that establishment, — that apparatus? Is the fire ever diminished or increased or altered in the least by the influence of that apparatus? *A.* O yes, sir.

Q. How often do you see it influenced? *A.* When we are running.

Q. You notice it, do you. *A.* Yes, sir.

Q. Is it ever diminished under the influence of that apparatus? *A.* Well, we have it so —

Q. But we want you to answer the question directly, — is the fire ever diminished. *A.* No, sir.

Q. Is it ever increased? *A.* Yes, sir.

Q. How is it increased? *A.* By its burning.

Q. Is the heat more powerful? *A.* Yes, sir. When it is burning it is increased.

Q. (*by Mr. McIntire*). Do you make any difference in the quantity of fuel burned now from that which you burned before this apparatus was put in? Is there any more fuel burned in the boilers than before? *A.* It burns about the same, of course.

Q. But I am speaking of the quantity of fuel. *A.* I don't know of any difference in fuel.

Q. You say this tank is filled with air? *A.* Yes, sir.

Q. Where does it come in? *A.* Right there.

Q. Where does it run off? *A.* It flushes out there.

Q. Is that water kept running, or do you simply fill up the tank and keep watch over it? *A.* It is kept running.

Q. (*by a member of the Board*). You think this gas would burn if not mingled with the gasoline? *A.* I think it would.

Q. You never tried it yourself? *A.* No, sir. Mr. Turner said it would.

Q. Do you observe any difference in the brilliancy of the flame from the apparatus at different times? *A.* No, sir.

Q. You observe no difference? *A.* No, sir.

Q. You have stated that you have observed no difference; you have also stated that the condensing apparatus has been hot several times, — does it make any difference? You said that the condensing apparatus is of no use? *A.* O no. As a general thing that water in there is kept cold.

Q. But if it is n't kept cold, that does n't make any difference? *A.* If the water gets hot it don't condense it.

Q. What effect does it have under the boiler if the water gets hot? *A.* We get gas.

Q. There is no steam there at all? *A.* No, sir.

Q. Then this condensing apparatus is of no use? *A.* I don't mean to say that.

Mr. McIntire. I understood him that its effect would be to blow it off out into the water.

Q. (*by a member of the Board*). If the gas does n't blow off, where

does it go? *A.* It goes out through the water if the condensing apparatus is cool enough.

Q. (*by Mr. McIntire*). I have been requested to ask you whether there was any such receiver there on the night of the 31st of July. *A.* There was.

Q. You are sure of that? *A.* I am.

Q. In the little apparatus there was a receiver of that kind, with a simple siphon? *A.* Yes, sir.

Q. That is, take that tank right out and that gas passes right off; do you know of any other machine like that? *A.* No, sir; that is the only machine of that kind that I have seen.

Q. (*by a member of the Board*). The pipe which I see leading from the receiver for the condensed water to throw off, — where is that discharged? *A.* That goes into the tide.

Q. I want to know the point at which it is discharged. *A.* It runs into the channel.

Q. Has it run into the channel from the beginning? *A.* No, sir; we ran it for a month or six weeks under the slaughter-house.

Q. How was it on the 31st? *A.* It was run under the slaughter-houses.

Q. Well, if it was discharged upon the flats at low water or high tide, on the 31st of July? *A.* When those gentlemen were there the tide was out. It was discharged upon the flats.

Q. Have you ever perceived a disagreeable smell from that condensed water on the flats? *A.* I never have.

Q. Never at any time received any disagreeable odor from that condensed water. *A.* No, sir.

Q. (*by another member of the Board*). This tank (1) contains what kind of material? Is the rendering material in this tank fresh lard? *A.* Yes, sir.

Q. Suppose you should open this gas-pipe after it has passed through the condenser, would it be a bad smell? *A.* Yes, sir.

Q. Even if the lard were fresh? *A.* Yes, sir.

Q. (*by Mr. Derby*). Is it leaf-lard or trimmings? *A.* Trimmings.

Q. Leaf-lard is rendered in open kettles? *A.* Yes, sir.

Q. (*by a member of the Board*). After the gas becomes cool then it becomes offensive? *A.* Yes, sir. When it is hot, blowing right into the room, I have known men, working right there in the room, say it was not offensive.

Testimony of William G. Carson.

Q. (*by Mr. Derby*). You are employed at Mr. Squire's? *A.* Yes, sir. I am acting superintendent.

Q. Now, tell me what are your duties? *A.* I have general charge of the works.

Q. What hours are you on duty? *A.* From seven in the morning till late in the evening.

Q. How late at night? *A.* The time varies from six to nine o'clock.

Q. By nine o'clock, then, your duties are discharged? *A.* Generally they are; but sometimes I am there later.

Q. Through the night, sometimes? *A.* Not during the night, sir; but at times I have had occasion to be there as late as midnight.

Q. Have you had any charge of this machine? *A.* I think I am familiar with it.

Q. Have you seen that machine before? *A.* I have seen a machine on this same principle as late as five years ago.

Q. You saw this machine at the time it was started? *A.* I saw it within three months. Since the first of September, I have seen it daily.

Q. Will you please state how it operates and how any deleterious odor can escape from it? *A.* I will say, first, that that square tank (2) is filled with a running stream of cold water. That is the preparatory arrangement.

The Chairman. Do I understand that it gets hot sometimes?

Mr. Derby. Mr. Carson will explain whether it gets hot.

Witness. That tank contains eleven hundred feet of pipe surrounded by cold water, constantly renewed during the operation of condensing.

The Chairman. Does it become hot, or keep cool? *A.* It cannot be kept hot when constantly renewed by cold water.

Q. (*by Mr. Derby*). Did you make this drawing yourself? *A.* Yes, sir. The drawing on the left represents the rendering-tank. The outlet of the pipe at the top carries off the waste steam in the latter part of the operation; but in the earlier part of the operation it carries it off in connection with the gas which rises during the primary part of the operation of steaming lard. That is how, when the gas passes off during the latter part, there is very little gas left. As it passes through the eleven hundred feet of pipe, the steam becomes condensed into water, passes down into this receiver (3), which is essentially a trap, a modification or change from the former trap which was there when this apparatus was put in this past week.

Q. (*by Mr. McIntire*). You know only from what you learn? *A.* Yes, sir.

Mr. McIntire. That is n't testimony.

Witness. I have direct information that it was put there from the man who did it. This receiver or trap receives water in the condensed form, and allows the discharge of the gas into the lime purifier (4), from which the gas passes into the gasoline tank (5), by which the gas becomes further charged with gasoline, and the gas from there passes over the fire and is consumed (6). The water which is condensed passes through this double trap, the seption of which is relieved by this small pipe and passes it into the channel.

Q. (*by Mr. Derby*). You found it running in September? *A.* I did.

Q. You found the water running into the condenser in a steady stream? *A.* I did.

Q. You never knew the water to get hot? *A.* I never have. And I think the other witness did n't intend to convey the idea that the water would become hot, — only slightly warm.

Q. Can you tell us whether, from September down to the present time, there have been any offensive gases escape therefrom? *A.* No, sir.

Q. The pipes run into the channel and the flame under the furnace (6). I understand that goes under the furnace in connection with the blaze? *A.* There is very little blaze from the hard coal. The gas constitutes the principal blaze. It goes out just as it is represented in the drawing.

Q. Is that blaze large? *A.* It is very plain, a very large blaze.

Q. Have you known any gas not being consumed? *A.* I have n't any doubt that the apparatus works thoroughly.

Q. (*by a member of the Board*). Where does that water come from that

supplies the condenser? *A.* The water that supplies this large tank (2) is Fresh Pond water.

Mr. McIntire. The water that supplies the city is Fresh Pond water.

Q. (*by a member of the Board*). Where does it enter? *A.* Through a pipe at the top which is not shown on the drawing.

Q. And it is constantly running? *A.* Except when the condensation is not going on.

Q. (*by Mr. Derby*). It flows freely through these coils? *A.* It does. The pipe is two inches in diameter.

Q. What is the size of the supply-pipe? *A.* I can't say precisely; think it is more than an inch.

Q. And that is constantly open while the process of rendering is going on? *A.* It is.

Q. And that steam and water is constantly flowing through this condenser (2)? *A.* It is, sir.

Q. Where is the outlet? *A.* The outlet is the overflow at the upper end of the tank on the right. It is perhaps three feet wide. The water flows over the end, like a little fall. It is n't the pipe; it is the overflow from the end of the tank.

Q. (*by a member of the Board*). I suppose the water is introduced into the bottom of this tank and taken out at the top? *A.* No, sir; it is introduced at the top. It comes in at one end and passes out at the other.

Q. (*by Mr. Derby*). The first water-supply was pumping from the basin? *A.* It was.

Q. And that was discontinued early? *A.* Yes, sir.

Cross-Examination.

Q. (*by Mr. McIntire*). You say you keep it running all the time? *A.* Yes, sir.

Q. Well, in summer this Fresh Pond water is pretty warm in itself? *A.* No, sir, I should n't call it warm.

Q. You don't mean to say it would take as much steam to heat it in July or August as it would in winter? *A.* Probably not quite so much; but the difference is not very great, or hardly perceptible.

Q. Well, when that blows off, is n't there a certain amount of organic matter goes off with it? *A.* None at all.

Q. Do you know anything of this apparatus except the one you have there? *A.* I answered that before. I knew of it five years ago.

Q. Now, don't you know that it is a fact that matter sometimes gets into the machine, and clogs it up and renders danger of explosion? *A.* No, sir; I never heard that complaint of this machine, or any with which I am familiar.

Q. Don't you know that a machine of that kind is liable to clog? *A.* I don't know what the liability may be, but I know it has never occurred.

Q. You know that it has never occurred? *A.* That might be saying too much. I will say it has never occurred to my knowledge.

Q. It has never become clogged? *A.* It has never become clogged.

Q. Well, has it ever had to be taken out and cleaned or blown off? *A.* No. sir.

Q. You were away when that was put in? *A.* I was away.

Q. You don't know whether any receiver was put in then? *A.* I have every reason to know that a receiver was put in.

Q. Where were you in July, sir? *A.* I was in various parts of the country.

Q. Were you around for your health? *A.* Yes, sir; my health has not been very good.

Q. And you were away recovering your health? *A.* I was away to recover my health.

Q. You know that one of the boss slaughterers has been ill for some time? *A.* Yes, sir.

Q. Do you know who was fireman on the 31st of July? *A.* I have been told that Richings was the fireman on that night. The present fireman's name is Sumner.

Q. Has there been any fireman there within the last few months who is not there now? *A.* I think there was one fireman there in the spring who is not there now. I can tell by looking over the books.

Q. Do you know why he is not there? *A.* He is not there because he was not faithful to his duty.

Q. Did you discharge him yourself? *A.* I did not.

Q. Who did? *A.* The engineer who had charge of him.

Q. Do you know in what respect he was not faithful to his duty? *A.* Perhaps in many respects. It was considered that he was n't faithful to his duty in not keeping the water in the right position in the boilers of the engine.

Q. Will you tell us, Mr. Carson, — we have heard it from Mr. Crowe, — what would be the effect provided the water did become hot in that tank (2), and the steam did not condense? *A.* The water must necessarily become very hot in order that the steam would not condense; and supposing that to be so, the result would be essentially the same as if the apparatus was not there.

Q. We know that, but we want to know at what part of the apparatus the steam would come off? *A.* I see no reason why it should not pass off both ways. There is nothing to hinder it from passing off both ways.

Q. The steam, you think, would have exit at both ends? *A.* There is nothing to hinder it from going out both ways.

Q. Do you think that the lard which is rendered in those close kettles is as good as lard rendered in open kettles? *A.* Equally so.

Q. Don't you know that they put upon lard which is sold in the market, "first-class quality," "prime quality," "kettle-rendered lard"? *A.* That is an old-fashioned idea.

Q. They do put that on? *A.* They do in some cases. The lard which is rendered in close tanks and kettle-dried is considered equally good in the markets. When the lard is drawn from this tank, it is charged with moisture, the result of pressure. It passes into the kettle, the steam is let on, the moisture is evaporated, and it becomes, then, essentially, kettle-rendered or kettle-tried lard.

Q. Well, then, the lard would not be of the best quality unless it passed through the close tanks, and was afterward put into the kettle and the moisture evaporated? *A.* Yes, sir.

Q. You want to get all the water out of it, and that will make it solid lard? *A.* That is it precisely. The lard is precisely like butter.

Q. That lard that is rendered in close tanks is to a certain degree filled by these gases which pass through it? *A.* I did not state so.

Q. You do not consider that there was any gas in that lard? *A.* I stated that the principal part of the gas passes off in the early part of the operation.

Q. Do you hold that the lard itself does not hold a certain quantity of gas? *A.* It is possible that Mr. Avery is better capable of judging of the scientific fact than I am, but I judge that it is n't, because it comes out in a sweet condition.

Q. You judge, of course, from your own experience. I ask you whether there is not more scent from that, owing to the gases which are evaporated, than in common lard tried in open kettles. *A.* Do you mean my opinion?

Q. Yes? *A.* I will say it is impossible to try kettle lard, because it is already rendered.

Q. So you think there is no difference between the rendering of lard in open kettles and the trying of close-tank lard in open kettles, — no difference in it because the gas goes off? *A.* I did n't say that. This moisture which is given off has not precisely the same smell which kettle lard gives out.

Q. Does n't it smell something like the gas which passes off? Don't it partake of that kind, — of course we don't pretend to say it has as much strength, — but don't it partake of that nature? *A.* Not to a great extent. It has a different smell. There is a smell of moisture, a little smell of water, different from what comes from kettle-tried lard.

Q. Which do you think is the more disagreeable smell, — the smell from trying lard, or the smell from lard tried in open kettles? *A.* I don't consider them disagreeable.

Q. Which would be more disagreeable to an inexperienced nose? *A.* I don't know. I think several have thought them disagreeable.

Q. (*by Mr. Derby*). The receiver (3) of the condensed water or gas you say was put in how long since? *A.* The receiver itself was put in last week.

Q. I want to ask you why that was substituted for another; if it was to get it out to show it more easily to those visiting the establishment? *A.* The other trap was under ground fully, and could not be shown unless we dug down to get at it. There are many people who come there to see the operation of this apparatus. I consider the other trap thoroughly efficient.

Q. As good as this? *A.* I see no reason why it is not as good as this?

Q. This is a larger trap, merely that it may be seen and got at? *A.* Yes, sir.

Q. You speak of a trying process by which the smell is expelled from the lard, conducted in a close tank. How long does that operation take? *A.* Half an hour, or possibly an hour.

Q. While the rendering process takes from ten to eleven hours, this drying operation takes but half an hour, you say? *A.* Yes, sir.

Q. Would there be any offensive smell come from that operation? *A.* It would be a little of the moisture that would come from the simmering of lard, and the operation would be only half an hour or so, instead of eleven hours.

Q. Well, with regard to the pressure upon these pipes. I understand you that the gas is made in the close tanks. Now I will suppose that the water becomes partially warmed. Would there be any gases driven out in the water sufficient to make an offensive smell? *A.* No, sir, if the outlet of the pipe is several feet under water. From our experience previous to using this apparatus, it is my opinion that if the water in this tank (2) was hot, and the pressure pressed the steam through these pipes and it escaped into the water, there would not be any smell created in the air.

Q. Well, suppose that it came upon the flats, sir, previous to the rise of the tide. I may ask what might have been the effect for a few weeks after the introduction of the machinery? Would it have been offensive or not in your opinion? Would the bulk of it have gone with the water, or forward to the furnace? *A.* I will say, sir, that for several years the steam was blown into the water near the establishment. At the present time there are scores of tanks blown off into the air in New York City, in thickly populated districts. Instead of being carried under the furnace or blown into the water, there are scores of them emptied into the air, and no offence arises.

Q. That is a common way, is it, sir, of disposing of the gases? *A.* It is a very common way, sir.

Q. In this apparatus the gas expands in the pipes as it goes along. Is it carried on by the steam or by its own expansion? I think the gas works its own way along through the pipes. I don't know about the steam. *A.* Yes, sir; the condenser (2) and the trap (3) interpose between the pressure, and it then goes on by its own expansion. The burning of the gas creates a vacuum which draws the gas along with it.

Q. (*by Dr. Derby*). Have you the apparatus they have been using at Communipaw in rendering there? *A.* Yes, sir, that is the one to which I refer.

Q. The apparatus at Communipaw, five years ago, was similar to this, with the exception of the gasoline? *A.* It was the apparatus which we found there at the time of our visit, two years ago. I was with you at that time, sir.

Q. Do you remember what they told us with regard to the effect of the condensed water upon the flats? Do you remember of their stating to us how essential they found it to discharge this water when the tide was up, and the effect it had upon the establishment and upon the surrounding country if they discharged that condensed water upon the flats? *A.* I remember the fact, sir, that they told us that the water was discharged at high tide, and that there was an offensive smell created through their discharging it in large quantities upon the flats.

Q. Do you remember the force of the expression used in describing the effect of discharging that water upon the flats? Did you hear what they told us about it? *A.* My attention was more particularly called to the offence which arose from that superphosphate manufactory, which I learned was the cause of more stench than all the remainder of the city of Communipaw combined.

Q. I ask you if you remember what the man in charge of this rendering machine said of the effect of discharging this condensed water upon the flats? *A.* No, sir, I don't remember that he mentioned the fact.

Q. (*by Mr. Derby*). Have you found anything offensive about the smell

of the water which encloses the pipes (in 2)? *A.* I spoke of the water in the pipes. It is undoubtedly very offensive. I will say in explanation of the question which Dr. Derby asks, that the whole of the water condensed in from five to ten tanks at Communipaw was retained and all let off at once. It was necessarily very offensive compared with a small amount passing off constantly.

Dr. Derby. I am only calling your attention to the fact that we found this apparatus at Communipaw.

Q. (*by Mr. Newhall*). Can you tell us whether or not the gas will burn without the gasoline? *A.* I have not the least doubt that it would burn thoroughly. It burned at Communipaw, and if it would burn there it would burn everywhere. I think this gasoline addition is not really essential to the operation, although the patentee has combined it in his process.

The Chairman. Do you think this gas can be burned with perfect ease without smell? *A.* I do, sir.

Q. Why should not they use it, then, to light up the establishment? *A.* There is no reason why they should not; though the quantity evolved is very slight compared with the amount that we burn there at the works.

Q. It could be stored in receivers? *A.* Yes, sir.

Mr. Derby. We will use it if the Board will allow us.

Witness. This idea of disposing of the gases is a new one, and we have not yet arrived at the climax of it, which will be the utilization and not the waste of it.

Q. (*by Mr. McIntire*). One question suggests itself to me. In speaking of the drying of the lard, do you use a different kettle for the drying of the close-tank lard from that used for the rendering of the lard? *A.* The only preference we give is their nearness to the tank. They are all equally adapted to the work.

Q. As a matter of fact, do you dry it in a different kettle? *A.* Yes, sir.

Q. Where is that kettle situated? *A.* It is situated perhaps ten feet from this close tank (1).

Q. Is it on the same flat with the tank? *A.* It is one flat lower than where the tank hangs. It is on the same flat where this tank is emptied. The tanks are suspended in the story above where the jacket kettles are situated.

Q. I am speaking of the flat where the kettle is, as compared with that on which you do your rendering. Is it not a story higher? *A.* The tank is charged in the story above that in which the kettles are placed.

Q. Which kettles? *A.* We have nine kettles, jacket kettles. They are situated on one floor, and the tank is suspended on the floor above.

Q. Whether the kettle in which you refine the lard is on the same flat with the jacket kettles where you render. There are no kettles above the kettles in which you render? *A.* Not at all; and all the kettles are on that one floor.

Q. And the kettles that you dry or clarify in are on the same floor, are they? *A.* Now that I think of it, there are three tanks above, situated in a story still higher than that.

Q. What is done in these kettles? *A.* The lard is refined and dried.

Q. The tank lard? *A.* The tank lard and kettle lard also.

Q. Do you call these tanks or kettles? *A.* We call them tanks. You might, perhaps, call them kettles. They are open, and there is no pressure put on them. They are very large.

Q. Whether these kettles are on a flat a story higher than the tanks? *A.* They are a story higher than the top of that tank.

Q. How much do they hold? *A.* I have not their capacity in my mind at the present time; 20,000 pounds of lard each, perhaps.

TESTIMONY OF HON. GEORGE O. BRASTOW.

Q. (*by Mr. Muzzey*). You are the Mayor of Somerville? *A.* Yes, sir.

Q. And have held that office how long, sir? *A.* Two years, on the 1st of January.

Q. And you are Councillor elect from your district? *A.* Yes, sir.

Q. Now, sir, within the last two years have you, or have you not, as Mayor of Somerville, paid attention to the matter of the Miller's River nuisance, and, if so, will you, in your own way, give a history of the matter to this Board? *A.* Previous to my having been elected Mayor, the town authorities of Somerville, together with the authorities of Cambridge, had sought for some remedy by which the nuisance arising from the stench of the Miller's River basins could be abated. Some progress was made, but not much. When I was elected Mayor I thought that the greatest responsibility that rested upon the first city government was the abatement of that nuisance. And in my first inaugural I laid down what was my judgment, and it was the judgment of the old Board of Selectmen as given to me by one of the members, — the proper mode of procedure, — which was the filling of the basins. I said that the basins must be filled and the territory thoroughly sewered. At about that time Cambridge had introduced a petition to the Legislature, asking for the authority to compel the owners of the flats to fill them. Somerville at once joined in that petition, and an effort was made before the Legislature to get authority for the two cities to compel these basins to be filled and the territory properly sewered. We failed in our efforts, and a Commission was appointed, constituted of the Board of Health and the Harbor Commissioners, to investigate the whole subject, and report to the mayors of the two cities a plan for the abatement of the nuisance, — the plan to embrace if possible the keeping open of the lower basin. The report of the Commission was everything that the city of Somerville could ask for. It substantiated the theory of the government of the city of Somerville, certainly, that the whole territory must be filled; that the whole basins had become so corrupt that nothing short of filling them to the depth of thirteen feet above mean low water would correct the evils. I have myself felt, from the experience of over thirty years in riding by there, that these basins were so corrupt as to cause an immense stench and nuisance, — a nuisance almost insufferable. My great effort has been directed to getting the basins filled and the territory thoroughly sewered, with the feeling that that was the great cause of the nuisance. I may not be right. I am unaccustomed to the modes of rendering meat, and have not examined into them at all. I have been invited sometimes to go in and see this tank and that, and observe the improvements that had been made, and I did go up to Brighton once to see one, and that was the only one I ever particularly examined. And, in refer-

ence to the fact of whether this kind of trying of lard or of putrid meats could be carried on without being offensive, I have been invited several times to go out and examine various kinds of machinery ; but I have never been out. My whole effort has been to fill the basins. That work is now going on. We have made in Somerville quite a progress in the construction of the main sewer, and are very sorry, indeed, that we have not been able to finish it this year. But winter has closed upon us, and the work will now be completed to East Cambridge early in the coming season. From present appearances I should think that the main part of the filling will be substantially finished before the hot weather of another season.

Q. Let me ask you whether the legislation of last winter was the result of an agreement between the two cities and Mr. Squire, appearing for his interest before the committee ? *A.* Substantially it was.

Q. And whether or not he has been personally faithful to that legislation ? *A.* I should only say what I have said everywhere. I have my own theories about this whole matter. I may provoke criticism probably by coming here, even though under a summons, and I would not have come but for it. My people very well know the course I have taken in this matter. No one has been more earnest and determined in their efforts to abate this nuisance and to get these basins filled and the territory properly sewered. But I am here, and I shall say, having been summoned here against my wish, — and I have always said it, — that no one is pursuing the work more diligently and made better progress than Mr. Squire. To use an old expression of mine, Mr. Squire has beaten all the rest. The legislation was, as the counsel has suggested, substantially the result of a compromise. Mr. Squire did oppose very vigorously the filling of the lower basin. He has opposed the authorities of Somerville and Cambridge, and he was a most formidable opponent. But since the very moment that the present arrangement was made, which is substantially in accordance with the recommendation of the Joint Commission, I ask no fairer man than Mr. Squire has been. He said to me at once, even before the bill was passed, to " hurry that bill through and let us commence at once. I want to be the first one to commence and the first one to finish my filling. It is going to cost me a great deal of money, but I want to fill it, and I will enter into $ 20,000 bonds to have my filling accomplished as soon as the sewer is completed." That is the substance of what Mr. Squire has always told me, and I have seen nothing in his action to lead me to doubt, in the least, his sincerity. Certainly his works show that he is in earnest. I don't mean to say anything against the other slaughtering establishments, although they have not made so much progress, that is, I am inclined to think that some of them were not so fortunate in the men with whom they contracted ; although they are at work, they have not made so great progress as Mr. Squire has.

Q. Well, Mr. Mayor, has or not Mr. Squire been obedient to orders from the Somerville Board of Health ? *A.* I don't know that we have had to issue any orders to him. We have had no trouble with Mr. Squire, except that he was determined that he would not fill the basin, and we were determined that he should. Since that was decided we have got along all right.

Q. Do you represent the public sentiment of Somerville, as well as

express your own views on this matter? *A.* I am not prepared to answer that question. A great many people would feel, I suppose, as though they would be glad to see the slaughtering-houses destroyed. I am treating this matter strictly in a business point of view. We have made a fair and square arrangement with the slaughtering-houses, and while they keep good faith with us I am certainly not disposed to break faith with them. These basins are a great nuisance. They are the most corrupt places of filth, probably, in Massachusetts, and we are very anxious to get them filled, but as I have always said to Mr. Squire and the other slaughtering men, "When this is done, when your filling is accomplished and the sewer completed, if you can demonstrate to us that you can carry on your business without being a nuisance I certainly have no objection to it. I feel that you should have a fair chance. Finish the sewer and this filling and then if you cannot go through another season without inflicting upon the public the same amount of nuisance that you have for the last two years, why you must remove. There is no use to talk about it. The public cannot endure what they have been through for several years, and my doctrine is that in that event you must start at once."

Mr. Muzzey. We are willing to go in that event.

Dr. Derby. You speak of Mr. Squire doing all that the Joint Commission desired to have done in reference to the basin. I would ask you if you remember that the Joint Commission recommended, in as strong terms as they could possibly use, the complete filling of these basins, and whether several acres of that basin under the establishment are not being left unfilled.

Mayor Brastow. That was part of the compromise that was made, and I will tell you why it was assented to by the authorities of Somerville and Cambridge. It was this. Mr. Squire proposed, as he said, to excavate all the filth under his establishment, and make it perfectly clean, and use a bulkhead for a wall against the filling. We at once said, "Well, if you are willing to take the risk of that, and be subject still to the authority of the State Board of Health, and the Boards of Health of Cambridge and Somerville, — for the bulk of it is in Somerville, — we certainly shall not object." Those are the circumstances under which Somerville and Cambridge acted.

Q. (*by Dr. Derby.*) You speak of the basin arrangement being a compromise. Is it not the second great compromise made in that matter, the first being the attempt on the part of Mr. Squire to reserve the entire basin on which his establishment stands? *A.* Yes, sir.

Q. And part of the citizens of Cambridge and Somerville also compromised and assented that the basin should be kept open. But the Joint Commission did n't think proper to recognize it. That was the first compromise. Then the second is that the whole portion of the basin under Mr. Squire's buildings is to be left open. That is the second compromise? *A.* Yes, sir. The first one did n't amount to anything.

Q. It was a proposed compromise for Mr. Squire? *A.* Yes, sir.

Q. (*by Mr. Muzzey.*) In reference to that matter, after the Joint Commission had decided that it was best to fill the basin, did not Mr.

Squire cheerfully, and of his own accord, go to the Legislature and ask for an Act requiring the filling? *A.* I don't know.

Mr. Muzzey. We shall show that.

Mayor Brastow. But I recollect perfectly well after we got there that we hardly knew what we were about, — these lawyers are generally expected to mystify things all they can, — and I recollect the first thing that the City Solicitor asked Mr. Squire's counsel, Mr. Muzzey, what he was there for, and what he was going to do. Mr. Muzzey rose and said that if the cities of Somerville and Cambridge were prepared to carry out precisely the recommendations of the Joint Commission, Somerville and Cambridge would meet with no opposition from Mr. Squire. But with all due deference to the Commission, I may as well state here that the first recommendation in regard to the sewering don't meet with our approbation. We prefer numbers two and three to number one. The two cities being perfectly willing to leave the responsibility upon Mr. Squire, of leaving that territory under his building without being filled, the Legislature granted that bill. It was not done, Mr. Chairman, with any disrespect to the judgment of the Joint Commission, by any means. The two cities were willing to have the responsibility rest upon Mr. Squire.

Dr. Derby. I only spoke of it to qualify your expression that the plan of the Joint Commission had been carried out.

Mayor Brastow. I meant to say, substantially, sir; that is, as to the matter of filling.

Q. (*by Mr. Muzzey*). Before the Legislative Committee last winter, was any voice raised, in behalf of Mr. Squire, in opposition to anything contained in the recommendations of the Joint Commission and their engineer? *A.* I don't recollect of any.

Cross-Examination.

Q. (*by Mr. McIntire*). Does not that bill contemplate that in case Mr. Squire and others do not fill that space, Somerville and Cambridge shall go on and do the filling? *A.* It provides that they may, or shall, I don't know which.

Q. Well, you consider that it is better for Cambridge and Somerville that Mr. Squire and others shall do it than that the cities of Cambridge and Somerville should do it? *A.* We very much prefer they should do it.

Q. That is, your position is a position of expediency, is it not? That is, if you allow him to go on and fill, the cities feel that it is better for them to allow these nuisances to go on rather than that they should be sent away now and that Somerville and Cambridge should have to go on and do the filling? *A.* Well, that is pretty sweeping. I could almost answer it yes; still I should want to qualify it a little.

Q. We have talked this matter over before? *A.* Certainly, and we don't agree, I find. I have been frequently snubbed because I have said we have nothing to do in this business until the filling is done and the sewer built. When that is done, if the evil is not remedied, I will take hold again, with my coat off. I have been at work some time in this matter.

Q. Don't you remember that last summer you expressed yourself substantially as I expressed myself just now, very much? *A.* Yes, I don't think it would require a great qualification. I say it here, I am willing

to give them a fair show. Fill the basins, sewer it; abate your live-hog stink, — for I said a year and a half ago to both Mr. Squire and Mr. North, "If the territory were filled and thoroughly sewered, my judgment is that the live-hog smell would be a great and insufferable nuisance." But they told me about disinfectants and other things they were using by which they were going to make everything sweet and nice. And I must say that I am satisfied that a great improvement has been made. I have been through Squire's and North's establishments, and there was something thrown on the floor which I think, to a certain extent, abates the most offensive part of this live-hog smell, which to me is about as bad as the basin.

Q. Well, then, if I understand you, Mayor, you are willing to stand all the other smells provided the basin is filled? That is, you only want one thing at a time? *A.* I think the hog-smell has, to a certain extent, been abated. When the filling is accomplished, if the stench, the coloring of the houses, and the smells are as unendurable as they have been, I am willing to take off my coat and go in for another campaign. I want the basins filled and the sewer accomplished, and then, in good faith, I think they should have an opportunity to show whether they can do business as they did for the first ten years.

Q. You don't mean to give us to understand that you represent the opinion of the citizens of Somerville? *A.* No, sir. This is my own private opinion, call it personal, or official, just as you have a mind. I have not consulted half a dozen people about it. I recollect of seeing one little article about some caucus or other, where a very nice gentleman, a clergyman, an excellent man, offered a resolution that no person should be elected to any State or city office who should not be pledged to the annihilation of these slaughter-houses. I don't know that I have spoken to anybody about it. I don't know whether it was adopted or not.

Q. You have already spoken of being affected by the live-hog smell and the basin smell. I would like to ask if you have not distinguished smells which are entirely different from them? *A.* If you mean the rendering smell, yes, sir. I must say frankly that I myself have not distinguished, with any distinctness, the rendering smell, but I hear a great many other people talk about it. One of the most offensive smells I can designate is the scalding-water odor. When the vats have been turned out I have been able to detect that out of the other smells for several years.

Q. Have not you detected the rendering smell? *A.* I know people are talking about an offensive smell that comes from the top of the chimneys at night. If it is so, I don't smell it. I have smelled odors from Miller's River twice, I think, last summer. I got it one night when not thinking of it, and my first expression was "Miller's River basin."

Q. Do you think it would be hardly fair to Mr. Squire to let him go on and fill this basin, helping Cambridge and Somerville, and then drive him away because of the smells of the hogs? *A.* Yes, sir, certainly. If he cannot carry on his establishment free from nuisance, clear him out.

Q. If you were satisfied that he could not carry on his business without creating an offence to the people, should you think it fair to make him go on filling the basin, and then drive him out? *A.* Well, that is sort of argumentative, a little. I think Mr. Squire owns the territory he

has filled, and it is not going to be a loss. I think he should fill it whether he stays or goes. I don't think he should stay unless he can carry on his business free from offence.

Q. There has been some action of the city of Somerville in regard to these places, and the town authorities have refused to allow O'Neil to use his close tanks, have n't they? *A.* I think they have.

Q. That is under an ordinance or statute under which, unless by the authority of the Board of Health, a person cannot extend his works?

The Chairman. That is for putrid grease.

Mayor Brastow. Probably Somerville would refuse to license another single person to establish anything of this kind of rendering business.

Q. (*by Mr. McIntire*). Do you know whether the town government of Somerville, in 1871, undertook to regulate, or passed resolutions, in regard to these rendering-places? *A.* I know generally that they did make some kind of a contract with the establishments. I think the contract was drawn so that at a certain season of the year no soup or solid substance should be poured into the basins.

Q. Do I understand you to say that the policy of Somerville is to prevent the establishment of any new slaughtering-houses? For instance, if a large concern like Squire's or Boynton's should propose to put up an additional building in Somerville, on the Miller's River district, do I understand you to say that that would be the policy of the city of Somerville with reference to that establishment? *A.* I think the feeling would be pretty strong against the erection of any such establishment, particularly as the population is becoming so dense. There was no objection to it formerly. Speaking of O'Neil's, his is a small concern, but my impression is that he has rendered very offensive matter there; and that when he asked for a license to increase it was refused. I think the general feeling would be entirely against the increase of that kind of manufacturing business, particularly in our densely populated parts of the city.

Q. That was the case with North & Merriam's, and the Boynton Packing Company, too? *A.* Yes, sir. We don't invite these industrial enterprises, but we feel disposed to treat them fairly.

Q. (*by a member of the Board*). Have not you licensed Mr. Squire to increase his establishment recently? *A.* I have no recollection of it.

Q. It has been testified to that he has been doubling his capacity.

Mayor Brastow. I want to say this in vindication of myself: I am getting old and gray-bearded, and I don't change my opinions easily, unless I have some basis to change them upon. Some people think that I have had Miller's River nuisance on the brain. I think some people have got the rendering smell on the brain. For twelve years after Mr. Squire went there, I don't know that any complaint was made against him, or that any houses were discolored by the effect of the business there. There were no complaints of silver-ware corroding. It all goes to show me that the results complained of come from the basins, for they have always rendered here more or less. I know that it is only within a few years that we have heard complaints, and this establishment has been in existence some fifteen to seventeen years, more or less. My theory has always been that the basins should be filled and sewered, and I am not going to change it until I have some good reason for changing it. I have often said that if the territory had been thoroughly sewered, and the

sewers carried to deep water, things would have been altogether different than they have been within the last four years.

Q. (*by Mr. McIntire*). You are speaking now of the houses and paint, but not with regard to the smell? *A.* O yes, sir. I think the gases come from the flats and the basin. It is what you may call a conglomeration of odors. You must excuse me if I say that you give a little too much importance to the sewers, when the fact is that Somerville had not water, and was not connected with the sewers emptying into these basins till they had come to be very corrupt. We had n't the water to do it with, but Cambridge had.

Q. They had water earlier than you? *A.* Yes, sir. I have always tried to treat the slaughtering-houses fairly, and allow them to fill these basins; and I rejoice that they are doing it, and I hope it will only be a short time before the work will be done.

Q. (*by the Chairman*). As Mayor of the city of Somerville, you have received complaints, have you not, with regard to this so-called nuisance, and yet you don't know exactly where it comes from? *A.* We have had no official complaint.

Q. Has not the complaint been brought to you by individuals that it was a source of great trouble to them? *A.* I have no recollection of any communication from any citizen or from any number of citizens, officially, within the two years I have been Mayor.

Q. But you have had the smells? *A.* O yes, sir.

Q. Has the city government ever made any attempt to thoroughly trace out the origin, or the special origins, of these various smells? *A.* No, sir, we have not. I have no knowledge of it.

Q. (*by Dr. Derby*). Have not they stopped some of the small establishments? Have not they stopped O'Neil's? *A.* I am not sure. I don't know but that he is using open kettles. He had some open kettles and wanted to enlarge, and promised to put in improved apparatus and it was objected to. I don't know whether he is using the open kettles or not.

Testimony of Hon. Estes Howe.

Q. (*by Mr. Muzzey*). You reside in Cambridge, Doctor? *A.* Yes, sir.

Q. And have lived there how many years? *A.* The greater part of the time for forty-five years.

Q. Have you owned property in the vicinity of the Miller's River basins? *A.* I own property in East Cambridge.

Q. The flats lying near Miller's River? *A.* Yes, sir.

Q. Have you watched the growth of the trouble in the Miller's River valley? *A.* I have had it impressed upon me by my senses and by the talk about it.

Q. You have been in the vicinity frequently during this period? *A.* Yes, sir.

Q. Have you examined Mr. Squire's establishment, and been over it? *A.* I have.

Q. In what condition did you find it at your visit? *A.* In a very good condition; orderly, cleanly, and well managed. I found in the whole establishment, from beginning to end, nothing offensive in the way of smell, and I saw no evidence of any opportunity for an accumulation of matter to putrefy. The only very perceptible, decided odor was that

which is not generally considered objectionable, — at least, only in a moderate degree. I know when we were boys we always liked to have doughnuts. It is the smell of doughnuts cooking in the kitchen which comes from the trying out of the fresh lard in open kettles, — a sweet odor. I think if there had been putrid material in it the odor would have been very offensive. But as it was, it was the smell of boiling lard.

Q. Now, suppose these open kettles to be abolished, and the rendering of the sweet lard to be done in close tanks, is there anything else about the establishment which is in your opinion offensive? *A.* I could not perceive anything, sir. I was surprised to find to what extent the smell of the hogs itself had been controlled. The hog-smell is one particularly offensive to me. I can perceive it from a train of hogs a quarter of a mile away, as everybody can. I was surprised to find to what extent it seemed to be controlled. Of course it was perceptible to a certain degree; but, in approaching the place where the hogs were, where the pens were located, I noticed that you had to be in their immediate vicinity before you could perceive it. It did n't seem to be powerful enough to extend itself outside.

Q. Was the rendering-process going on? *A.* In several of the tanks, but not in all of them; that is, they were heated up. Of course I could not look inside them; they were hot.

Q. Did you examine the machinery now used for burning the gases? *A.* I did.

Q. How did that work, sir? *A.* It seemed to be working pretty well. It is a patent process. There is one matter connected with it which, to satisfy myself upon a scientific question, I would like to have seen tested. The mixing of the gas with gasoline I believe to be one of the humbugs that belongs to the patent. I don't believe it is of any value in connection with the process, but I could not tell without making the experiment of having it carried on without the gasoline. The gas, of course, gave a very bright light, and probably would satisfy people who don't work out the analysis of the matter. It looked as if it were burning up a little more than if you had had simply the products of the animal matter carried into the flame. It probably would have made very little show. But Professor Horsford could state to you more about that. I regard the gasoline as a simple superfluity. I should think that the gas should burn well enough without it, knowing where it comes from.

Q. Well, now, as a citizen of Cambridge, frequently in the neighborhood, having watched the progress of the difficulties in the Miller's River valley, to what do you trace the offensive smells that pervade the atmosphere? *A.* Well, sir, I don't live so near nor have I had so frequent opportunities for observation as Mayor Brastow has had. But I have heard his evidence, and it coincides precisely with my judgment of the matter; that is, that the basin has been growing corrupt by the accumulation of sewage matter of every conceivable kind, and that of late years it has become so foul that the amount of salt water that comes in there at every tide is not sufficient to purify it, and under favorable circumstances for fermentation it develops these gases which are so offensive. It is not so offensive, let me say, whenever I have seen it, as the flats at the mouth of the sewer at the foot of State Street were before it was carried out to deep water.

Q. Did you ever perceive a smell at the sewer at the foot of State

Street similar to that you find in this basin? *A.* Precisely. I landed there one night in a boat and observed the same odor.

Q. (*by the Chairman*). What was your question?

Mr. Muzzey. Whether he had perceived the same stench at the foot of State Street before the sewer was carried out to deep water that he perceives in the Miller's River valley? *Witness.* I did n't analyze, or I did n't compare it as I should compare the smell of cologne with that of jockey club, but generally it was the putrid sulphuretted hydrogen smell.

Q. That is the general character of the smell in the Miller's River valley? *A.* Yes, sir.

Q. If there had been no slaughtering-houses there, in your opinion would the odor have been any different? *A.* Well, sir, I have not a doubt that the slaughtering-houses have contributed a large quantity of material to it.

Q. But take the slaughtering-houses away, do you believe there would now be any difference? *A.* I should think not, sir.

Q. So that if the slaughtering-houses that are on the basins should be removed, in the state the basin now is, would you expect the bad odor to remain? *A.* I have not the slightest doubt we would have the same smell next spring if Mr. Squire stopped slaughtering there to-day; that is, if you don't cover it.

Q. In other words, as I understand you: if Mr. Squire's establishment and the others were stopped, and the basins allowed to remain for another year without filling, you would not expect any relief from the smell? *A.* I don't believe there would be any material relief.

Dr. Derby. I understand Dr. Howe to express an opinion which amounts to this: that after all the testimony which has been received by this Board of a distinctive rendering smell which has awakened people from their sleep, and destroyed the comfort of ten thousand persons, that odor he has never perceived?

Dr. Howe. I said I had never perceived it.

Q. (*by Dr. Derby*). But you disbelieve in the existence of a rendering smell which may produce such an effect? *A.* I cannot say that I am convinced, Doctor.

Q. You said just now that you thought that if all these establishments were closed, the same smells would be perceived the coming summer as last? *A.* Yes, sir, the same smells that I perceive.

. Then you have never perceived the rendering smell in the establishment, except as the smell of cooking doughnuts? *A.* I have never perceived any other smells.

Q. (*by Mr. Newhall*). Where is your residence? *A.* Two miles from Mr. Squire's in a westerly direction.

Q. (*by Mr. Muzzey*). I wish to ask you whether, from your examination of Mr. Squire's premises and an inquiry into the processes there conducted, you think it is possible that any such gases could be evolved from it as would cause sickness to ten thousand people, irritation of the throat, and depression, so that they would be awakened in the night? *A.* Certainly, so far as my observation would go, I did n't see anything going on, and I saw no arrangements for anything to go on, which should produce such results. I don't know what they would do another time.

Q. They were killing the hogs; the scalding-tub was in operation, and also the open kettles and close tanks? *A.* Yes, sir.

Q. You saw all the different processes that go on when they are actively at work? *A.* I was told that I saw all. I did n't go into the smoke-house.

Q. (*by the Chairman*). How many times have you been in there? *A.* I have never been there of late years but once. Some years ago I was there.

Q. How long did you stay at this time? *A.* Two hours.

Q. (*by Mr. Newhall*). How often were you in the neighborhood? *A.* I am in East Cambridge every day. I have had occasion to be in that part of East Cambridge a great many times within the last few months.

Q. Do you ever get the odor of the soap-factory? *A.* There used to be an establishment over there that I got the odor of.

Q. Do you know what it is? *A.* I am not familiar with it.

Q. Did you ever get the odor of that in that neighborhood? *A.* There are two places in that neighborhood where it has been very recently.

Q. You have smelled that odor? *A.* That is the odor of putrid meat. The latest time I can recollect smelling must have been two or three years ago. When Merrill's establishment, on Bridge Street, was at work, it was almost always offensive when I went by. That establishment, I am told, is not at work now.

Q. Do you know what is called Reardon's place, on Cambridge Street? Do you ever go by that? *A.* The Reardon's that I refer to is on Winsor Street, and is, perhaps, a quarter of a mile from the main street. That is as near as I go to it.

Q. Do you ever get any odor from that? *A.* I don't remember personally to have smelled it, but I have heard of it. There is a place that I think used to belong to Conlon, and one belongs to a man named Winchester. I have frequently perceived odors of that kind which I suppose came from one or the other of these establishments. I have never recognized any such smell as that coming from Mr. Squire's. I did n't, in looking through the establishment, see any process going on there that would give rise to such an odor.

Q. Is this place that you speak of as Conlon's situated near the establishment of the Boynton Packing Company? *A.* Yes, sir.

Mr. Muzzey. Well, that is called Reardon's. There are two Reardons. The one that the Doctor spoke of is in Cambridge.

Mr. Newhall. The place was not material. I was only trying to see if any one had distinguished that putrid-meat rendering-odor.

Mr. Muzzey. There is a complaint before the Board against one Reardon, who is the keeper of the place that the Doctor described as Conlon's, near Boynton's, where he got these offensive odors.

Q. (*by Mr. Muzzey*). Do you know a place kept by a man named Barry, near Boynton's? *A.* I don't know of the name.

Q. Do you know of any other grease-boiling places? *A.* No, sir.

Q. Do you ever smell this putrid-meat odor at your house? *A.* I don't think I ever do. Once or twice some members of my family thought they perceived the smell of Miller's River.

Q. You don't get any other smell? *A.* We have a smell from the varnish factory over in Brighton. That gives us the most of our odors.

Q. Where do you reside? *A.* On Kirkland Street, near the head of Miller's River.

Cross-Examination.

Q. (*by Mr. McIntire*). Remove the basins or fill them up, and would you be content, with the doughnut smell and the hog smell, or either, to live within two hundred feet of Mr. Squire's establishment? *A.* I don't think I should buy a house within two hundred feet of such a place.

Q. Or five hundred feet? *A.* Probably not.

Q. Well, you say the doughnut smell is agreeable to you? *A.* I say it is not disagreeable. Still I should not want it for a smell in my parlor.

Q. You would not want it in your parlor or chamber? *A.* No, sir.

Q. Or the live-hog smell? *A.* No, sir.

Q. Well, have not your cars on the Union Railway been discolored by some of the gases that have arisen from these basins? *A.* Not to my knowledge.

TESTIMONY OF HON. ISAAC BRADFORD.

Q. (*by Mr. Muzzey*). You are the Mayor of Cambridge? *A.* Yes, sir.

Q. You have held that office during the present year, and are re-elected? *A.* I am, sir.

Q. Have you in your official capacity had occasion to examine the establishment of Mr. Squire? *A.* I have, sir.

Q. How frequently? *A.* I think I have been there four or five times during the past year.

Q. Do you remember when you made your first visit? *A.* My first visit was made, I think, in the latter part of June.

Q. And your last visit? *A.* It was as recent as the 1st of September; somewhere in that neighborhood.

Q. Were you in the place on the night of the 31st of July? *A.* I was.

Q. You were accompanied, sir, by what members of the city government? *A.* I think the whole Board of Aldermen were present. I think there was no exception.

Q. Had the night been fixed upon for a visit of the Board and yourself, or was it an informal visit? Had there been an appointment? *A.* Mr. Squire, as I remember it, if I am not greatly mistaken, — I cannot remember whether that was Wednesday night or not, — but as I remember it, Mr. Squire extended an invitation to the Board of Aldermen to visit his place, he having complied with a certain regulation of the Board in the introduction of a gas-burner. It was a quite hasty compliance with his invitation. I don't know whether it was Wednesday night when the Board was in session, or on Thursday night. I don't know how it was.

Q. You went on invitation? *A.* Yes, sir; to inspect the operation of the gas-burner which had been introduced by our order.

Q. I won't ask you to go into the details. You have been into this establishment and seen all its various processes and operations from time to time. Now, taking into account all the recent improvements that have been made, give the Board the benefit of your opinion as to whether offensive gases are generated by any of these processes, and also state whether you think the health, comfort, and convenience of the inhabitants requires the suppression of these works?

Mr. McIntire. I think it has been already testified by Mr. Carson that offensive gases are generated.

Q. (*by Mr. Muzzey*). Well, whether they can get abroad to the injury of the community? *A.* Without going into the details of the matter, I

would simply say that the Committee on Health in Cambridge, by ordinance, does not join the Mayor to that committee, although as Mayor I am Chairman of the Board of Health. Early in June an order was introduced before the Board of Health to instruct the Committee on Health to visit these establishments, especially the establishment of Mr. Squire, and to that committee the Mayor was joined. We made the visit to the establishment, and afterward visited the Abattoir at Brighton and the rendering works of Mr. Upton in Brighton. The result of what we saw was, that we became convinced that there were certain gases evolved by this steam rendering that might be noxious,— at any rate, disagreeable and offensive. From what I saw at Mr. Upton's place I became convinced that by the combustion of these gases the odors were removed. I would say personally that two years previous to that I had often experienced disagreeable odors from establishments that came to Ward One in Cambridge, and had recognized the entire absence of these odors at places where this improvement had been made. It was only in connection with this matter that I visited it. The result of the matter was, that the order was introduced in the Report of the Committee, and the order was passed by the Board of Health, making it imperative that all parties engaged in steam-rendering should introduce some burner to destroy their gases. A short time elapsed, and I have reason to believe — in fact, I know — that Mr. Squire, as well as other parties, complied immediately with the regulation of the Board. Mr. Squire introduced the method to burn by the aid of naphtha. An invitation was extended to the full Board of Aldermen to visit the place on the 31st of July, in the evening. On my arrival the process failed somewhat of satisfactory results. It was only temporary, however, and lasted for perhaps ten minutes. It was understood that it was owing to the fact that the water had become heated about the coil in the condenser. It was replaced, so I understood by parties there, by colder water, and then we had another display of this combustion. The next evening, with Alderman Kendall, I visited East Cambridge, — it was the night when the indignation meeting was being held, I understood, at East Cambridge, — unexpectedly went to the establishment of Mr. Squire. That was on the 1st of August. I went into the boiler-room, and there observed that there was this volume of combustion. They had a pipe that was introduced directly into the boiler, independent of the pipe that went under the furnace. I remarked to the gentleman who showed me about the building that I desired that the volume should be extinguished from this burner, and it was. I then requested that the gas should be turned on unburned. It was done, and it was quite offensive. It was then burned again, and we remained there ten or fifteen minutes, I should think, in that close boiler-room without experiencing any annoyance whatever. To make sure that these gases came directly from the retorts or close tanks, I visited first the condenser, and had a small valve turned, and received the offensive odor directly from the coil. Then I visited the rendering-tanks and had a valve turned there, and was then convinced that the odor was contained in the tanks. As I remarked before, everything seemed to be so entirely satisfactory that I went away, at least assured that there was a successful process in operation for burning up this gas, or destroying the offensive part of it. I still enjoy that belief. I cannot believe that I was deceived on that night. I know I was not. I

know there were odors in the tank, and that I got the odors at the condenser, and also of its exit ; and on fire being brought in contact with it, it was entirely destroyed,— that is, the odor.

Q. (*by a member of the Board*). Was the gas brought out under the boiler? *A.* No, sir. This was my second visit. As I say, the pipe led directly into the boiler-room and turned up as an inverted siphon or a jet. The flame was extinguished there, and then the gas was let on and I could smell it very perceptibly.

Q. Was the gas lighted immediately after it was turned on? *A.* Yes, sir. It was set fire with a match.

Q. Was it not under the boiler and over the fires? *A.* The pipe led under the boiler or furnace, and then made a joint, and came out into the boiler distinct, so that it burned through all the boilers and in the open arm. On the first visit to the establishment, my first introduction was into the narrow court-yard of the building, and I found rather a disagreeable odor there. I went to the window that overlooked Miller's River basin, and the window was opened and a perfectly intolerable odor came in. We fortunately, or unfortunately, arrived there at the time of the investigation, when the tide was low, and we got the odor from the flats in all its force and fragrance.

Q. That was on the 31st? *A.* No, sir, that was in the middle of June, on my first visit. I have since been there when the water was out of the basin and noted the same effect.

Q. (*by Mr. Muzzey*). The window you speak of looked out of a shed? It was in the extreme easterly part of the establishment? *A.* It looked out on to the basin.

Q. And the odors that arose from the basin were what you received? *A.* Yes, sir, entirely from the basin.

Q. Do you think the introduction of charcoal, with carbolic acid, is a substantial improvement? *A.* I think it is.

Q. How is the offensiveness of the animal affected by it? *A.* Well, on my last visit, after the introduction of the charcoal dust and carbolic acid —

Q. (*by Mr. McIntire*). Do you know that there is carbolic acid used? *A.* I saw the charcoal dust ; the odor was scarcely perceptible.

Q. (*by Mr. Muzzey*). A very great improvement, in your judgment, over the pens without it? *A.* Very great ; yes, sir.

Q. About their general appearance as to cleanliness? *A.* They are entirely clean, I may say, sir. I will say that, about the 1st of September, I visited the place entirely unexpectedly, with a gentleman who was very desirous of seeing the establishment ; so that that visit was entirely unexpected. We visited the pens, and they were in an entirely clean condition.

Q. Well, now, will you give the Board the benefit of your opinion, as Mayor of the city of Cambridge, whether the public health, comfort, and convenience of the community require the suppression of Mr. Squire's establishment? *A.* In answer to that question, of course I can simply speak within my knowledge of what I have experienced. I live in another part of the city, in Ward 1, two miles distant. I have received no such experience as would lead me to believe that it is unendurable. I am unable to judge as to how far the establishment may be responsible for any odor. I am conscious that very offensive odors have come from the basin. But my own individual belief, if expressed, would be that we should first fill the basins and then ascertain whether there be any real cause for grievance ; it seems so impossible to do it now.

Q. (*by Dr. Derby*). I would like to see whether the odor of rendering has been offensive to the people of Cambridge. I ask you, as the head of the city, whether you know the opinion of the citizens? The smell of the basin I understand you to testify to of your own knowledge. I ask you now, whether the smells arising from the hog-slaughtering and rendering establishments of the city are a source of offence to the citizens; whether they are the subject of complaint; whether it has come to your knowledge. *A.* The only knowledge I possess on this point, is the fact that certain gentlemen of East Cambridge have appeared before the city government, and have now appeared before your honorable body. That is the only knowledge that I have. I have not heard much said about it beyond the complaint made at City Hall, and the knowledge that came to me that there was a meeting holden on the night of the 1st of August.

Q. (*by the Chairman*). Has the city government ever taken any measures to trace these smells? I have asked this of the Somerville and Charlestown authorities, and I would like to know about Cambridge. Have you taken any measures to efficiently trace these smells to their origin or origins? *A.* No further, sir, than the action through this committee at a certain time.

Q. You don't know of any special arrangements being made, by which you might trace the odors? *A.* We don't get any smells, sir, except that from the basin, that we are conscious of.

Q. The question is, whether the city authorities have made any arrangements to trace out these smells? *A.* We have made no rigorous examination.

Q. (*by Mr. Muzzey*). Has not the Board of Aldermen refused, by a vote of eight to one, after a visit to the place, to appeal to the State Board of Health to suppress it? *A.* They have, sir.

Q. When was that occasion? *A.* That was during the month of August. I think about the middle of August.

Q. Well, there was a hearing, was there, on an application to your Board, asking the city Board of Health to indict this establishment, and it failed by a vote of eight to one, after a hearing of the petitioners? *A.* Yes, sir.

Q. Have you visited any soap-making or grease-boiling places in the vicinity of Mr. Squire and North & Merriam's? *A.* At the time when I was joined to the committee we made a very general examination, and visited different places. There was one place that we visited where we found them rendering that which was quite objectionable, to say the least, and the party complied immediately with our requirement.

Q. What place was that? *A.* That was on Winsor Street, at Reardon's.

Q. (*by Mr. Derby*). It was the rendering of grease? *A.* I think it was.

Q. Pretty strong? *A.* Yes, sir.

Q. (*by Mr. Muzzey*). No such smell as that was perceptible at Mr. Squire's establishment? *A.* At no time when I have been there.

Q. Are there any other places that you have gone into in your official capacity, where this business of grease-boiling has been carried on, in that general vicinity? *A.* No, sir, I think not. It will be observed that a very small part indeed of even Mr. Squire's establishment is within Cambridge, the line being drawn so that Miller's River is not the dividing-line between Cambridge and Somerville, so that the place on Winsor Street was the only one in Cambridge.

Q. There are located over the line in Somerville several places conducted substantially the same as Reardon's was? *A.* Yes, sir. I know that in one place we saw an open kettle in a place in Somerville, that I presume its Mayor referred to.

Q. How has Mr. Squire been in his attitude toward the local Board of Health of Cambridge? Has he been prompt in obeying the orders given him? *A.* Entirely so, sir. Since the order of the State was issued — and I may remark that the act, as I understand it to be, says the cities *may* fill, etc. — the cities of Somerville and Cambridge immediately passed the orders for the owners to fill. A little time elapsed before Mr. Squire became ready or able to undertake the work.

The Chairman. We admitted the testimony of Mayor Brastow on this point.

Q. (*by Mr. Muzzey*). I will ask you whether or not Mr. Squire has proceeded in a manner entirely satisfactory to the city of Cambridge? *A.* Entirely so, sir.

Cross-Examination.

Q. (*by Mr. McIntire*). You have said that committees appointed at the indignation meeting have appeared before the Board of Aldermen, and asked you to complain of this and other establishments to this Board. I will ask you whether the Board of Aldermen were not incensed by some expressions which were made at that meeting, and whether that did n't furnish mainly the topic for discussion when the subject was brought before them. Whether the expressions that were used in relation to an Alderman there did not give offence. *A.* I know that there was something of that kind said, but I don't suppose it had any influence on the decision of the Board.

Q. Don't you think Alderman Sawin —

Mr. Muzzey. I object to this.

Mr. McIntire. It has been put in here as a matter of testimony favorable to Mr. Squire, may it please your Honors, that the city Board of Health took no action in this matter. Now I think we can show that they acted hastily, or were vexed at something that had been said by the citizens. I think I ought to be allowed to put that in, and to show what controlled their action at that time. I wish to put in the reasons why that favorable action was taken.

Mr. Muzzey. That will simply oblige us to call in these eight Aldermen out of ten to say that they hold the same opinion that they expressed that night. We will do it, if you choose to hear them, but we give notice in advance.

Mr. McIntire. I wish, if the Board will allow me, to put in that testimony.

Mr. Newhall. That would be trying the Aldermen, to see whether they acted as they should.

Mr. McIntire. But if it shows that the Board of Health refused this action, we certainly should show why they did so. I don't think there was any fraud in their action, but I do think we can show that there was

interest in the matter on the part of a certain Alderman; also that there were opinions formed there upon the action of citizens, and that some gentlemen were vexed at words that were said at that meeting. For instance, suppose we can show here that there were spoken there statements in relation to the action of the Board of Aldermen in relation to this very nuisance; suppose we can also show that the Chairman of the Committee on Health was himself engaged in the slaughtering business, and has since been condemned by this Board; suppose we show that another member of the Committee on Health, Mr. Kendall, is employed constantly in the works of Mr. Squire, North & Merriam, and Mr. Boynton, in putting in the steam-apparatus, and gets thousands of dollars per year out of it; why should not that be put in if the other is to have any weight with this Board?

The Chairman. For my part it has no weight, either the one or the other. It has no weight whatever in this matter.

Mr. McIntire. If that is so, I don't care to put it in.

Q. (*by Mr. McIntire*). I will ask, then, if on the evening of the 31st, when, with other gentlemen, you visited Mr. Squire's establishment, you did n't yourself distinguish any odor which was offensive to you? *A.* Yes, sir; I did for a few moments.

Q. You expressed yourself in that way there? *A.* I did.

Q. And whether you did n't pass outside the factory and there distinguish it outside the walls, and mention it to Mr. Stevens, a reporter, and pass into the yard again, and find the water heated? *A.* I did; if I may be allowed to enlarge, on this visit, as remarked to the Board, I arrived there about nine o'clock, and went into the boiler-room. The pipe was let in underneath the furnace, and the gas failed to burn. I felt, of course, somewhat disappointed, and while there discovered the odor and stepped out into the yard, and a gentleman present said to me, "Smell this dock smell!" Said I, "That is not the dock smell, that is the rendering smell." I had discovered its nature previously only by having that valve turned at a previous visit. In the course of ten minutes it was stated that the water having become heated, there being no method for renewing it, it had been drawn off and replaced with cooler water. Then, there was all the flame we could desire to see. In fact, the jet of flame reached almost to the ceiling of the boiler-room. It was an immense flame, and came from a pipe at least two or three inches in diameter.

Q. I understood you to say that you found an offensive odor at the end of the pipe when it was let out; you also found an offensive odor as the gas passed through the condenser and also through the trap? *A.* No; you mistake me there, sir. The process is this: that the material is put into tight tanks; the steam then is drawn off and passes through the coil into the condenser; from the condenser it passes into the purifier, and from that into the naphtha, and then under the furnace. After discovering the odor of the pipe, I visited the condenser. At the condenser there was a valve that was turned, and there was this odor. I then went to the tank; I had heard it said that the operation was simply the burning of naphtha, and I wanted to discover for myself whether it was so or not.

Q. Then you traced these odors back? *A.* Yes, sir.

Q. Did you understand whether it was fresh matter or otherwise in the tank? *A.* I forget. The impression that I had there was that one of these tanks had rusty material, and the other perhaps sweeter and cleaner material.

Q. When those odors were found do you remember the expression of yourself to Mr. Squire, that the smell had at last been located; what it came from? *A.* I did n't hear that.

Q. Did you hear the testimony of Mayor Brastow? *A.* I did.

Q. Well, do you agree with him in what he says in regard to the expediency of this matter of filling? That is, he expressed himself, if I understood him, that it was better if we can have the filling done now and wait a year to see whether there are any smells that will arise, than it would be to close up the place now and prevent the carrying on of the filling? *A.* I can simply answer to that, sir, that it would not prevent the filling from going on if the places were stopped.

Q. Certainly not; but of their filling by Mr. Squire, I mean. In the first place we have about three or four acres in Cambridge, a large portion of which the city has undertaken to fill for private parties? *A.* Yes, sir; but that is let out under contract to Mr. Squire himself.

Q. So I have understood; and the city itself is to recover from the owners? *A.* The reason why the several owners did n't undertake that filling themselves, was that if they had gone on, the first man to fill would have filled his neighbor's land. The surface was too sloping for each to fill and do only his share.

Q. I will ask you the same question that I asked Dr. Howe, whether you would be willing yourself, with the odors you find there from the basins, and in that factory, from the hog, from the scalding, from the opening, from the rendering, to live within five hundred or eight hundred or even one thousand feet of the establishment and basin, — whether you would be willing to reside there yourself and have your family there? *A.* I should not.

Q. Well, should you, with all that you found there, with all the modern apparatus, with the other scents, exclusive of the Miller's River smell, would you be willing to live within a thousand feet of it? *A.* I should find no objection from what I have seen.

Q. Do you smell that doughnut smell? *A.* Within the building I do.

Q. But you do smell the rendering smell outside. Well, now, would that doughnut smell, suppose it got outside the building, be agreeable in your house? *A.* Well, I don't know that it would be very disagreeable or unpleasant. I cannot say that a house within a thousand feet would get it.

Q. No; but I am supposing that it would. Would you be willing to have that constantly in the atmosphere of your rooms? *A.* No, I should desire a change of air once in a while.

Q. Have you ever experienced these excessive rendering odors in passing there? *A.* I never have. Of course, as I have answered the honorable Chairman, I have heard complaints, but I have never experienced the odors.

Q. Do you know whether Mr. Hastings has not requested yourself and members of the Board of Aldermen to stay at his house and experience these smells? *A.* It is not within my recollection.

Q. (*by Mr. Newhall*). Had the gas which you saw burning been

through the gasoline? *A.* It had been through the gasoline; so I understood. The tank or reservoir of gasoline was represented to us as being buried in the yard for safety.

Q. (*by Mr. McIntire*). These rendering odors you experienced on the 31st of July, — how long do you think they affected you after leaving the establishment? *A.* What odors?

Q. Don't you remember saying that you had them for breakfast next morning? *A.* That was the first visit to the tanks. The first morning that we went there, the two other gentlemen of the committee had business engagements that took them away at an earlier hour. I remained there with Mr. Brine, I think till about twelve o'clock, viewing the premises, every corner. At that time one of these tanks was turned on; and I think it was then, on that night, that I made that remark. That is, the smell got into my mustache and tainted it. I think there were three members of the committee, at least, present at that time when the tank was turned on.

Q. You would not say that you didn't discover the odors there? *A.* I would not say we did not. That is in our report, I think.

Q. That is, that there were odors proceeding from the rendering? *A.* But not that we discovered them outside. It was simply that these odors were turned on and the valve turned at our request. I remarked at the time to Mr. Squire: "How do you get rid of these odors?" Said he, "We have a pipe that runs down to the water, where it floats off at high tide."

Q. (*by a member of the Board*). Did you try these odors that came from the tank to see if they would burn before they passed through the gasoline? *A.* No, sir.

Q. I thought there was a cock there by which you could smell the gas before it reached the receiver? *A.* There may have been one; but this was at the end of the coil, between the coil and the purifier.

Q. (*by the Chairman*). How long did the odors stay by you, did you say? You said something about noticing them the next morning? *A.* I don't think the odor stayed over night. I said that perhaps in pleasantry.

Q. (*by Mr. Derby*). A few minutes, was it not, sir? *A.* A few minutes; it was not very bad.

Testimony of John M. Merrick.

Q. (*by Mr. Muzzey*). What is your business? *A.* I am a consulting chemist for the city of Boston.

Q. What other situations do you hold? *A.* I am employed by various manufactories in the city and vicinity. I am a Fellow of the American Academy.

Q. Are you familiar with the Report of Professor Horsford? *A.* Yes, sir; I have read it.

Q. State whether at his request you made the analyses, the results of which are presented on pages 11, 12, 13, 14, and 15 of Professor Horsford's Report? *A.* I made those analyses, sir; they are numbered from one to twenty-eight, inclusive.

Cross-Examination.

Q. (*by Mr. McIntire*). You are not connected with Professor Horsford in any other way than this? *A.* Not at all, sir. I was formerly his student.

Adjourned.

TENTH DAY.

Friday, December 19, 1873.

TESTIMONY OF CHARLES W. H. MARTIN.

Q. (*by Mr. Derby*). You are by occupation a ladder-maker? *A.* Yes, sir.

Q. You do business at East Cambridge and reside at East Cambridge? You occupy, sir, a tract of land bordering upon the Squire Basin, — about a quarter of an acre? *A.* About ten thousand feet filled in, and fifteen thousand feet of flats that is not filled.

Q. You project out into the basin below Mr. Squire's, near what street? *A.* Near Gore Street.

Q. Opposite what cross streets? *A.* Between Fifth and Sixth.

Q. You conduct the business of ladder-making in this place, immediately over the edge of the basin? *A.* I do.

Q. You have lived in that neighborhood for the last four or five years? *A.* For four years.

Q. State the streets you have lived on there. *A.* First, in 1870, I lived on Third Street, between Gore and Winter.

Q. Have you lived on Fourth Street also? *A.* I went from there, and lived directly opposite the works, on Gore Street.

Q. How long did you live opposite? *A.* One year.

Q. Where else have you lived, sir? *A.* I lived a year on Winter Street, No. 62, near Fifth Street.

Q. Very near the basin? *A.* The nearest point I have lived to the basin.

Q. Have you lived on any other street, sir? *A.* I live now at 158 Cambridge Street, at the corner of Fifth.

Q. Then, if I understand you, sir, within the last four years you have lived at four different places: for one year opposite Mr. Squire's works, then on Third Street, then on Winter, and now you are on Cambridge Street. Very well. Now inform the Board, sir, whether when you lived on Third Street and Cambridge Street and at your shop you have experienced bad smells from the basin? *A.* While living on Third Street, I did n't smell the dock smell very much; and I did n't smell the factory then at all. That was in 1870.

Q. You mean to say Mr. Squire's factory? *A.* Yes, sir.

Q. You did n't smell anything from the factory, dock, or anything else? *A.* Only a little from the dock when I left there.

Q. Well, now, sir, you have moved to one or two other places? *A.* On Winter Street was the worst place I have lived. It was very near the basin, and the smell was awful. The houses there were changed more than at any other point. It is a peculiar smell there, but I never experienced anything from the factory there at all.

Q. You did experience from the dock a very strong smell, that altered the color of the houses, and made it almost insufferable to live there? Well, was that the basin smell, sir? *A.* I am well satisfied that it was nothing else.

Q. Now, in course of time, did you live opposite the counting-room of the factory? *A.* Yes, sir.

Q. Directly opposite for a year, summer and winter? *A.* Yes, sir.

Q. Will you state whether you, with your family, were disturbed there? *A.* I have no family. I boarded there. That was the best place that I found. The dock smell I did n't get there, not much of it as compared with what I received on Winter Street. My idea of that was that the buildings came between me and the dock, and kept away the dock smell.

Q. Intercepted it? *A.* Yes, sir.

Q. Well, as compared with the spots where you have lived, you found this the best place to live in? *A.* I did, sir.

Q. Of your four years' residence in Cambridge, you found it the best place? *A.* I did, sir.

Cross-Examination.

Q. (*by Mr. McIntire*). Did you live at Mr. Greaves's? *A.* No, sir; I did not. My factory is at Mr. Greaves's, but I have not lived there.

Q. When on Winter Street, did you live near where Mr. Greaves did? *A.* No, sir. Quite a distance away.

Q. How far? *A.* It is one street and part of another. He is near Sixth Street, and I lived between Fourth and Fifth.

TESTIMONY OF HARVEY GEORGE.

Q. (*by Mr. Derby*). Have you retired from business? *A.* I have been an invalid a dozen years, and have n't been able to do anything.

Q. Do you reside in East Cambridge? *A.* Yes, sir.

Q. In what part of East Cambridge do you reside? *A.* On Otis Street; a little east of Fifth Street.

Q. (*by the Chairman*). How near is that to Mr. Squire's? *A.* About five or six hundred feet.

Q. (*by Mr. Derby*). Do you know of a place for trying grease kept by Mr. Reardon? *A.* A number of years ago I sold the land to Mr. Conlon. There was a grease place built, and I have n't been near it for a dozen years.

Q. Well, do you know who occupies it, sir? *A.* I don't know of my own knowledge.

Q. On what street is that, sir? *A.* That is on Winsor Street. The man who bought it erected a place for rendering of grease. He bought the land to do what he pleased with it.

Q. Whether you know that any grease was tried there, or if there were any bad smells? *A.* I don't know about grease being tried there; but I have smelled this bony, greasy smell.

Q. Offensive? *A.* Well, it is not very pleasant.

Q. At what hours of the night have you smelled it? *A.* It was as early as ten or eleven o'clock.

Q. Was it previous to that time? *A.* I have smelled it in the day-time and in the night, but not very frequently. If the wind is right, it will come, but not so strong as it used to be when I lived up there close to it. I now live up on Cambridge Street, five or six hundred feet from it.

Q. How long since you have moved from that place, sir? *A.* About a dozen years.

Q. You have recently smelled it by day and night? *A.* I have smelled it occasionally in the day-time.

Q. Will you describe to the Commissioners whether it is a pretty bad

smell? *A.* It is not so bad as a bone factory. Then there was a place called Merrill's. I used to get that more frequently and more sensibly. It seemed very offensive. And then, from off this direction, I occasionally smelled this odor; but it has never come so acute as at the other place.

Q. But you have experienced it at various hours of night and day, and found it very offensive? Has it ever made you close your windows in the night, sir? *A.* Well, we do.

Q. For the bad smell? *A.* That is one reason; but I don't like the night air.

Q. Does it ever make any of your family sick to your knowledge, or yourself? *A.* None of my family; but one of my boarders was sick on the 31st of July. He went to bed, he said, and went to sleep, and in a little while he was waked up. His windows were up. He said he smelled a terrible smell, and supposed they were clearing vaults under the windows. He got up and looked, and saw nothing. He shut down his windows, and retired again. He asked me if the authorities allowed that work to be done in the night; and I told him I guessed not. He said he had a hard one, and thought it was on this account.

Cross-Examination.

Q. (*by Mr. McIntire*). You live next house to Mrs. Binney? *A.* Yes, sir.

Q. You live in one half, and Mrs. Binney in the other? *A.* Yes, sir.

Q. Were you here when she testified? *A.* I was not.

Q. You say you get the rendering smell a little? *A.* Yes, sir.

Q. Did you smell anything last night, between six and eight o'clock? *A.* I did.

Q. The tide was up last night, was it not? *A.* I don't know.

Q. You say you did smell something last night, between six and eight o'clock. What was it? *A.* It was n't a very pretty smell. The night before last, at the stable at the foot of Fifth Street, three men were standing; and as we got the odor, one of them said, "There 's brimstone," meaning the odor.

Q. And the tide was high, was it not? *A.* Not when I am speaking of.

Q. Did n't it last after seven or eight o'clock on that evening? *A.* I don't know.

Q. You don't know whether people complained night before last near the corner of Sixth and Cambridge Streets? *A.* I don't know.

Q. Do you know the fact of people complaining? *A.* I do not.

Q. You have not got the rendering smell within two or three years? *A.* Yes, I have. I say, not so much.

Q. Have you got it at night? *A.* Not after ten o'clock.

Q. You sleep with your windows shut? *A.* I do generally. The moment I distinguish the smell, I shut the windows, take a fan, and go to bed.

Q. What part of the house do you sleep in? *A.* In the southwest corner.

Q. Well, now, when you lived on Cambridge Street, up near Conlon's or Reardon's place, you spoke of Mr. Merrill's establishment as smelling bad? *A.* It was not up there.

Q. When did you get that smell? *A.* Since I have lived in the Third Ward.

Q. How do you know that you get it from Mr. Merrill's? Is not Mr. Merrill directly in a straight line from you? *A.* No, sir; he is five or six hundred feet to the north of me.

Q. You live between Fourth and Fifth Streets? *A.* Yes, sir.

Q. What made you think the odor came from Mr. Merrill's? *A.* I judged from the way the wind was.

Q. You never traced it to Mr. Squire's? You never followed it up? *A.* No, sir.

Q. Did you get the scent of the 31st of July? *A.* Yes, sir.

Q. At what time? *A.* Just about ten o'clock.

Q. Where were you then? *A.* On my sidewalk. In warm weather I frequently walk on the sidewalk. I cannot sit down a great while at a time, but have to exercise. I walk the house a great deal. In pleasant weather when it is warm I go out and walk along the sidewalk.

Q. Which way did the smell that you got on the 31st of July come from? *A.* From a westerly direction.

Q. Coming up Otis Street from the Court House? *A.* Yes, sir; as it did over a year ago, from the same direction.

Q. Then you distinguished one that night? *A.* I did, but it was light. It was one of those sultry nights; we have a great deal of that kind of weather occasionally. We can always feel it, but we cannot see it as we can a fog. We know we are in an immense smell, but we cannot see it. Sometimes it is hard to distinguish where it comes from.

Q. After you got into your house and had shut the windows down you were not troubled, but one of your boarders was? *A.* Yes, sir.

Q. Who was that, — Mr. Hill? *A.* Yes, sir.

Q. Have you ever expressed your idea as to what that smell was? *A.* I think very likely I have many times.

Q. Did you ever say what you thought that smell was before coming here? *A.* Yes, sir.

Q. What was your idea? *A.* I hardly know. They told me that there was something at the factory that smelled so, but I was never there; I had always supposed that it came from the dock and the common sewers. I got these smells in my cellar; when the wind was in a northerly direction it filled my cellar with this smell. This was three or four years ago.

Q. Do you know what was done at the factory? *A.* I don't know anything about it. I know they manufacture hats or caps there, I don't know which.

Q. Oil-cloth hats, caps, and tarpaulins? *A.* Yes, sir.

Q. But you don't know anything that occurs in there that would create a smell? *A.* No, sir.

Q. Have you ever been at Mr. Squire's establishment? *A.* Yes, sir, a great many times.

Q. Have you ever smelled anything there? *A.* I have.

Q. Have you ever smelled anything at your house reminding you of that smell? *A.* I have got the scent of the cooking, especially when they used to try that bad stuff. I have not smelled it of late.

Q. Did you ever try to trace any of the smells you have described to any place? *A.* No, sir. I went right off after the 31st of July and asked the foreman at Mr. Squire's if they let off anything to make the odor, and he said he did n't. I saw Mr. Squire afterwards. I don't know

as I had spoken to him before. I asked him if he did, and he said there was not.

TESTIMONY OF ALDERMAN CURTIS DAVIS.

Q. (*by Mr. Muzzey*). You reside in Cambridge? *A.* Yes, sir.

Q. And have resided there how many years? *A.* Forty.

Q. You have been in public office, in the Legislature, and are at present an Alderman of Cambridge? *A.* Yes, sir.

Q. Have you been into Mr. Squire's works in your official capacity as Alderman? *A.* Yes, sir.

Q. You have been over there and inspected them? *A.* Yes, sir.

Q. How many times? *A.* Once, in my official capacity.

Q. When was that? *A.* I think in July.

Q. How many times have you been there unofficially? *A.* I don't recollect of being there but twice. I may have been there more times than that.

Q. Do you remember the times? *A.* This I speak of now was in the night.

Q. On the night of the 31st of July? *A.* I think it was.

Q. You accompanied the Board of Aldermen? *A.* I did.

Q. At what hours were you there that night? *A.* From seven till nine o'clock.

Q. And the Mayor was also present? *A.* Yes, sir.

Q. How many of the Board of Aldermen? *A.* I could not tell. I don't recollect whether they were all there or not.

Q. Well, now, speaking from the knowledge acquired at that visit and at the other visits you have made, will you please state to this Board in what condition you found it, and whether or not anything of the nature of a nuisance was discovered by you there? *A.* That particular time in the building itself I did n't discover anything that was very objectionable to myself, — nothing that I should consider a nuisance. There was nothing bad to me about the rendering of the lard or the slaughtering of hogs. Outside, in the yards, there was a stench that was a little disagreeable to me.

Q. Where did that come from? *A.* I don't know as I can explain that. It is where the gas passes through the water. It was a place where there was a little leakage among some of the valves where this gas escaped.

Q. The water in the machine got hot that night? *A.* Yes, sir.

Q. How long did that odor last, sir? *A.* I was travelling around through the place considerable, and I don't know whether it continued all the time I was there.

Q. Well, aside from the escape of the gas, was there anything about the place which was offensive? *A.* Not to me.

Q. Now, Mr. Davis, to what do you trace the odors that prevail in that region? *A.* I had always supposed that they came from the dock, the creeks, mud-holes, backhouses, and other places.

Q. How much do you think the foul condition of the river and basin has contributed to it? *A.* Very largely. I don't know how much.

Q. It has been suggested here that the Board of Aldermen in dismissing the complaint against Mr. Squire by a vote of eight to one, — that the majority of that Board acted under some excitement —

The Chairman. I understand that subject is not to be brought in.

Mr. Muzzey. Very well, I won't pursue the investigation.

Cross-Examination.

Q. (*by Mr. McIntire*). You say that you found nothing disagreeable to you. You said that two or three times. I suppose you mean that the rendering smell is not disagreeable to you? *A.* No, sir; it is not.

Q. You carried on the rendering business some years ago? *A.* Not now. I have in years past; a great many years ago.

Q. You have a soap establishment in Cambridge? *A.* Yes, sir, it is on Broadway.

Q. How long have you been there? *A.* I bought the place in 1851.

Q. You carried on rendering more or less till when? *A.* I think I never rendered in that factory, — since 1851.

Q. Where is your rendering done? *A.* We buy the stock.

Q. And make soap of it? *A.* Yes, sir.

Q. Did you ever have any complaint against your place for getting up plenty of smells of any kind? *A.* No, sir.

Q. Not in that locality? *A.* No, sir.

Q. You have nothing new to say as to your visit with the Mayor and Aldermen on the 31st of July? Your experience was about the same at Mr. Squire's? *A.* With regard to the escape of the gas, I presume, sir, I have not.

Mr. McIntire. You have expressed yourself substantially as they did?

Q. (*by Mr. Muzzey*). You did find, as I understand you, disagreeable odors that arise from the sewers, sinks, drains, etc.; from what direction did they come? *A.* There are never any at my place, nor in that section that I have ever discovered. I live some ways off from Mr. Squire's establishment.

The Chairman. You reside at Cambridge? *A.* Yes, sir. We used to have a dock in the rear of our factory, but it is filled up now.

Testimony of Hon. James D. Greene.

Q. (*by Mr. Muzzey*). You were the first Mayor of Cambridge, sir, and took the chair in 1846? *A.* Yes, sir.

Q. And have held that office, beside your first term, twice, I believe, since? *A.* Yes, sir.

Q. Where did you first reside in Cambridge? *A.* In East Cambridge.

Q. And when did you go there to live? *A.* In 1830.

Q. You were then the settled Unitarian clergyman in that place? *A.* I was, sir.

Q. I believe you were a resident of East Cambridge when there was trouble about odors, from 1830 till 1843? *A.* On one or two occasions I remember there were offensive odors.

Q. Proceeding from what source, sir? *A.* I am not sure, sir. I think they were said to have come from Winchester's slaughtering establishment and soap-making place; soap-making, I think.

Q. You still reside in Cambridge? *A.* I do, — in Old Cambridge.

Q. Where did you go in 1843, — directly to Old Cambridge? *A.* Yes, sir.

Q. So you have resided in East Cambridge for thirteen years, and the remainder of the time in Old Cambridge? *A.* Yes, sir.

Q. You have been familiar with the Miller's River district and the locality spoken so much about? *A.* Not all of it.

Q. You have known the locality, and have visited it, more or less? *A.* There are portions of East Cambridge that I have not visited scarcely at all. I may specify this section of East Cambridge where Mr. Squire's establishment is. That I have not visited it but once, I think, for thirty years. When residing at East Cambridge I formerly passed through there when there were probably not more than six or eight houses in the whole section.

The Chairman. Is it worth while to go into this matter, so far back?

Mr. Muzzey. He has been there more recently. I only wish to make a comparison of the state of affairs between the two periods.

Q. (*by Mr. Muzzey*). Mr. Greene, you state that at the time when you visited that section where Mr. Squire's establishment is, there were but few houses? *A.* At the period when I resided at East Cambridge?

Q. Yes, sir; before Mr. Squire's establishment was there? *A.* There were few houses there then.

Q. When did the neighborhood begin to grow and become populous, sir? *A.* Within the last ten or twelve years the population has gathered there very rapidly. There was but little increase until within about fifteen years, I should say. I have not passed through it lately.

Q. Well, have you visited Mr. Squire's establishment? *A.* I have.

Q. Will you state to the Board in what condition you found it? *A.* Considering the magnitude of the establishment, I should consider it to be in a remarkably good condition; that is, remarkably free from offensive odors, when we consider the magnitude of the business that is carried on.

The Chairman. When was this visit made? *A.* A week ago.

Q. You consider the establishment, taking its magnitude into account, as in a remarkably clean condition and free from offensive odors?

The Chairman. It seems to me that you might produce a great many witnesses who would say the same thing that he does. I don't think it would be worth while to introduce any more of that evidence.

Mr. Muzzey. I put Mr. Greene upon the stand because he represents public opinion and has a general and wide knowledge, and has had, with others, occasion to look into these things.

Q. (*by Mr. Muzzey*). Will you give the Board the benefit of your opinion, whether the health, comfort, and convenience of the inhabitants of Cambridge demand the suppression of this establishment at the present time? *A.* I don't think I am entirely qualified to answer that question. I could not be able to form any opinion as to what would be the condition of these works during the whole year, for my acquaintance with it is very limited indeed, except at this season of the year. What it would be in the hot season I am wholly unable to conjecture. As the business is managed now I see no cause for offence without the enclosure. I perceived nothing outside of the enclosure, and very little inside.

Cross-Examination.

Q. (*by Mr. McIntire*). How came you to visit the establishment of Mr. Squire? *A.* I was invited to call there, sir. I don't know the name of the gentleman who called upon me.

Q. He called at your house and asked you to go? *A.* Yes, sir.

Q. What time in the day was it? *A.* In the evening I went there.

Q. You were invited to be taken there and shown about? Was there any one else present invited but you? *A.* I don't know about the invitations; there were other persons present.

Q. Who was there at that time? *A.* Dr. Howe and Mr. Parker, formerly city solicitor.

Q. Any one else that you remember? *A.* Yes, sir; Mr. Merrill, ex-Mayor.

Q. Did you find them there, or did they arrive subsequently? *A.* Dr. Howe went at the same time that I did.

Mr. Muzzey. I will spare you any examination on this subject. These gentlemen were all invited by us to visit the establishment, and were sent for personally, so that they should be able to come here and say what they thought upon the question before this Board.

Mr. McIntire. I only wanted to know whether it was so or not.

Q. (*by Mr. McIntire*). Then you discovered nothing very disagreeable outside? Did you visit any of the hog-pens? *A.* Yes, sir; we saw all the hog-pens, I think.

Q. Were there many hogs there? *A.* I think all the pens I saw were empty.

Q. Did you see any live hogs? *A.* Yes, sir.

Q. How many did you see? *A.* I am unable to say, sir. I should say twenty or thirty; possibly, forty or fifty. We saw one pen that had a considerable number in it.

Q. Well, should you think that in all the pens you saw more than fifty? *A.* I don't know. I don't think I did. I don't know what others may have seen.

Q. Was there any scent at all coming from these unoccupied pens? *A.* I don't recollect any unpleasant scent there from them.

Q. The pens were very clean and were sprinkled with charcoal? *A.* Yes, sir.

Q. Were many of the animals dressed and hanging up? *A.* Yes, sir; quite a large number.

Q. Were they at work at the time, killing and scalding? *A.* They were.

Q. Did you perceive any odor from the scalding-tanks, — any smell? *A.* Yes, sir, there was some smell, but it was not very disagreeable. It was the smell of the hog.

Q. They were rendering at any time while you were there? *A.* They were.

Q. Where? *A.* In the room appropriated for it.

Q. I know; but I understand there is a story above where the rendering is done, as well as below? *A.* We saw the tanks that are used for that purpose.

Q. What were they rendering in these tanks? *A.* I could not say. They were close tanks. There was one open tank, where the pork was being boiled, or tried out, I suppose.

Q. Did you go up a story above the top of the close tanks and see any tanks up there? *A.* I did. The close tanks are partly in one story and partly in another. We saw them both below and above.

Q. In the story above the close tanks did you see three large open tanks? *A.* No, sir, I did not.

Q. Did anybody go up there? *A.* I can only say where I went myself.

Q. You have already said that you don't visit that locality, and live far away from it? *A.* I have never visited it, sir, until about a week ago.

Re-direct Examination.

Q. (*by Mr. Muzzey*). Have you made any other visit privately, on your own account? *A.* I have, sir.

Q. Now, in what you state to the Board, are you speaking of the observations you made at the time you went by invitation, and also as to when you went privately? *A.* I have spoken of my first visit. I went of my own accord a few days afterward. I had seen the interior, and I wanted to see the exterior of the building.

Q. Did you discover anything on your second visit that you made privately, without notice, different from what you found in your previous visit? *A.* No, sir. I found everything in about the same condition. I found no disagreeable odors from Mr. Squire's establishment; but from the adjoining establishment, which I think was O'Neil's, I think there were offensive smells.

Q. (*by Mr. McIntire*). You say from the adjoining one, which is O'Neil's; which one do you mean? *A.* I mean the one on the opposite side.

Mr. McIntire. That belongs to Charles H. North & Co. Mr. O'Neil's is half a mile away. Mr. North's establishment is on the railroad, just above Mr. Squire's.

GROWTH OF POPULATION AND BUSINESS.

Mr. Derby. With regard to the growth of business and the increase of population in East Cambridge and Somerville, I wish to put in a table from the census of the United States and from the books of the assessors: —

Population of Ward 3, Cambridge.

In 1860	7,091
In 1870	9,171

An increase of 30 per cent.

Assessors' Valuation of the Ward.

In 1860	$ 3,886,300
In 1870	6,710,300
In 1873	9,680,700

It has nearly trebled from 1860 to 1873.

Population of Somerville.

In 1860	7,997
In 1870	14,685

An increase of 82 per cent.

Assessors' Valuation of Somerville.

In 1860	$ 5,851,700
In 1870	12,590,900
In 1873	29,643,100

The witness, Mr. Rapp, who was examined, put in a few tables which were not read, as at that time the Board were about to adjourn. I hold the tables in my hand, and, with your permission, I will put them into the case: —

Slaughtering, Cutting, and Packing Houses in the 20th Ward of New York.

Acres in the Ward	512
Population	75,407
Slaughterers	8
Hogs killed daily	7,400
Tanks used in the Ward	17
Hogs cut and packed	2,270
Tanks used	20
Tallow rendered daily	28,000 lbs.

In the 9th and 16th Wards.

Acres	540
Population	95,349
Packing-houses	10
Hogs cut and packed daily	1,895
Tanks used	18

The Butchers' Hide and Tallow Association renders 20,000 pounds of tallow daily, and uses three tanks.

In the 10th and 17th Wards.

Acres	475
Population	136,778
Packing-houses	10
Hogs slaughtered daily	1,525
Tanks used	15

TESTIMONY OF MR. EDWARD K. RICHARDS.

Q. (*by Mr. Muzzey*). Where do you reside? *A.* At the corner of Sixth and Cambridge Streets, East Cambridge.

Q. What is your employment? *A.* Mechanical engineer.

Q. Where are you employed? *A.* At the Revere Sugar Refinery.

Q. I don't recollect where that is. *A.* It is by the New England Glass Works.

Q. Have you been troubled at your house with bad odors? *A.* I have, sir.

Q. Proceeding from what source? *A.* I supposed from Miller's River flats.

Q. What are your reasons for saying that? *A.* Because I have never noticed the odor till the flats were uncovered, and the more they are uncovered the more the odor is increased.

Q. Has any injury to your dwelling-house resulted? *A.* Nothing more than the general discoloration of paint.

Q. How about the health of yourself and family? Has it been affected at all by this odor? *A.* Not very materially. We cannot sleep.

It makes us feel as though we had an extra tax upon our nervous system.

Q. Have you noticed in what direction the wind has been, whenever you have experienced this effect upon yourself and family? *A.* No, sir, I have not particularly.

Q. Have you ever observed the wind when the odor has prevailed? *A.* No, sir; because these smells are generally in the night. I don't know that I have ever smelled them in the day-time.

Q. Does the state of the atmosphere make any difference with you? *A.* Yes, sir, it does.

Q. In what state of the atmosphere do you get that smell? *A.* I get the smell more plainly just before a rain, or with a low temperature. On the night of the 31st of July the smell was severe, so severe that an indignation meeting was held on account of it. I have noticed that these smells have preceded a rain, and when the air is heavy and muggy.

Q. Have you ever experienced such smells as trouble you at your house in East Cambridge in other localities? *A.* Yes, sir.

Q. Where, for instance? *A.* In Havana, at Vera Cruz, and on board steamships, — the bilge-water.

Q. You identify the smell as of the same kind that you have experienced in Havana, Vera Cruz, and elsewhere, and also on board steamships? *A.* Yes, sir.

Cross-Examination.

Q. (*by Mr. McIntire*). How long have you lived, Mr. Richards, at the corner of Sixth and Cambridge Streets? *A.* A little over a year.

Q. How long have you lived in East Cambridge? *A.* About two years and a half.

Q Do you ever trace any of these smells? *A.* Well, no more than that we pump some 1,500 gallons of water daily to the top of the sugar refinery, and I know that when the water is low we have that same smell at the top of the building that there is in the basin.

Q. Do you ever smell any rendering smell? *A.* Occasionally I do.

Q. At what time? *A.* At no particular time. I have smelled it at all times.

Q. What direction did that come from? *A.* I suppose it came from the slaughtering establishments, but I don't know.

Q. Was that disagreeable to you? *A.* Not at all.

Testimony of Captain Charles J. Adams.

Q. (*by Mr. Muzzey*). Are you Master of the House of Correction? *A.* I am, sir.

Q. How long have you held that place? *A.* For twenty-three years.

Q. You are keeper of the jail also? *A.* Yes, sir.

Q. Well, at the House of Correction have you detected bad odors? *A.* I have, sir.

Q. Springing from what source? *A.* I have no doubt, sir, but what they came from the basin and the sewers.

Q. Has there been a sewer emptying by the House of Correction? *A.* There has.

Q. And has that made any nuisance? *A.* Some, sir.

Q. I believe the County Commissioners have made a change there, — have they, sir? Have they appropriated money for the carrying out of the sewer? *A.* Yes, sir. It should have been months ago.

Q. Has it been done? *A.* It has not been done yet.

Q. Is there trouble still from the place? *A.* There is.

Q. Well, now, you say that the smell comes from the sewers and basins, — do you mean from the basins of Miller's River? *A.* Yes, sir, and the sewers about Broad Canal and Charles Street, — Thorndike Street and Otis Street sewers. They all come into the basin there into what we call the County sewer, which was built some twenty years ago, before those buildings there, excepting the House of Correction.

Q. Do the tide or the atmosphere make any difference in the perceptibility of the smells at the House of Correction? *A.* It does.

Q. What is the difference? *A.* When the tide is in we don't smell it. When the tide is out we get the smell.

Q. Now, about the state of the atmosphere. Do you perceive any difference as to the prevalence of the odors from that? *A.* Well, when it is low, muggy weather we get it worse.

Q. Did you observe the condition of things on the 31st of July? *A.* I did, sir.

Q. In your company that evening were some gentlemen present at your office? *A.* There were, sir.

Q. Who were there? *A.* Mr. Meacham and Mr. Chaffee.

Q. About what time did you separate? *A.* Soon after nine o'clock.

Q. When you went out of the office did you notice the direction of the wind? *A.* I did, sir.

Q. In what direction was the wind about nine o'clock on the evening of the 31st of July? *A.* It was a little east of south.

Q. Was the attention of the party called to this smell in connection with any reports that had been circulated that bad odors came from Mr. Squire's establishment? *A.* It was.

Q. What was said? *A.* As soon as we went out of the office we smelled this bad odor, and I looked to see which way the wind was, and I remember one gentleman said, "You can't lay this to Mr. Squire, for the wind is n't right."

Q. How did you know? *A.* I looked at the vane on the church. When we got a little way up toward Mr. Squire's we did n't smell it at all. We smelled it more plainly by our place than at any other.

Q. Was there a breeze blowing that night? *A.* No, sir, there was not. There was just breeze enough so that we could see that it turned the vane, and we could feel the air.

Q. Are there any facts within your observation in reference to the controversy as to where the smells come from that you would like to state? *A.* Well, sir, I have smelled these bad odors and have started from the office to trace them. I have been into Mr. Squire's place a great many times both night and day. I never perceived any such smell about Mr. Squire's place as we get at the house, but I have around the basin. I will say, too, that I think the smell has increased every year. It is very much worse now than before we had the water works in Somerville and Cambridge. Every one has a water-closet running right into the sewers, and I think that it has a great deal to do with the condition of the basin.

Q. What they used to carry off in carts now is carried into the sewers, and into the basin? *A.* More or less.

Q. Do you remember when Mr. Squire came there? *A.* Yes, sir.

Q. I want to know what the state of the neighborhood then was about him? *A.* There were very few about him at that time. The population that has since gathered about him was not there when he came, but has gathered there year by year since he began his business. There has been a constant increase.

Q. You have visited the establishment recently, have you? *A.* Yes, sir, and a great many times.

Q. What has been the condition of it as you have perceived it during your visits? *A.* I have not seen it for a great while but what it was perfectly clean and neat. I was up there last Wednesday night between nine and ten o'clock, and went over the whole concern.

Q. There were complaints about odors on Wednesday of this week? *A.* There were.

Q. And you went into that establishment? *A.* Yes, sir; after it was locked up, between nine and ten o'clock.

Q. Well, now, did you or not perceive within that establishment or in its immediate vicinity the smell that troubled the people that night? *A.* No, sir, nothing that we smell upon the street.

Q. The smell which you had upon the street, and which troubled the people, you did n't find within the establishment or within its immediate vicinity? *A.* Nothing like it.

Q. (*by Mr. Newhall*). You heard the complaint? *A.* I did, sir.

Q. Did you perceive this odor before you heard the complaint, or was your attention called to it? *A.* My attention was called to it. I did n't smell it until I started out.

Q. Before you started out, near your place, did you smell it? *A.* Not very strong. I have smelled it very much worse than on that night.

Cross-Examination.

Q. (*by Mr. McIntire*). That was on the 17th you visited it, — Wednesday night. Do you know how the tide was? *A.* When I was up there it was full tide, very nearly.

Q. On the 31st of July, do you know how the tide was when you came out of the office? *A.* I don't know.

Q. Do you know that it was not high water? *A.* I have never smelled the smell when it was full tide.

Mr. McIntire. As a matter of fact, the tide was not out of the basin that night until half past ten or eleven o'clock, on the 31st of July. It was going out.

Q. Do you ever get any rendering smells? *A.* Never at my place.

Q. You are only troubled by the other smells? *Q.* But I have smelled it upon the street, the rendering smell.

Q. Where? *A.* Well, in going up Cambridge Street, and going by Mr. Squire's place.

Q. Was it disagreeable to you? *A.* Not at all, sir. Not half so bad as the boiling of cabbages.

Q. What was the smell like to you? *A.* It was like the frying of doughnuts or the rendering of lard.

Q. You noticed the vane on the Unitarian Church, on the 31st. Do you know that it turned at all on that day, from morning till night? *A.* I know which way it pointed. The vane is very reliable, and the vane on the Court House is not.

Q. I ask you whether it had not been so all day? *A.* I don't think it had.

Q. Have you described the smell from the basins and sewers? *A.* It is very much like the smell at the National House in Washington, the whole dock flats, and everything put together.

Q. Anything of the putrid-meat character, has it? *A.* Not that I know of. I have nothing but what comes from the basin.

TESTIMONY OF MR. JAMES ALEXANDER.

Q. (*by Mr. Derby*). You represent, sir, the Cunard line of steamships? *A.* I do.

The Chairman. I think that with regard to property we have decided to hear nothing.

Mr. Derby. Mr. Alexander has visited several establishments in Chicago, and I propose to ask him two or three questions about them.

Q. You receive large shipments from this firm of J. P. Squire & Co.? *A.* We do.

Q. You have been in the works? *A.* I have once, sir.

Q. Have you been also to the establishments in Chicago? *A.* I have.

Q. I will ask you to make a comparison between those establishments in Chicago and this establishment of Mr. Squire, in point of neatness, order, and management, so far as your observation went? *A.* I visited several establishments in Chicago —

The Chairman. What is the use of bringing that into this case? We are considering whether the health, comfort, and convenience of the people require the suppression of Mr. Squire's establishment.

Mr. Derby. I wish to show, sir, that this establishment is far better than those in other cities.

Mr. McIntire. I will admit that this establishment is as good as any other, and as well conducted as it can be.

Mr. Derby. If that is admitted I am content.

Q. (*by Mr. Derby*). I will ask you whether the packages that come to your wharf are free from smell, and are in good condition when you receive them? *A.* They are.

Q. As good as any part of your cargo? *A.* In perfect order.

Q. No bad odor about them? *A.* No offensive smell; not at all.

Mr. McIntire. When I say that this establishment is neat and is well conducted, I mean it is conducted as well as such an establishment, built in such a way —

Mr. Muzzey. Is it conceded that our establishment is in as good condition as any establishment for the purpose can be?

Mr. McIntire. As a hog-rendering establishment, built as that is, with the machinery and appliances there, can be.

Mr. Muzzey. Well, we propose to show that it is as good as any in the world. We propose to show that there are necessities for these places; that they are necessary for all communities; and that ours is as good as any in the world. If that is conceded, we are satisfied to let the testimony pass; otherwise, we wish to make this comparison.

Mr. Newhall. But suppose it should turn out that this establishment is dangerous to the health, comfort, and convenience of the people, how can it do you any good to show that other people are conducting the same business in the same way?

Mr. Muzzey. Because I shall have the honor, when I am speaking at the close of this case, to offer it to your discretion, whether it is in as good order as any other establishment is to be found; whether the business is not necessary to every community, and whether some district must not suffer for the whole community, in the way of unpleasant odors. That is the only light in which we wish to put this in.

The Chairman. You may put it in. Some members of the Board would like to hear it. I myself don't care anything about it.

Q. (*by Mr. Derby.*) I will ask you to compare this establishment with the works at Chicago, and say how it compares in neatness and in any other particular with them. *A.* I visited three of the establishments in Chicago. I have only visited Mr. Squire's establishment once. The comparison is entirely in favor of his works. I was struck with the absence of noxious odors in his establishment. In comparison with the establishments in Chicago his was remarkably free from offensive odors.

Q. As I understand you, it is superior to those establishments in all particulars? *A.* Yes, sir.

Q. You are from Scotland, I think, sir, — from Glasgow on the Clyde? *A.* Yes, sir.

Q. And have charge of a line of steamers running from Glasgow to Belfast, Ireland, every day. *A.* The company with which I am connected owns a line of steamers which sail between Glasgow on the Clyde to Belfast, Ireland, — some six or eight steamers. There is one point which I have seen brought out in the published account of the evidence here, and which I think should be observed by the Board, and that is with regard to the blackening of silver in the houses in the vicinity of Charles River basin. I happen to know that the silver plate on board our steamers, which sail up the Clyde in the morning, is blackened every day by the noxious gases which escape from the river Clyde. The sewage of the city of Glasgow falls into the Clyde, and, in hot weather, the condition of the river is something terrible. I have myself seen the river on a hot day seethe, and present the appearance of water boiling, in consequence of the escape of the noxious gases from the water. I am in the habit of almost daily passing the Milldam on Beacon Street, Boston. In

hot weather, and when the tide is out, I observe the same odor which I have found at Glasgow. I think that the annoyance of the parties living in the neighborhood of Miller's River basin has been from the exposure of the flats in that basin at low water, particularly in hot weather. Another observation I have made is this: I know that the city of Glasgow is at present engaged in the consideration of the question of improving its sewerage. Works of very great magnitude are being discussed for that purpose. The population of Glasgow is double that of Boston. I think that a great many of these things have a bearing upon this point.

Q. Is the plan of draining parallel with the river? *A.* It is proposed to carry the sewage of the country seat to the seaside, forty miles away from the city.

Q. By drains? *A.* I gave Mr. Squire an elaborate report published by the engineers, explaining it fully.

Q. They propose to pump it up and discharge it through the sewer as in London? *A.* Yes, sir.

Q. You see an indication of the same kind in Charles River now, do you, sir? *A.* I do.

Q. Do you draw the inference that when our population reaches that of Glasgow we shall have the same difficulties? *A.* I think you have the same difficulty here to some extent already, in that basin. I am not myself an engineer, but it seems to me that Boston has got to do what London has lately done; and that it would be greatly for the benefit of the public if that basin was embanked, and these flats covered.

Cross-Examination.

Q. (*by Mr. McIntire*). Do you know, Mr. Alexander, whether the smell from the water of the river Clyde is perceptible at any distance from the banks? *A.* Yes, sir, it is.

Q. How far away? *A.* I could not state with exactitude the precise distance at which these odors are felt, but they threaten the health of the city. In Glasgow public attention is drawn to the obnoxious state of affairs, very much as it is now being drawn here to Miller's River basin.

Q. Did you ever perceive any blackening of the houses a quarter of a mile from the river? *A.* The houses in Glasgow are all black.

Q. It is not the blackening of the gases? *A.* Well, I could not say how much might be color and how much gas. Most of them are built of brick and stone.

Q. There are not many wooden houses painted with lead paint? *A.* Not many.

Q. Whether any of these wooden houses are discolored as if by ammoniacal gases? *A.* I think it is impossible for me to say what gases blacken the houses of Glasgow, or how much is due to the gas and how much to something else. The obnoxious gases that escape from the Clyde are dreadful.

Q. Well, there is no tide there, is there? — that is, no such tide as we have in Charles River? *A.* Yes, there is a tide.

Q. I mean such a baring of the flats as we have here; such an exposure of flats as we have in Charles River? *A.* The banks of the river are laid bare at low water partially.

TESTIMONY OF HON. J. WARREN MERRILL.

Q. (*by Mr. Muzzey*). You have been Mayor of Cambridge? *A.* For two years.

Q. Also a member of the Board of Aldermen? *A.* Yes, sir, for several years.

Q. And a member of the Legislature from Cambridge? *A.* Yes, sir.

Q. Have you visited the Squire establishment? *A.* I have, sir.

Q. On what occasion? *A.* Within a fortnight.

The Chairman. The same day that the other gentlemen were there, I suppose? *A.* Yes, sir; I think so.

Q. (*by Mr. Muzzey*). Will you state in what condition you found the establishment? *A.* In a very excellent condition.

Q. It is in evidence that the excessively bad smells which have been complained of originated there. What is your opinion? *A.* I don't believe they could originate there, under the condition which I saw the works in.

Q. To what, sir, do you trace the odors in East Cambridge, Cambridgeport, and Boston? *A.* I think they are the result of the accumulation of filth from various sources. The first that I knew anything about was the bleachery at Somerville. That has been for years pouring in a residuum from their vats and ditch, which has been running down into these basins of Miller's River. Then the city of Cambridge put in a sewer from Baldwin Street, which entered into the same ditch. Then after that various establishments have been placed on the river or these basins or near them, which have been pouring in masses of animal, refuse, and vegetable matter, which I think has accumulated in the bottom of these basins to a very great extent. I don't imagine they have been careful about the direction of the tide, and this filth has been floated up, and when the tide turned it has been, perhaps most of it, deposited there, and it has been accumulating there for years. The same process is going on in several other places in Cambridge, with the same effect.

Q. What is the condition of Broad Canal? *A.* I have n't it from present knowledge, but I have it from past knowledge that the same operation is going on there.

Q. Is there not a great deal of public anxiety fixed upon that locality now? *A.* There is, and it is an absolute necessity that it should be attended to immediately.

Q. There are no slaughtering-houses on Broad Canal? *A.* None.

Q. What is the condition of Broad Canal, where the drainage of the city is turned into it? *A.* There is a small place on the other side of the city, on the southwest side, that is offensive.

Q. That is on the flats near the Grand Junction Railroad, is it not? *A.* I think the sewer runs in at the northwest side of Luke & Bent's wharf. I presume that is cut off by the new sewer upon Harvard Street.

Q. But that is turned into Broad Canal? *A.* Yes, sir.

Q. Well now, sir, from your knowledge and observation, I wish you would say to the Board whether you think the public health, comfort, and convenience of the neighborhood require the suppression of the Squire establishment?

Mr. McIntire. You mean the neighborhood about the establishment?

Mr. Muzzey. Yes, sir.

Witness. I think the danger to the public health will be removed so far as this establishment is concerned when the basin of Miller's River is thoroughly filled up with clean gravel or sand. I think that essential. I don't think it would answer to leave the portion of it under Mr. Squire's establishment unfilled, or not cleaned out thoroughly. I believe there is the worst accumulation. I don't know this from personal examination, but only from reports which I have heard from various parties for several years past.

Q. You think, sir, that the portion under Mr. Squire's establishment should be cleaned out or filled? *A.* Yes, sir.

Q. Suppose it to be thoroughly cleaned out and thoroughly bulkheaded so that nothing could possibly get in, and a good sweet cellar built? *A.* I think it would be just equivalent to filling it with clean soil. They would be obliged to do the cellar in cement, and that would thoroughly keep out offensive matter that now is seething there, and that is throwing out bubbles of gas constantly. I think I have observed these bubbles coming up from the water.

Q. Now in bulkheading and filling outside, would you not advise taking the course Mr. Squire has adopted, and begin to fill against the bulkheading so as to drive out the mud from the bottom toward the centre where it may be taken out and carried away? *A.* I think that would be well.

Cross-Examination.

Q. (*by Mr. McIntire*). Did you ever notice the discoloration of the buildings near Broad Canal? *A.* I don't think I have, sir, to any great extent. The building of the McLean Insane Asylum was very much discolored, pretty much as these boards are, but to no very great extent. I have noticed that because it was my duty to attend to the paint upon the building.

Q. That was before this sewer from Broad Canal was emptied into it? *A.* I judge it was largely from the effect of the dock mud. It may be of some interest for me to say, — I volunteer this, — that eighteen months ago I was exceedingly annoyed by an offensive smell upon the top of Dana Hill. Mine is the highest house on the hill. I was exceedingly annoyed by an offensive odor, corresponding very much to the description that I have heard of the offensive smells in Charlestown and East Cambridge. I traced it out, and after a full and thorough investigation, I discovered that the sewer brought in from the main sewer was not thoroughly joined with the wall of the building, and leaked.

Q. Your own sewer? *A.* Yes, sir. Being at the top of this hill, these gases came up the hill and found vent at this point. I had at the foot of my driveway, which is perhaps twenty feet lower than my cellar, a trap, an ordinary stone trap, built, which shut it off completely, and I have never been annoyed by this smell since. I only spoke of it to show that this same kind of smell is running over the city from these offensive outlets of the city, even to the very highest point.

Q. Do you get the rendering smell up there? *A.* No, sir, I do not.

Q. You are quite a distance away? *A.* Yes, sir. I should not be likely to get it, except when a very strong wind was blowing. I think that perhaps on one occasion I have got it. On the occasion of visiting

the works a few weeks ago I received a fatty smell at the corner of Sixth and Cambridge Streets. It was the same smell which I have in my own kitchen when the cook tries out the soap-grease. I did n't get, in any respect, the rancid or offensive smell. I found it proceeded from these open kettles in Mr. Squire's establishment.

Q. Did you go up and view these open kettles above the top of the close tanks? *A.* I did. They had melted lard in them. They were pretty nearly full.

Q. Did you smell any of the gas which comes from the close tanks? Did you turn on the gas? *A.* I think the worst thing I experienced was the scrap from certain close tanks, which was on the cart. The cart was open and the top taken off, and a part of it was shovelled for us to see. I smelled nothing else then, but that was the most offensive of all.

Q. The scrap had been put into a cart to be carted off? *A.* Yes, sir.

Q. That was in the evening or day-time? *A.* In the evening, at half past seven o'clock.

Q. Do you know whether any of those foundries on Broad Canal, or near there, pickle, as they call it, their castings in sulphuric acid? *A.* I am not familiar with the process. I understand they undergo an acid process.

Q. Is that acid poured into the canal? *A.* I presume it would be.

Q. (*by a member of the Board*). Fifteen or eighteen months ago you say you were annoyed by a bad smell which you found proceeding from your own sewer. Will you be kind enough to say whether that smell was perceptible at any considerable distance from your house? *A.* No, sir, it was not. The cellar into which it came was tightly closed except a little hole in the chimney and another which went out on the outside of the flue. They were intended as ventilators, originally, and took away the most of the smell. It did n't penetrate to all parts of the house; only sometimes it was perceptible in the room above. It was not noticeable outside of the house. I noticed another fact, which I think had some bearing upon this. These smells were uniformly stronger when there had been a heavy frost, or the ice had formed over the docks. That seemed to imprison the gas down at the basin, and throw it up into the sewer.

Q. So that it came into your house? *A.* Yes, sir.

Q. (*by Dr. Derby*). Do I understand that you are one of the present Board of Aldermen? *A.* No, sir. I have served as alderman for two years.

Q. I would like to ask Mr. Merrill, as being conversant with the state of affairs, a similar question to that which I put to Mr. Brastow at our last meeting, whether he regards it as the true policy of Cambridge at the present time to encourage the erection in East Cambridge of new establishments of equal magnitude and of equal character with those of Mr. Squire, North & Merriam, and the Boynton Packing Company? *A.* I don't regard these establishments as all of the same character.

Q. Well, take the best? *A.* The best I do, sir. I regard the location as peculiarly appropriate for such an establishment. The land is low, ill-drained, is not suitable for residences, and will never be occupied as residences except by persons who in connection with such a business are obliged to live in such a locality. I am an owner of land close by this establishment. I never expect to have it of any value except

for such purposes, that is, for the residences of men who work in these factories. The New England Glass Company was formerly as objectionable, and as great a nuisance, if I may use the word, as anything that has been there, and I think more dangerous to health, in consequence of the use, under great heat, of metallic oxides, litharge, and arsenic. They erected an immense chimney and produced an immense draught, for carrying the fumes to such a height in the atmosphere, that before they reach anybody they are diluted sufficiently not to be noxious. I have seen a column of smoke, evidently tinted with these fumes, on a day when it was perfectly quiet, rise as high from the top of the chimney as the chimney itself, making 400 or 500 feet, forced up by a column of hot air. I could not agree with the statement I heard this morning, that Mr. Squire's establishment is as perfect as it can be. I think the erection of a chimney like that of the New England Glass Company, and the introduction into it of a column of heated air, might produce sufficient suction to carry off almost entirely, if not entirely, the hog smell. I have seen similar operations in the coal reigon. The fire-damp from our coal-mines in Pennsylvania is carried off by means of long shafts cut through the solid rock 500 feet deep. At the bottom of the shaft a fire is kindled and a draught is created which carries off the gases and furnishes pure air from outside. I think that might be done here without any great expense.

Q. (*by a member of the Board*). Are you aware that the slaughtering establishments in New York have taken down most of their tall chimneys in order that the gases may not be distributed over so large a surface, as I understand it? *A.* I don't know it. I don't think it is sufficient to put up a chimney. It must be very large and very tall. I don't think then it would be very valuable unless a column of hot air is kept constantly going up it. I know that an exceedingly small pipe in a house will conduct away the smell from a water-closet from a great distance, and keep it perfectly sweet all the time, the pipe being carried into a kitchen chimney. I can show that in my house, where there is never the slightest smell from a water-closet from which a four-inch pipe is carried 75 feet horizontally into the chimney.

Q. I suppose you have no doubt that these noxious smells would continue if only the heat of an ordinary chimney is applied. *A.* I think the heat from the furnaces in operation there would be ample to produce a powerful draught from these pens.

Q. You think it is simply a question of draught. It is not a question of heat enough to destroy these gases? *A.* Not at all. The heat would not destroy them at all, unless a burning heat were applied.

Q. You don't think it necessary that they should be consumed? *A.* I think it is desirable, certainly; but the next best thing is to distribute them in the atmosphere at such a height that before they reach any one they would be so diluted as not to be noticed, as in the case of the New England Glass Company's works. I am not aware that any deposits have been complained of since that chimney was erected, either in Cambridge or its vicinity, or in Charlestown. Their chimney is 220 feet high, and, as I say, this column is carried up still higher; then the wind takes it, and before it reaches the ground it is so diluted that it becomes practically harmless.

Q. (*by Mr. Frothingham*). You have been on a visit to Charlestown? *A.* Yes, sir.

Q. Have you been there when these odors were in their most offensive aspect, and have you perceived them? *A.* No, sir, I have not.

Q. (*by Mr. Newhall*). How far is your land that you own from Mr. Squire's establishment? *A.* It is what is called "Brick Bottoms," on Linwood Street, about 1,000 feet.

Q. What effect upon the value would the removal of this slaughtering and packing establishment have upon your property? *A.* I think it would make real estate there fall, and be for years unsalable. I know they have had the effect to enhance its value within the last five or six years. I will say, with regard to my land, that I have sold most of it recently. I still own one or two lots, but not anything very important. I don't consider that I have any pecuniary interest in this matter. I think it unwise, if I may be allowed to say it, pending this filling, to suppress any of these establishments. I think if after the filling is finished, there still exists what may fairly be called a nuisance, there should then be an investigation made as to where that nuisance comes from. I have recently signed a petition for the annexation of Boston to Cambridge, or Cambridge to Boston, which you will, and one principal reason why I did so was because I recognized the necessity of a comprehensive system of drainage, which I believe can only be carried out by the two cities acting together. There should be but one interest in the matter; I believe our interests and those of Boston are identical. It is absolutely essential that this drainage should be provided, and it can be carried out with greater facility in this way.

Re-direct Examination.

Q. (*by Mr. Muzzey*). Did you examine, sir, the apparatus for the combustion of the gases in the establishment? *A.* I did, sir.

Q. Did it appear to be effectual, or otherwise? *A.* There seemed to be a stream of gas going into the furnace and being consumed with a bright flame.

Q. You understood the nature of the apparatus? *A.* I think I did.

Q. Did you think it effectual for burning or destroying the gases? *A.* I think it effectual for burning it. It is rather a question for chemists to say whether it is destroyed. I am not chemist enough to say what gases are given off from the trying of fat. I was not aware that there was any gas. I have a conviction that, if it is desired, I would state as to what I suppose. I did n't suppose there was any true gas brought out at a pressure of sixty pounds steam.

Q. (*by Mr. Derby*). You think no deleterious gases would be produced at the temperature which is used?

The Chairman. What is your question?

Mr. Derby. I asked him whether he thought that deleterious gases could be produced by a pressure of sixty pounds of steam, and he says he does not.

The Chairman. But he is not an expert in that business.

Re-cross-Examination.

Q. (*by Mr. McIntire*). You speak about land being low about there. Do you know of the relative height of the land in East Cambridge and

the top of Dana Hill, where you live? Take it at the corner of Fourth and Otis Street, sir, is not that about as high as in the city of Cambridge? *A.* No, sir, it is about as high as Dana Hill.

Q. Well, it was, before it was taken down, the highest point in the city? *A.* I was not aware of it. My impression was that it was not.

Q. They have taken it down about fifteen feet. You speak of a chimney, and the warm atmosphere passing up the chimney. Is not the advantage inside the chimney from the fact that, when you reach the top of it, there is a cool atmosphere that precipitates the matter down the chimney inside and not outside of it? *A.* I have no knowledge of that.

Q. Don't you know that in these high chimneys not so much of the soot goes out into the atmosphere on account of the cooling of the smoke before it gets to the top? It falls down the chimney rather than outside of it. Is not that the fact? *A.* I am not aware of it. I believe that the longer the chimney the more the smoke would condense and form soot as it passed along. If the column of air became cold at the top of it, it would not go; it would reverse.

Q. Are you sure of that? *A.* I feel quite confident of it.

Q. You speak of metallic vapors passing out of the top of the chimney; you say you see them. What makes you think that? *A.* From the color of the smoke.

Q. Might that not be caused by the height of the chimney and the cold atmosphere at the top changing color, and not of the smoke changing as it passes through? *A.* That may be so, but it is not my opinion.

Q. Well, now, if I should state as a fact that none of the lithargic fumes go up the chimney at all, — and we can prove it, if you wish, — would you then say that the smoke was colored by the metallic vapor? *A.* I should know better. I know that the smoke is colored by metallic oxides. I know that you cannot make flint glass without lead.

Q. You say that the great quantity of metallic vapor is from the melting of the metal itself. If I should tell you that that vapor does not go into the chimney, but passes off in a low chimney, would that alter your opinion? *A.* It would, so far as that was concerned.

Mr. McIntire. Well, we can show, as a matter of fact, that none of that metallic vapor goes into that chimney at all.

Mr. Merrill. I know, of my own knowledge, that the fumes from the pots go into the chimney.

Q. (*by Mr. McIntire*). If I should tell you that none of the vapors from the pots go into the chimney, would that alter your opinion? *A.* Yes, that would affect my opinion somewhat.

Mr. McIntire. Well, that is a fact, that none of the vapors from the pots, from the melting of the litharge or anything from the melting of the metals, passes off into that chimney. If it is necessary to prove that, Mr. Magoun is here and will testify.

Mr. Merrill. I used it only as an illustration, to show what Mr. Squire could do with a chimney; that he could produce this effectual draught in a chimney constructed like that of the New England Glass Works. I believe that it is possible to remove what is really the most objec-

tionable odor about this establishment, that is, the live-hog smell; in this I believe a draught of air could be carried through these sheds with a constant tendency in one direction up a large chimney through which the odor would be carried, and that the smoke and heat of the furnace under the boilers would be sufficient to create this draught.

Q. (*by a member of the Board*). Have you estimated the quantity of hot air passing up a chimney on the present plan of Mr. Squire's? *A.* I only estimate from the observation I made the other night as to the number of furnaces and the quantity of fuel burned.

Q. How much volume? *A.* I could not tell.

Q. Do you know the quantity of air necessarily passing up a chimney for each ton of coal consumed? *A.* No, sir, I do not. I should suppose that the furnaces I saw in operation would require a volume of air 30 inches in diameter at least to produce a sufficient draught to keep the fire burning brightly.

Q. Do you think the total quantity must be about fourteen tons? Do you know the temperature of an ordinary chimney with an ordinary draught? *A.* It depends upon the rapidity with which the water in the boiler takes up the heat.

Q. Do you call 300° Fahrenheit a minimum, and does it vary up to as high as 600°? *A.* I don't know exactly what it would be without knowing the style of boiler used. I have just put a boiler in operation in Essex Street where it was difficult to get heat enough into the flue to produce a good draught. It took me nearly three weeks to get it in operation, because the heat from the fuel was so thoroughly absorbed by the water that there was nothing left to dry the chimney.

Q. Then a certain amount of heat remains in the smoke and is necessary to create a draught. Should you think that a double quantity of air passing through the chimney would reduce its temperature to one half that of the smoke itself? If you have a common flue with a temperature of 400° and admit a quantity of air of a lower temperature, would you not reduce the temperature of the whole and diminish the draught? *A.* That would not be my plan in this case. If I was called upon to make a plan for this chimney, I should place a cast-iron column inside of this chimney, of the requisite capacity to create the draught from the furnace. Then the heat that would be evolved from the outside surface of the cast-iron pipe would heat a column of air around it, between it and the brick chimney, and produce a constant upward draught. It would not be powerful enough to carry these boilers, but enough to carry these odors up to the top of the chimney.

Q. Have you estimated the cubic contents of the hog-pens and hog-yards which you would remove in that way? *A.* I have not, except by my eye. I had reference to this idea when I was present, and I am satisfied that such a thing could be done.

Q. Upon what data is your opinion based that any practical fire could be kept burning so as to completely ventilate the hog-yards, making an upward draught from the pens to take away the hog-smell up the chimney? *A.* Well, sir, such an opinion as I have expressed this morning is formed and founded upon experience. It must be. I have had, outside of my own business, more experience in the matter of heating and ventilation than in any other matter, and have tried many experiments in heating

and ventilation. I have used this same contrivance that I now speak of in several buildings, and know that it has worked well. I know that an amount of ventilation that people don't believe to be possible can be got out of a very little heat, properly applied in the right place.

TESTIMONY OF DR. EBEN JACKSON.

Q. (*by Mr. Muzzey*). You reside in Somerville? *A.* Yes, sir.

Q. Are you in the practice of your profession in Somerville and East Cambridge? *A.* Yes, sir.

Q. How long have you practised medicine in the neighborhood of Mr. Squire's works? *A.* Four years.

The Chairman. Where did you graduate? *A.* I am a graduate of the University at Cotherton, Vermont.

Q. (*by Mr. Muzzey*). How early did you hear any complaints of the odors in the vicinity where you practise? *A.* I think my attention was first drawn to them in the fall of 1871 and the spring of 1872.

Q. Now, what have you noticed in the way of stenches in the general neighborhood yourself? *A.* Well, I have perceived two stenches, — one arising from the bone-boiling establishments and another from the basin.

Q. Have you been into Mr. Squire's establishment? *A.* I have, sir.

Q. And are yourself acquainted with the processes pursued there? *A.* Yes, sir.

Q. Now, sir, whether either of the offensive odors which you have perceived — the smell from the basin and the smell from the bone-boiling establishments — was perceptible in or about Mr. Squire's establishment? *A.* No, sir.

Q. From your observation what is the cause of the smell in the basins? *A.* The accumulation of animal matter and the matter from the distillery and bleachery. To my mind, it is generated sulphuretted hydrogen.

Q. Have you noticed any irritation of the throat among your patients, to any extent? *A.* None at all, sir.

Q. Any nausea? *A.* No, sir.

Q. How frequently have you been in the general neighborhood at night? *A.* Very frequently in 1870, 1871, and a portion of 1872.

Q. Have you had patients in the vicinity of any of these establishments? *A.* Yes, sir.

Q. I wish you to compare the immediate neighborhood of Mr. Squire's establishment with a wider territory within the range of your practice, and tell me whether sickness is more or less prevalent in the vicinity of his works than at a distance from them. *A.* I have not seen any great difference, sir. I should expect that there would be more sickness around Mr. Squire's works than in other parts of Cambridge, owing to the fact that a large part of the land to the west and northwest of the establishment is four or five feet lower than the other land. People have built houses upon that marsh. Their cellars are flooded a great portion of the time, and there is an accumulation of matter which naturally gathers around such habitations. Then there is another thing; until within a year or two nearly every house around on that marsh has kept a piggery. I believe in 1872 the city of Somerville passed an ordinance forbidding the keeping of pigs or goats. Some of these families have kept fifteen or

twenty pigs, and the stench has been unbearable. I wonder that there has not been more sickness than there has been. I think, in the fall of 1871 or the spring of 1872, I noticed that the basin above was very filthy, and I reported it to some of the authorities verbally. I live in Union Square. In going down to that region I often walked upon the Fitchburg Railroad, and, in passing the basin, it has been a common thing to see dead animals there. One day I counted six dead animals lying there. I reported the fact verbally to the city authorities. After a second report I think Mr. Houghton set about burying them, and I think fifty or sixty were buried in one day. The basin is certainly in a very filthy condition, and I should not have wondered to have seen more sickness.

Q. Do you know whether these pigs that you speak of as being kept by the inhabitants so numerously were fed on the city swill? *A.* They were, the most of them. There was one especially that I remember. I think it was the piggery of Mr. McGow, near the basin. He used to keep twenty-five or thirty pigs, and they were fed entirely upon city swill. The common disposition of swill in Somerville, up to 1872, was for boys to go around the city and collect it to carry away. It became a perfect nuisance. I think it is only since 1872 that there has been any removal of this material by the city.

Q. Have you noticed whether the smells from the basin are perceived very generally? *A.* I have noticed them invariably. They prevail more in the night. I think I have not smelled any bad smell except at low tide, when the atmosphere is dense. With regard to the bone-boiling establishments, I have had attention called to one of them.

Q. Have you observed that these bone-boiling establishments and grease-rendering places have been in the habit of lighting their fires at night? *A.* I don't know that they have, but I think so. I have often noticed, in passing down over the "Brick Bottoms," that very oppressive bone-boiling smell.

Q. Well, now, what in your opinion is the remedy for the evils of that district? *A.* I think, sir, that if a proper sewer should be built for these slaughtering establishments, the distillery, and bleachery, that their refuse matter may be turned into, and if the basins be thoroughly filled, that will remedy the trouble.

Cross-Examination.

Q. (*by Mr. McIntire*). Have you traced up any of these odors? *A.* Never, sir.

Q. What do you mean by bone-boiling places? *A.* I mean such places as Mr. O'Neil's and Mr. Reardon's. I did smell an unpleasant smell at Merrill's when I used to pass up on Bridge Street, when he tried out this unpleasant lard.

TESTIMONY OF BRAD. R. THROCKMORTON.

Q. (*by Mr. Derby*). Where is your place of business? *A.* In the city of New York.

Q. What is your business? *A.* I am a commissioner of lumber.

Q. Does it take you to the North River, in the 20th and 16th Wards? *A.* It does, very frequently.

Q. You have traversed these wards a great deal? *A.* I have.

Q. They are the wards in which the slaughtering of the city is done, more or less? *A.* Yes, sir, the 20th Ward more particularly.

Q. You have seen those slaughtering-houses down in that ward? *A.* I have.

Q. You have seen the ship which has been spoken of in this case at the foot of Thirty-eighth Street, on which the trying of grease has been conducted? *A.* I have.

Q. Will you state, sir, how far the trying of grease on that ship was smelled? *A.* I have smelled it as far as Sixtieth Street and Fifth Avenue.

Q. That would be how far? *A.* A mile and a half from the ship.

Q. That was when they were rendering what? *A.* Putrid matter.

Q. Have you perceived it on North River? *A.* As far as Striker's Bay, as far as Ninety-seventh Street.

Q. What would be the distance? *A.* Two miles or a mile and a half.

Q. You have distinctly smelt the smell of putrid grease that distance? Has that business been discontinued? *A.* It has, for some months past.

Q. Have you experienced that putrid smell since it went away? *A.* I have not.

Q. Do you know where it has gone? *A.* I believe it is on the Jersey shore.

Q. Now with regard to these slaughtering-establishments, do you know whether they kill at night as well as by day? *A.* In the day as well as in the night.

Q. Whether they kill summer and winter? *A.* Summer and winter.

Q. Have you seen work going on there in both seasons of the year? *A.* Yes, sir.

Q. You have of your personal knowledge? *A.* Yes, sir.

Q. Ever since this grease-trying ship has been removed, there has been no offensive smell in that part of the city to which you refer? *A.* There has not. I have not perceived it.

Q. You have not heard any complaint? *A.* No, sir.

Q. Is there rendering carried on on a pretty large scale in these wards? *A.* I believe there is.

Q. Do you find any offensive smells coming from any of them? *A.* No, sir, I do not.

Cross-Examination.

Q. (*by Mr. McIntire*). You say you don't know whether they have gone to the Jersey shore or not? *A.* I know they have left Thirty-eighth Street. They were on the Jersey shore some two months ago, or in July.

Q. Do you know whether they rendered on the Jersey shore at that time? *A.* I believe they did.

Q. Don't you know that the New York Board of Health have jurisdiction over the Jersey shore, and that they can prevent anything of that kind there as well as on the New York side? *A.* That may be, but I am not certain.

Q. You seemed to state it so confidently, that they did render upon the Jersey shore? *A.* I was so informed.

Q. Don't you know that the New York Board of Health forbade them

to render on the Jersey shore a year ago early in the spring? *A.* I believe that they have rendered there since that.

Q. Then you don't know, as a matter of fact, that that ship has rendered any since the early spring? *A.* No, sir; not since the early part of July.

Q. Did you experience any smells yourself? *A.* I did experience them in the early part of July.

Q. Do you mean to say that it came from that boat? *A.* Yes; because I have been there.

Q. At what time? *A.* In the early part of July.

Q. You are sure that is the date? *A.* There is no mistake.

Q. (*by Dr. Derby*). When were you in New York last? *A.* I was in New York on Monday last.

Q. You say that at the present time there are no offensive odors proceeding from the hog-slaughtering establishments between Eleventh Avenue and the North River, on Thirty-ninth, Fortieth, and Forty-first Streets? *A.* None, sir.

Q. You are there continually? *A.* Yes, sir.

Q. Have you the bad odor of the vaults? *A.* No, sir.

Q. Nothing from the carrying of dead horses around in that neighborhood? *A.* I don't receive any of that smell now.

Q. How far are you from the dock? *A.* My business calls me into the vicinity of Thirty-eighth Street.

Q. There is nothing offensive about that neighborhood? *A.* No, sir.

Testimony of Hon. Henry O. Houghton.

Q. (*by Mr. Muzzey*). You are the head of the Riverside Press establishment? *A.* Yes, sir.

Q. Have you been Mayor of Cambridge? *A.* Yes, sir.

Q. And an Alderman also? *A.* Yes, sir.

Q. I wish to ask you if you have paid a visit to Mr. Squire's establishment? *A.* I made several visits to Mr. Squire's establishment while I was Mayor; and I have made one visit recently.

Q. How recently were you Mayor? *A.* I was Mayor in 1872.

Q. During your term you made several visits, and since then you have made one visit. Well, sir, now compare the condition of the establishment when you first visited it, during your term as Mayor, with what you found it to be a fortnight ago. Have you seen any improvement or not? *A.* I think there has been a great improvement in the arrangement of the establishment; and a great many of the offensive things about it which I noticed when I first went there are entirely removed. Perhaps I might say with truth that all of them are removed.

Q. What opinion did you form of the establishment as to cleanliness? *A.* That it was in admirable condition. I don't see how such an establishment could be in such condition as I found it, in that respect, the last time I was there.

Q. Was it in full operation in all its departments? *A.* I am not able to say whether it was in operation in all its departments. It seemed to me in the same operation as when I visited it as Mayor. When I went there as Mayor, I frequently went without invitation.

Q. Were there hogs in the pens? *A.* Yes, sir; some, but not a great number.

Q. Were they slaughtering? *A.* Yes, sir.

Q. Was the rendering process going on? *A.* Yes, sir.

Q. Did you examine the machine for the combustion of the gases? *A.* We did.

Q. How did that work? *A.* It seemed to work very well. I am not a chemist, and am not competent to judge of that.

Q. It was during your term as Mayor that the investigation took place in reference to the Miller's River nuisance by the Joint Commission? *A.* Yes, sir.

Q. Now I desire to ask you, sir, to what you trace the unpleasant odors which prevail in the general neighborhood of the Miller's River valley, and what is the cure for the evil? *A.* My opinion was, from the investigation that I made personally with regard to it at the time that I was Mayor, that the great difficulty with regard to that locality was the low ground and the open basins there, which were the receptacle of every imaginable kind of filth; not only the filth that was thrown in from the borders, but from the tide which came up there. The efforts that our City Council made when I was Mayor, and especially my own efforts, were directed to having that basin filled up, as the best thing to cure the evils. You may remember that in the Legislature that year Cambridge urged very strongly that this basin should be filled up. Our feeling was that if that basin was filled up and properly drained, and the establishment managed in a proper manner, as I believe it is now, that it would do away with the difficulty.

Q. Do you still hold that opinion? *A.* Yes, sir.

Q. That if the work which the Legislature has prescribed — the filling of the district and the building of the sewers — is completed, Mr. Squire's establishment, in its present condition, will not be objectionable? *A.* I felt then, — and said so in the address which I delivered to the City Council when I left the office, — and I feel now, that Mr. Squire's establishment, properly managed, is a very desirable thing, in many respects, to have there. I think that all that region must be given up to business, and the way for the city of Cambridge is not to destroy that business, but to have proper sewerage and drainage, and then encourage all manufacturing business on the line of the Grand Junction Railroad; and by that means they will develop the necessity for drainage, and we shall get it, and the means from the manufacturing establishments to pay for it. It seems to me that this is a matter which the citizens of Cambridge are very much interested in. Here is a combination of the facilities of all the railroads of the country by means of the Grand Junction Railroad, and it is the natural place for the location of business. When we get that business, the necessity will soon be apparent, — which I think is apparent now, — for having a sea-wall on Charles River, and a large trunk sewer within that sea-wall, and that all these establishments must be drained into deep water; and then the more we have of them the better. The river will be improved; and we can use the money which this new wealth and these establishments will bring in to build boulevards and parks in other places. But the natural tendency of the manufacturing business is in that quarter, because of the facility of transportation, and because the land is good for nothing else. I was very glad to make this last visit to Mr. Squire's establishment, because it confirmed my theory that, with proper drainage

and a proper carrying on of the establishments of that kind, the business could be carried on there now perfectly unobjectionably. I only hope that we may have a great many more of these establishments, or those of a similar character. I don't care to have them all hog-slaughtering establishments, but they should be manufacturing establishments.

Q. (*by Mr. Muzzey*). It is hardly worth while, then, to ask you whether you think Mr. Squire's establishment should be suppressed at the present time? *A.* I think it would be a great calamity, sir, to the city of Cambridge. I am free to say that.

Cross-Examination.

Q. (*by Mr. McIntire*). Did you ever smell the rendering smell? *A.* Well, I never could get in the way of distinguishing one smell from another. There was a smell when I passed these basins that was very objectionable to me; and since this hearing has been going on I have smelt the same smell at the west end of the West Boston Bridge, — within a few days,— I think it was a week ago to-day that I perceived it. I came in on the cars, and the stench was almost insufferable. The wind at the time was south. I remember that from the fact that I rode in a carriage with my children, and we put the window down on the south side to keep the rain out. That stench must have come from the basin on the left side of the West Boston Bridge. It could not have come from any establishment on Miller's River.

Q. (*by Mr. Derby*). Could it have come from Mr. Squire's? *A.* It could not, because the wind was south at the time, and blew the rain directly into my carriage. That smell was perfectly sickening and intolerable. It is what I take to be the dock smell.

Q. (*by Mr. McIntire*). You don't get any of these smells at your house, do you? *A.* Yes; we get smells at my house of a very offensive character, but I never anticipated that they came from that source. The smells that I get on Dana Hill come from Brighton or from down towards the river.

Q. While you were Mayor we had quite a hearing before you and your Board of Aldermen as a Board of Health in relation to this establishment, or such part of it as is in Cambridge, did n't we? *A.* Yes, sir.

Q. At that time the Board of Aldermen as a Board of Health resolved that the Squire establishment as then conducted was a nuisance? *A.* Well, my own recollection is not quite in accordance with that. I know that the Cambridge Board of Aldermen as a board insisted a whole year on the necessity of the filling of these basins. I don't think they indicted Mr. Squire's establishment as a nuisance in just that form. They felt that all these basins should be filled, and all the efforts of the city government, so far as I remember, were directed to that end.

Q. Don't you now remember that some such resolve as this was passed: —

"That this Board, as a Board of Health of the City of Cambridge, believe that the business of trying and rendering pork and lard, as at present conducted in the slaughtering establishment of John P. Squire & Co., in East Cambridge, so called, is, sometimes, a source of noxious and offensive odors. Therefore,

"*Ordered*, That the Committee on Health ascertain and report to this Board what action shall be taken to remove said nuisance.

"November 20, 1872."

Do you remember such a thing as that being passed? *A.* I think there

was. I could not say that it passed, but I remember that such an order created a great deal of discussion.

Q. Don't you know that it was passed, or that some such order was passed, and that there was a report of a committee upon that order? *A.* I don't recollect that fact distinctly. It may have been so.

Q. This is the signature of the City Clerk of the city of Cambridge? *A.* I should think it was.

Q. And that appears to be a copy of an order? *A.* I never undertook to carry in my mind the orders that were passed. I remember the discussion of an order of that sort.

Q. Well, now, if that was so, if at that time the local Board of Health resolved that —

Mr. Muzzey. They did not resolve any such thing. They say that, once in a while, there are offensive odors, and they inquire how they can be avoided. There was no verdict of nuisance. It was quite the other way; they refused that.

Q. (*by Mr. McIntire*). If it was as I have stated, that the Board of Aldermen at that time resolved that this place was a nuisance, is there anything that you have seen since that time in your visits to this establishment that would make the difference of things there so essential as to make it not a nuisance? *A.* I have answered your question.

Q. I don't ask you whether it is a fact or not that this resolve and order was passed, — I will put in proof of that; but if it was so at that time, has anything been done since to essentially change its character? *A.* It was a gratifying surprise to me to find, on my late visit to Mr. Squire's establishment, that those things that were objectionable before are to a very great extent removed.

Q. Now will you please tell us in what respect the changes have been made that would remove the nuisance? Just mention them. *A.* One thing I noticed was the shed made, by which the hogs are received from the cars directly, instead of being driven in the open air. Furthermore, he has disinfectants in the pens, and the smell does not seem to be so strong. When I was there before, the blood in the slaughtering-house fell through the open floor into the water. I was very much nearer to it this time than I was ever willing to go before. It seemed to be all taken off by conduits away from the floor. Everything was orderly about it. The scalding seemed to be better. I think there was none of that disagreeable smell, or almost none of it. There was a live-hog odor, which you cannot escape from. But the greatest improvement seems to be the taking away the offensive odors of the works. You remember that at that time a great deal of stress was laid upon the fact that the hogs that died on the cars were rendered at the establishment.

Q. Do you know that there has been any change in that respect? *A.* I was going on to say that the night we were there they told us that dead hogs were in one of the tanks. They were put in for the purpose of giving us the effect of it.

Q. Whether at that time he did n't have an apparatus which communicated with the close tanks, and ran off the gas and everything into the water of the basin? Do you remember that? *A.* I think there was.

Q. That was the apparatus he had then. Now he has an apparatus by which he claims to burn the gas? *A.* Yes, sir.

Q. Now, beyond that change in the apparatus, was there any change that you saw in his rendering of pork, grease, or lard, or whatever it might be, in his establishment? *A.* At the time I used to visit the place, when I was Mayor, I never looked so much at these little matters of detail as I did at the general conduct of the business, because I thought the matter we wanted to remedy was the whole difficulty. I know that one of the things that attracted my attention, and which I saw myself early in the morning, was that on the borders of the basins we would find hogs in various stages of decomposition. I found then, on my examination of Mr. Squire's establishment, that there was nothing especially objectionable, except that the whole business was not done with the order and system and neatness with which it now is. I did not consider particularly this matter of running off these smells into the river. All that I knew about that was from the testimony at the hearing before the Board. I never examined this matter.

Q. Well, in other words then, there was hardly anything that was seen by you in the establishment that would cause those odors any more then than now? *A.* I think there were more odors in there at that time; the system was not so good. There is a difference between the establishment then and now, as there is a difference between the modes of cooking, perhaps, in a hotel where they are very careless and throw their slops all about, and the cooking in a hotel where everything is looked after in all its details. That was the difference that impressed me; that is, it was not so cleanly around about in past years as now.

Q. But you yourself saw nothing in the apparatus that you saw then and the apparatus you see now, which is used, that would make any difference in the odors? *A.* The thing I especially noticed was this matter of burning the gas. I did n't give much attention to that. I supposed there were other people who knew more about that than I do.

Q. (*by Dr. Derby*). You speak about the sewer being built through this region, through the Miller's River district, as if it were competent to remove the sewage. I would like to ask you whether you feel quite certain that the sewage resulting from the slaughtering of 800,000 or 1,000,000 hogs per year could be conducted without offence to tide-water through a submerged sewer 7,000 feet long? You speak pretty confidently about it? *A.* I am not prepared as an expert to answer that question, because it is a matter that I have not had anything to do with. But I will say this, that we must have sewerage in Cambridge in order to make it a habitable city. I trust that if there be science enough to give us that, it would give us sewerage that would carry all these things to deep water.

Q. Were you aware of the fact that the sewer is below tide-water? *A.* I am aware that it is very low there. I suppose there are difficulties in the case; but if that is the case our condition in Cambridge is deplorable.

Q. (*by Mr. Derby*). I would inquire where the 7,000 feet sewer begins and terminates? *A.* From Milk Street to Craigie's Bridge. By routes four, eight, and nine it is 7,000 or 7,200 feet.

Mr. Derby. From our establishment I believe it is only 3,000 feet.

Dr. Derby. Well, Mr. Houghton has spoken of the dedication of the whole valley to such business as is now carried on there by Mr. Squire.

Mr. Houghton. My idea would be to have a very much larger sewer and a longer one.

Q. Well, is it your opinion that a sewer of any size, below the level of the tide, carried a great distance to deep water, could safely convey the sewage resulting from the slaughtering of a million of hogs per year? *A.* It is a question of which I am not competent, perhaps, to judge. I had supposed that if this matter became troublesome the solid matters would be kept from the sewer, and that there would be some mode devised by which all it would be absolutely necessary to carry off in the sewer could be carried off. I have only judged from analogy. I supposed that if a city like London — a place situated upon a river so much like Charles River — could get rid of its immense sewage, that Charles River might, when it is so near as in this case, be made to accomplish this end for us.

Q. Then you would trust to a sewer all this matter of health? *A.* I have not entered into any of the details of the plan. I am not able to suggest what would be the best plan. I have said generally that we must have sewerage that will drain Cambridge.

Dr. Derby. I only want to call your attention to the fact that this branch sewer is also within the level of the tide, and must be controlled at its outlets by gates, I suppose, like those on the Back Bay.

Mr. Houghton. I believe almost all of our sewers are in that condition now, sir.

Dr. Derby. Yes, sir. But whether you had considered the fact of the slaughtering of this enormous number of hogs; whether the matter discharged into the sewer from these establishments would not, at certain stages of the tide, be retained for many hours in this sewer, and it would become an elongated cesspool; whether in your opinion that would be very offensive to the citizens of Cambridge and those living on the line of the sewer?

Mr. Houghton. I can only say that I think these are all considerations of the greatest importance, and I have not considered them sufficiently to give an opinion.

Dr. Derby. I have called your attention to it because you testified so freely in your opening remarks that, in your opinion, the sewer would be the remedy. You seem to have assumed that such sewerage could be obtained.

Mr. Houghton. There are some difficulties that come from them occasionally, but we do get what sewerage we get in that way; that is, they are pretty nearly all built with flood-gates, like the Oxford Street sewer. If we can carry off the ordinary sewage in that way, I don't see why we could not that which arises from a manufacturing establishment of this kind, provided nothing goes into the sewer except that which is proper for sewers; if the solid matters are kept out of it, and it is not allowed to be blocked up.

Dr. Derby. This is rather extraordinary sewage, not ordinary. It is so extraordinary that in most places it is required that these establishments shall be by deep tidal currents, as in the city of New York. The establishments of New York are on the banks of the Hudson River, which is a sewer of enormous capacity.

Mr. Houghton. This problem, I suppose, has been decided in Paris and London, — has it not, sir?

Dr. Derby. To a certain extent.

Q. (*by a member of the Board*). Do you know the grade of the sewer? *A.* It is about thirteen feet.

Mr. Muzzey. I think the mean low tide is ten feet, sir.

Dr. Derby. In all these plans the sewers are below the level of the tide.

Mr. Derby. I believe the engineer reports that they can be made efficient.

Dr. Derby. He reported the best that could be done. He did not report that they would be efficient for removing the sewage of slaughtering establishments.

Mr. Derby. We would like to be referred to his testimony, if you have it.

Dr. Derby. It was his testimony given to the Board in another regard.

Mr. Derby. Was it printed?

Dr. Derby. No, sir.

Mr. Derby. We entertain no doubt that a sewer can be built thirty-five hundred feet in length which would carry off the sewage from our establishment. It would be about half the distance you suggest.

Re-direct Examination.

Q. (*by Mr. Muzzey*). Mr. McIntire has put before you what he claims is taken from the record, and I have no doubt it is, of the City Clerk, a copy of the result of the hearing before the Cambridge Board of Aldermen. Last fall there was a reference of the subject to the Committee on Health, who were asked to inquire whether certain odors which, at times, were perceived, could be removed. Was not that about it, sir? In other words, did the Board of Health vote to suppress any manufacturing establishment? *A.* I don't remember any such action.

Mr. McIntire. I have the action of that committee in this. Perhaps I had better put in the report of that committee.

Mr. Muzzey. Perhaps, if you will allow me to examine the record of the whole case.

Testimony of Patrick McCabe.

Q. (*by Mr. Derby*). Do you reside in East Cambridge, sir? *A.* In Cambridgeport.

Q. Have you lived in Winsor Street? *A.* Yes, sir.

Q. How long have you lived there? *A.* I have lived there about fourteen years.

Q. How near are you to the establishment of Reardon for boiling grease? *A.* About a hundred feet; it may be a little more, but I guess it is about a hundred feet.

Q. How far is it from your place of business? *A.* It is about one hundred and fifty or one hundred and sixty feet.

Q. Are your premises extensive? — how much land have you? *A.* About ten thousand feet.

Q. What is your business? *A.* I deal in old barrels.

Q. And you occupy ten thousand feet near Reardon's? *A.* Yes, sir.

Q. On the same side? *A.* On the opposite side.

Q. He is within what distance of your premises? *A.* About two hundred feet, I should think, from where my dwelling-house is, and about one hundred and ten feet from my storehouse.

Q. What business is carried on by Reardon? *A.* He makes out grease tallow.

Q. Is the melting conducted day and night, or both? *A.* I think it is both day and night.

Q. It is conducted at night to your knowledge? *A.* There is steam and smoke there most of the night.

Q. Do you know what he renders? *A.* He renders grease that is collected all through the country. It is carried there and rendered out in that place, and when it is rendered out it has a very disagreeable smell.

Q. How disagreeable is it? How does it affect you? *A.* I never took notice how it affected me. It leaves a smell that you can smell all over the neighborhood.

Q. How many times during the past summer have you those strong smells? *A.* About three fourths of the time I should think, for these last two summers.

Q. Is the smell a strong one? *A.* It is fearfully strong sometimes, so that if you could see it, you could cut it, as people say.

Q. How does it compare with the smell about the slaughter-houses or packing-houses? *A.* It is very much more disagreeable to me than the slaughter-house. At the slaughter-house there is nothing more than the smell of fresh lard rendered out, and I think that smell is not offensive to me or anybody else.

Q. That smell from the slaughter-house is inoffensive to you? *A.* I never thought it was a very bad smell.

The Chairman. Is there any use of going into this examination?

Mr. Derby. I want to fix it very strongly upon them.

Q. (*by Mr. Derby*). Are there many carts that bring grease there? *A.* A great many during the day, though I have never kept any account of them.

Q. During the night you felt it very strong and offensive? *A.* Yes, sir.

Q. Is it perceptible at night or in the daytime? *A.* Both; it is worse during the night than the daytime. When I rise in the middle of the night, when I ought to leave my windows up to breathe fresh air, I have to shut them down tight in order to shut that air out of the place.

Cross-Examination.

Q. (*by Mr. McIntire*). Have you ever been engaged in a like business with Reardon yourself? *A.* I was some years ago.

The Chairman. Have you ever been to Mr. Squire's place? *A.* Yes, sir.

Q. Is there any difference between that and the other? *A.* A great deal of difference.

Q. Have you ever got any smell at Mr. Squire's? *A.* None that is disagreeable.

Q. (*by Mr. Derby*). Have you found any smell at Reardon's that is worse than the other establishment? *A.* I have found a smell that is more disagreeable to me than any other of them.

ABSTRACT OF RECORD OF CAMBRIDGE BOARD OF HEALTH.

Mr. McIntire. I will now put in, in connection with Mr. Houghton's testimony, this abstract of the record of the Cambridge Board of Health in 1872. I will say that the Board of Health is the Mayor and Aldermen; the Committee on Health consisted of three members, composed of Messrs. Woodbridge, Sortwell, and Kendall.

The following is a copy from the city records, under date of November 20, 1872: —

"The resolution in relation to the establishment of John P. Squire & Co. was taken from the table and amended by inserting the word 'sometimes' before the word 'arises.'

"The words 'which are injurious to the public health' were struck out by the following vote: yeas, — Aldermen Harding, Kendall, Sortwell, and Whitney (4); nays, — Aldermen Caldwell, Holmes, Snow, and Winnett (4), the Mayor giving the casting vote in the affirmative.

"The word 'considers' was substituted for the word 'adjudges,' and the order was then unanimously adopted by a yea and nay vote, being, as amended, in the following words: —

"*Resolved*, That this Board, as the Board of Health of the city of Cambridge, considers that the business of trying and rendering pork and lard, as prosecuted at the slaughtering establishment of John P. Squire & Co., in East Cambridge, so called, sometimes, causes and is the source of noxious and offensive odors. Therefore

"*Ordered*, That the Committee on Health ascertain and report to this Board what action can be taken to remove the said nuisance."

The following is a copy of the resolution as originally offered, under date of October 30, 1872: —

"*Resolved*, That this Board, as the Board of Health of the city of Cambridge, adjudges that the business of trying and rendering pork and lard, as prosecuted at the slaughtering establishment of John P. Squire & Co., in East Cambridge, so called, causes and is the source of noxious and offensive odors, which are injurious to the public health. Therefore,

"*Ordered*, That the Committee on Health ascertain and report to this Board what action can be taken to suppress the said nuisance."

The following is a copy of the Report of the Committee on Health, accepted December 26, 1872: —

"The Committee on Health, which was instructed to ascertain and report to this Board what action can be taken to remove the nuisance, consisting of noxious and offensive odors, caused by the trying and rendering of pork and lard at the slaughtering establishment of John P. Squire & Co., reports, —

"That the nuisance, of which the public has made complaint, although not confined to above-mentioned establishment, but shared by others, and especially certain smaller places, where the process of rendering is carried on, has been pretty thoroughly investigated in the case of Messrs. Squire

& Co., and to remedy any cause of complaint now existing, as far as possible, said firm have made arrangements by which, under contract, the blood and offal is to be removed in wagons from the premises nightly, and to confine the steam and odors in tight tanks.

"In view, therefore, of these improvements and remedies, and also the recommendations contained in the Report of the Joint Commission to which the complaints in relation to the existing condition of Miller's River were referred by the Legislature,

"Your committee decides that any further action at present is unnecessary. "For the Committee,

"S. F. Woodbridge.

"Cambridge, December 9, 1873.

"The foregoing are true copies.

"Attest, "Justin A. Jacobs, *City Clerk.*"

Mr. McIntire. That we desire to put in as a part of our testimony.

Mr. Derby. That report was accepted?

Mr. McIntire. It was about the last of the acts of that Board.

Testimony of Henry C. Lincoln.

Q. (*by Mr. Derby*). You reside in Boston? *A.* I do.

Q. Have you works in East Cambridge, sir? *A.* They are in Somerville.

Q. Do you render lard, sir, in close and open tanks? *A.* Yes, sir.

Q. I would inquire of you whether you have near your place an establishment conducted by a man named Barry? *A.* We have.

Q. What does he do, sir, in his works? *A.* He renders this grease that he collects from house to house.

Q. Does he do a considerable business of that kind? *A.* Yes, sir.

A. Will you state whether any offensive smells come from that process of rendering grease in that establishment? *A.* Very offensive smells.

Q. From trying grease? *A.* Yes, sir.

Q. Is it sufficiently near to determine that it comes from that establishment? *A.* It is; it joins us.

Q. You have a place in Somerville, near Miller's River? *A.* Yes, sir.

Q. Are those smells offensive by night as well as by day? *A.* I could not say that. I am not there by day.

Q. When you have been there by day you have noticed it? *A.* Yes, sir, when I am there by day.

Q. You have carried on the business of rendering lard? *A.* Yes, sir, and I am carrying it on now.

Q. I would inquire whether you have noticed any odors coming from the distillery? *A.* I have noticed some.

Q. State what they are, — whether they are offensive. *A.* It is peculiar; I don't know that it is offensive.

Q. It is distinctly perceptible? *A.* Yes, sir.

Q. Much of it? *A.* Quite a large amount.

Q. You have business of trucking more or less in Boston? *A.* Yes, sir.

Q. You truck into the markets and from the depot of the Boston & Albany Railroad? *A.* I do.

Q. Will you state what is the relative cost of freight per ton? *A.* Their general charge is one dollar and a quarter per ton.

Q. Is the charge different to a market at less distance? *A.* We don't get a great deal of it done, but I think we could get it for seventy-five cents.

Q. Would the distance be over a mile? *A.* It is a trifle over, I think.

Q. And for going that distance it costs you over a dollar? *A.* Yes, sir.

Q. I put this question to you: Would not the cost of trucking freight from one of these establishments, if moved away from Boston, be increased seventy-five cents or so a ton per mile? *A.* I should n't put it as high as that. I should say twenty-five or thirty cents per ton.

Q. At your own establishment you are put to some larger expense? *A.* These teams don't prefer to go that distance.

Q. And they prefer to make that difference in trucking? *A.* They do.

Q. You have often passed Mr. Squire's establishment? *A.* I have, sir.

The Chairman. It seems to me that this is entirely irrelevant.

Mr. Derby. It seems to me that it is a question of public convenience.

The Chairman. It a matter of private and not public convenience.

Mr. Derby. It seems to me that the question of private convenience is also one of public convenience when the public are affected by it. In this matter of transportation public as well as private convenience requires it. I should be sorry if I thought we were laboring with a Board who would not be convinced.

Cross-Examination.

Q. (*by Mr. McIntire*). How do you render your grease there? *A.* We render in open kettles.

Q. (*by Mr. Derby*). I would ask whether you have travelled up and down Canal Street, Charlestown, and found the smell offensive there? *A.* I have found it very offensive.

Q. More offensive than Miller's River? *A.* Yes, sir.

Q. (*by Mr. McIntire*). What do you render in open kettles and in close tanks? *A.* In open kettles we render trimmings and leaf lard, and in the close tanks sometimes both.

Q. Do you think there is any difference in the odors that pass out in the open kettles and close tanks? *A.* I do not think there is any difference.

Q. Is there any difference in the quality? *A.* The quality is the same.

Q. What is the quality you mean? *A.* It is the sweetness.

Q. Then you don't think that the rendering in close tanks produces a different odor from the rendering in open kettles? *A.* I have never been able to ascertain any difference in the odors.

Q. Where does that odor go to? *A.* It goes out into the open air.

Q. And you have never been able to ascertain the difference between those odors? *A.* Never. I tried several times in the last two months.

Q. How often did you blow off in the last two months? *A.* Within the last two months we have n't blown off.

Q. What do you do, then? *A.* We let the steam condense in the tanks.

Q. What do you do with it then? *A.* It goes out into the slush tank.

Q. What is done with it then? *A.* The water part is drained into the Miller's River basin.

Q. What is done with this matter? *A.* It is sold to Mr. Bradley.

Q. When does he take it away? *A.* In warm weather it is taken away every day.

Q. Is that offensive? *A.* It is if it lays there a very long time.

Q. How often is it taken away now? *A.* Three times a week at this time of the year.

Q. Then you have no method or apparatus which will carry it off except what you mentioned? *A.* I have not.

Q. Do you consider that there is any more smell coming from your close tanks without apparatus than there is from Mr. Squire's tank which has an apparatus which you have heard described? *A.* I would be unable to say what the odors rising from his always were ; but I have been unable to find odors rising from ours that would be offensive to any one.

Q. Do you think your method does away with the odor? *A.* I think we do.

Q. And if the vapor is thrown off into the atmosphere it would give no offence to any one? *A.* I think not.

Q. How long since you commenced it? *A.* Two months, I think.

Q. What was the object of doing so? *A.* They were finding so much fault about blowing off into the air, I thought I would try the experiment. I ascertained from outside parties that it would n't be necessary to blow off at all, though I never found the blowing off to be offensive.

Q. (*by Mr. Derby*). Did you go up to try the atmosphere? *A.* Yes, sir. I put my face close to it several times.

Q. And you found nothing offensive? *A.* Nothing offensive.

Q. (*by Mr. McIntire*). On Sunday morning, the 30th of November, was n't there a tank open there? *A.* I can't say. If they were in a hurry they might have blown it off, though there was no occasion for it at that time.

TESTIMONY OF DAVID M. OLIVER.

Q. (*by Mr. Derby*). Do you reside in Boston? *A.* In Cambridge, sir.

Q. But you conduct your business in Boston.

Mr. Derby (*to the Board*). I am going to introduce a new branch of testimony which will show that the rendering business is conducted on a large scale in Boston without giving offence.

Q. State if you please whether you render lard. *A.* I do.

Q. How many hogs do you render in the winter per week? *A.* From four hundred to six hundred in the winter.

The Chairman. Where is that establishment? *A.* Near Fulton and Cross Streets, about three hundred feet from the Commercial Exchange.

Q. (*by Mr. Derby*). You render in summer a less number ; how many do you render then? *A.* From three to four hundred a week.

Q. You have conducted the business in that vicinity for about how long a time? *A.* About six years.

Q. And previous to that time? *A.* I have been in the business thirteen years.

Q. And you have been engaged in this business how many years? *A.* I have been rendering lard in this business part of the city six years, and have been in the business thirteen years.

Q. I would inquire whether you have made any change? *A.* I moved into a new store this year, and put in some close tanks.

Q. Have any parties made complaints of your business? *A.* Don't know that any parties made complaint, never knew of persons knowing it unless I told them of it, except in one instance; never heard any complaint but that once.

Q. Was that a Boston nose or an East Cambridge nose? *A.* I think it is from East Cambridge.

Q. Who is it? *A.* It is Mr. Hastings. He was there one day and said he smelt it.

Q. You changed from open kettles to close tanks; will you state why you changed? *A.* I thought it was economy. I thought we got better lard and it could be rendered at a less expense.

Q. You did it from motives of economy and not from any complaint? *A.* Yes, sir; I thought it was for my interest to do so. Never had any complaint.

Q. Are there any other establishments in Boston that you know of? *A.* There are.

Q. State how many. *A.* There are four that I know of: one or two below me, and one on Ferry Street, and one on Fulton Street.

Q. (*by the Chairman*). How many establishments are there?

Mr. Derby. The witness speaks of four other establishments besides his.

Q. (*by Mr. Derby*). You don't know that any complaint is made in regard to them? *A.* Never heard of any complaint of them.

The Chairman. Where are they located? *A.* On Fulton and Ferry Streets, and at the South End; on Harrison Avenue, I think.

Q. (*by Mr. Derby*). You can state the amount of business they do? *A.* They do about the same amount that I do, — one of them not quite as much, perhaps.

The Chairman. How much do you do? *A.* From four to six hundred hogs a week at this season, and from three to four hundred in summer.

Q. (*by Mr. Derby*). You try out lard? *A.* Yes, sir.

Q. About the same as at Mr. Squire's? *A.* Yes, sir.

Q. And you have done it in open kettles without difficulty? *A.* Yes, sir.

Q. And you now do it in close tanks from motives of economy? *A.* I do.

Q. And you think open kettles just as good? *A.* Yes, sir.

Q. You have been in the other establishments in the city? *A.* Yes, sir.

Q. And never found anything offensive there? *A.* Nothing; I never found anything offensive to me at all.

Q. Any odors perceptible in those establishments, to your knowledge? *A.* No offensive odors.

Q. And you think the four other establishments, with one exception, do as much as you do? *A.* Yes, sir.

Q. Do they render in open or close kettles? *A.* They render in open kettles wholly.

Cross-Examination.

Q. (*by Mr. McIntire*). What time of day do you do your trying? *A.* In the daytime.

Q. Do you try your lard after it is rendered? *A.* My lard is kettle-tried.

Q. Where are those kettles placed? *A.* In the upper part of the store.

Q. Do you have a ventilator over those kettles? *A.* I do.

Q. Tell me why the kettles are placed high over the tanks, instead of down? *A.* My kettle is not; it is on the same flight. I pump my lard up.

Q. In regard to the conversation with Mr. Hastings, — he complained and smelt it; did n't you tell him that you had no doubt that he could smell it some? *A.* I don't think I told him so.

Q. Was n't it words to that effect, — that you should be surprised if he should n't smell it? *A.* I don't think I used those words.

Q. Do you blow these tanks off? *A.* I do.

Q. Into the atmosphere? *A.* No, sir; into a tank filled with water.

Q. At what time? *A.* About twelve o'clock.

Q. How much water is contained in them? *A.* Three or four hogsheads.

Q. Why do you blow it off there? *A.* When I was arranging them I was told there was danger of blowing out the lard; and it was very necessary to be cautious to see whether I blew out the lard. I had my pipe arranged to blow out at the side of the building, and after a trial I had it arranged in the cellar so that I could save the lard.

Q. Do you find any lard on the water? *A.* Sometimes, though very little.

Q. Do you get any odor from there? *A.* I never get any odor from there. If any of you gentlemen will come down, I will blow off the tank any time. The only smell is sometimes the water is like scalding-water and suds when a woman is doing washing.

Testimony of Luther P. Wiggin.

Q. (*by Mr. Derby*). What occupation are you engaged in, or where do you reside? *A.* I reside in Boston.

Q. Where is your place of business? *A.* On Harrison Avenue.

Q. What business are you engaged in? *A.* I am in the packing business, pork, lard, etc.

Q. Do you render any lard, sir? *A.* I do.

Q. How many hogs do you deal with a week, sir? *A.* On an average in a year about three hundred.

Q. Your place, sir, is on Harrison Avenue? *A.* Yes, sir, at No. 470, opposite Ashland Place, a few feet above Dover Street.

Q. You are very near Ashland Place? *A.* I am directly opposite it. Ashland Place leads from Washington Street to Harrison Avenue, and is just above Dover Street.

Q. Then you are three or four hundred feet from Washington Street? *A.* I should think it was n't more than that.

Q. How do you render lard in your establishment? *A.* In open kettles.

Q. How long have you had it there? *A.* It has been there fifteen years to my knowledge.

Q. Whether it has been a subject of complaint to anybody? *A.* There has been no complaint to me whatever.

The Chairman. No complaint to you from anybody during the whole fifteen years? *A.* No complaint from any one during the whole fifteen years.

Q. Have you ever heard of any? *A.* No, sir.

Q. (*by Mr. Derby*). Whether any offensive smells have come from it? *A.* No, sir.

Q. You render in open kettles? *A.* Yes, sir.

Q. You take lard and try it there without offence to any one? *A.* Yes, sir.

Q. And are doing it still? I am, every day.

Q. Do you know of a place in South Boston where rendering is done? *A.* I do.

Q. Where is that? *A.* At the corner of F and Sixth Streets.

Q. Is it in a populous part of that district of the city? *A.* Yes, sir.

Q. How much business is done there? *A.* Well, I can't say, but I should judge from what I know, about the same amount of business that I am doing.

Q. In South Boston, at this place? *A.* Yes, sir.

Q. And is that conducted inoffensively? *A.* Never have heard of any complaint.

Q. It has been there how many years? *A.* It has been there longer than I have been in business.

Q. And to your knowledge there is no complaint? *A.* No, sir.

Q. Is that section where you are located thickly settled? *A.* It is quite thickly settled in that vicinity. There is a dwelling-house in less than two rods; there is a family in the house adjoining my place and another dwelling-house not exceeding ten feet in distance from my place, and also about the same from the other place in South Boston.

Q. Quite a compact settlement? *A.* Yes, sir.

Q. Never heard of any complaint? *A.* No, sir.

Q. Do you know of any other place in the city? *A.* There is another place on Harrison Avenue, Curtis & Knowles, just above me.

Q. What business do they do? *A.* About the same amount I do.

Q. Has that been conducted for any length of time? *A.* Yes, sir.

Q. About how long? *A.* It has been there now about six years.

Q. (*by Dr. Derby*). Where are the hogs slaughtered? *A.* In warm weather they are slaughtered in Cambridge.

Q. (*by Mr. Derby*). In cold weather where are they slaughtered? *A.* They buy them where they can, — what we call railroad hogs, some of them, that come here from the West.

Q. (*by. Dr. Derby*). At this season of the year where are they slaughtered? *A.* I have mine slaughtered in Cambridge principally, by the Boynton Packing Company.

Q. (*by Mr. Derby*). Do you know of this establishment and the nature of the place? *A.* Nothing more than what has been mentioned here.

Cross-Examination.

Q. (*by Mr. McIntire*). You say you render in open kettles? *A.* Yes, sir.

Q. And you don't perceive any smell? *A.* No, sir.

Q. And in South Boston they render in open kettles? *A.* Yes, sir.

Q. And it is quite thickly inhabited about there? *A.* Yes, sir; there is a dwelling within a few feet.

Q. How many feet? *A.* Don't know precisely; it is pretty well settled up.

Q. Is n't there a burying-ground there? *A.* It is n't a great way off.

Q. The burying-ground occupies a great deal of the space around there? *A.* It is n't a great way off.

Q. Is n't it rather sparsely settled there except the burying-ground? *A.* I think not; it is pretty thickly settled.

Q. (*by Mr. Derby*). I would inquire, sir, whether you have seen any paint turned black in the vicinity of your establishment from the rendering of lard? *A.* No, sir, not from the rendering of lard, but I have seen paint blackened from the odor of the dock.

Q. You have seen that, yourself? *A.* Yes, sir.

Q. Whereabouts, — on the South Cove? *A.* Yes, sir.

Q. Above Harrison Avenue, where the basin was open? *A.* Yes, sir. After they continued Albany Street through, they let the basin in there between Harrison Avenue and Albany Street, and before that was sufficiently drained I have seen it discolor paint.

TESTIMONY OF COLUMBUS TYLER.

Q. (*by Mr. Derby*). You reside in Somerville, sir? *A.* Yes, sir.

Q. In former years you were in charge of the McLean Insane Asylum? *A.* Yes, sir, from 1847 to 1863.

Q. You remember the period when the upper basin had a gate upon it, shut in 1843? *A.* I can't fix the date precisely.

Q. Previous to that time had the river and basin been inoffensive? *A.* They had been.

Q. On the building of the Fitchburg Railroad in 1843 did you notice any change? *A.* Very soon.

Q. Please explain what. *A.* When those gates were shut.

The Chairman. Where were those gates? *A.* Just above the Grand Junction crossing. That gate made what we called three basins, now known as Squire's, North's, and the basin above them. This gate was put in just above the Grand Junction crossing, and it was closed when the tides were very high. After a few days, when that was closed, it filled up two or three feet higher than it used to be, and let the basin run off. That basin was the receptacle of dead cats, dogs, and every offensive thing which could be put there. Sometimes I think I have seen dead pigs there. Whenever the gate was shut, or soon after the gate was shut, we began to discover this bad odor of sulphuretted hydrogen gas.

Q. (*by Mr. Derby*). This was some thirty years since? *A.* Yes, sir. All this matter continued to be brought there, and in a very short time this basin began to be very offensive. Whenever the gate was shut at any particular time it would give offence in three days. The offensive air would come up into the houses, and it would be relieved only when the gate

was wide open. After the dye-works were put in the odors seemed to be terribly increased, whether on account of the peculiar kind of acids that were made, I don't know; still the trouble seemed to be increased, and the odors were very much more intolerable when the gate was shut. I think now that the whole flats are saturated with this offensive matter. Not long ago I was on the bridge between Cambridge and Somerville; the wind was blowing in, and the tide was just coming in. The odor seemed to be just as bad coming from Charlestown way as from Somerville. The drainage from the Asylum is no small matter. We have five hundred people on an average, and the matter enters Charles River just above the Asylum grounds; that has been going on for ten years. I have also perceived the same odor in Boston, near Chickering's factory, on Charlestown Neck, and in other places, — wherever the sewer empties and leaves the dockage at low tide.

Q. You have noticed this same odor? *A.* I have. Then we had another odor, very offensive, from Merrill's place. He made sausages and tried out lard. He made such a bad smell that he was threatened to be indicted, and I think he was.

Q. That is on the opposite side of the basin? *A.* Yes, sir. But he always kept good-natured and promised to be better, but sometimes he tried out very offensive matter. One night, after the odor had been almost unendurable, I went to see him. He said, "It is nothing, if it is a little bad at times; but we never have cholera here." After talking and threatening with him some time, telling him if he did not stop we would commence prosecution at once, he said, — and if you will permit me, I will use his own words, — "As for trying out any more of that rotten sheep's guts, I won't do it." We suffered from that odor very much, but we never suffered from any odor which we could trace to Mr. Squire's.

Q. The distance from your place to Mr. Squire's is how much? *A.* About a thousand feet.

Q. You did not trace any of the smells to Mr. Squire's? *A.* No, sir; none at all.

Q. And you have been in Mr. Squire's place? *A.* I haven't been in there for many years.

Q. And in going to and from Boston in late years you have passed on both sides of the basin and perceived nothing offensive from his works? *A.* Nothing from his works.

Q. And you do smell the odor from the basins? *A.* Yes, sir.

Q. What do you say as to the suppression of Mr. Squire's works? *A.* Always knowing how that gas escapes, — although I think he may have added to it some, — I have thought he was very much abused. It is easy to say, "That odor comes from Squire's." Every time an odor would come up people would say it comes from Squire's. It is a very settled conviction among a certain portion of the community that this odor comes from Mr. Squire's, but I don't believe it. It was there long before Mr. Squire came, and the odor is the same now as then. Since Somerville has been emptying its sewage there these whole basins have become polluted, and I think they are polluted all the way down to Charlestown.

Q. I would ask you, in regard to Merrill's, whether this trying has affected the color of the paint? *A.* I don't think it did.

Q. Then you think it must have been something else? *A.* Yes, sir.

Q. How recently have you heard any one complain of Mr. Squire's works? *A.* Continually.

Q. But is more with reference to the odor than the works? *A.* It is the odor principally. Whenever any one smells that gas they say they smell Squire's works. It is the smell of sulphuretted hydrogen gas.

Q. How far back do these smells go? *A.* I don't remember.

Q. What do you think the effect would be of a sewer down to Craigie's Bridge from these works? *A.* It seems to me that that would be the only relief we can have. I think it was fortunate that it was not carried down the other way. I believe that if it had been carried down Charles River it would have been necessary to carry it the other way afterward. It is my opinion that this whole question of sewerage has just begun to be felt in Boston. I think that channel ought to be walled up and built over. Unless something is done under one general system, the nuisance will be terribly increased. Now, each town or city has its own system, or no system at all. Many of the towns are increasing in population, and all this matter comes down to be scattered over the flats; they are all polluted now. I think a general system of sewerage is the only salvation Boston can have.

Cross-Examination.

Q. (*by Mr. McIntire*). Do I understand you to say that Charles River should be filled? *A.* I think Charles River should be walled up and filled to the channel.

Q. How wide is the channel? *A.* I don't know how wide that channel would be.

Q. When do you say you left the Insane Asylum? *A.* In 1863.

Q. When do you say those tide-gates were put in? *A.* Soon after the Fitchburg Railroad was built; I think it was in 1843.

Q. But did n't the Fitchburg Railroad run along on its old track for some time before that?

Mr. Derby. It was in 1843, I know, because I was in the direction of it.

Q. (*by Mr. McIntire*). Did they put any track in in 1843, when that was put in? *A.* I did n't say that.

Q. As originally built it did n't cut across the basins? *A.* No, sir.

Q. It ran across the old track along side of O'Neil's there? *A.* Yes, sir.

Q. Well, you won't say it was as late as 1853? *A.* I will say that when the Fitchburg Railroad was started, then the gate was first put in, and soon after that we began to smell this odor.

Mr. Derby. The Charlestown branch was first built in 1853, and the Fitchburg Railroad was built in 1843, — I was in the direction of it.

Q. (*by Mr. McIntire*). Do you think there was enough animal matter put in those basins to make those stenches you speak of? *A.* I think it would be with the sewage emptying into them. At that time there was a large sewer came down from Prospect Street and drained that neighborhood.

Q. Did you hear Mr. Munroe of Boston testify the other day? *A.* I did.

Q. Did you hear him speak of the magnifying of the statements in regard to the emptying of sewers? *A.* I don't agree with him in regard to the stench and its cause; I only testify to what I know. In regard to his knowledge, I should not vouch for it. I was in the habit of going by

those places every day, more or less. From the fact that we were so much annoyed by this whole thing, I called upon the Board of Health and insisted upon having those tide-gates kept open.

Q. You never knew of any of Merrill's workmen being sick? *A.* He said they were all healthy.

TESTIMONY OF JAMES GOULD.

Q. (*by Mr. Derby*). Where do you reside? *A.* I live at Lexington, now.

Q. You formerly resided in Charlestown? *A.* Yes, sir; Charlestown is my native place.

Q. You have been engaged in manufacturing soap in former years? *A.* Yes, sir; from 1844 to 1854, adjoining the present site of the State Prison in Charlestown. My works were where the yard of the State Prison now is.

Q. You had a lime-kiln built on the line of the railroad? *A.* Yes, sir.

Q. And you conducted the business of manufacturing lime and soap? *A.* Yes, sir.

Q. Since then you have been living at Lexington? *A.* For about twenty-five years.

Q. And you have passed in and out upon the railroad? *A.* Yes, sir, daily for twenty-five years, except Sundays, until within three years, when I have come in only twice a week.

Q. You are familiar with the establishment of John P. Squire & Co.? *A.* Yes, sir.

Q. Will you now explain to the Commission what these smells are, what occasioned them, and what they come from? *A.* Well, sir, the first and primary cause of the smell was the large quantity of sea-weed and rock-weed driven up and deposited in the basin. I have been there in my boyhood, when it has floated up after a heavy storm, and been driven up upon the flats and deposited there. My theory is that this deleterious sulphuretted hydrogen was formed there and left in large pools there, and caused the rapid decomposition of this matter which causes those odors.

Q. Any other cause, sir? *A.* I have noticed time and again that dead dogs and cats and different material calculated to make an offensive smell came floating down on both sides of the river, where the water was running from the bleachery would stir it up and cause this tremendously foul odor.

Q. Did the sewers or drains have anything to do with it? *A.* Yes, sir.

Q. Have you noticed any kind of smells as you go along the road? *A.* The principal smell was from the bone-drying establishments.

Q. Where were those? *A.* Those were these small establishments. There would be more foul odors from one of those small establishments than there would be from a large factory.

Q. How would be the effect of a smell from a small establishment rendering grease compared with that from a factory rendering lard? *A.* There is no offensive odor in the rendering of lard.

Q. I speak of these small establishments for rendering grease? *A.* One of those small establishments would make six times as much as a large factory.

Q. Please state whether there have been any of these small establishments on the bank of the river. *A.* There have been.

Q. Where has the refuse matter from those establishments been carried? *A.* Deposited right in that neighborhood.

Q. There has been a great deal of it done there within the last fifteen years? *A.* Yes, sir, and a great deal is done now.

Q. Have you perceived anything offensive coming from Mr. Squire's works? *A.* I have perceived nothing but the smell of sweet lard.

Q. Nothing offensive at all? *A.* Nothing offensive at all.

Q. If there is any other fact bearing on this question, you will please make an explanation of it to the Commission. *A.* I will state that I was carrying on the phosphate business at Charlestown two or three years ago, and had the material from North, Merriam, & Co., the blood and *refuse* matter, to work into my establishment.

Q. Our inquiries here are directed to Mr. Squire's establishment. You know of nothing offensive to come from there? *A.* Nothing offensive.

Q. You have been there more than once? *A.* Yes, sir.

Q. From what you know of this business, do you know of anything in that establishment that would give offence to the community? *A.* Nothing.

Cross-Examination.

Q. (*by Mr. McIntire*). I want to ask you if you have smelt the live-hog smell on the Fitchburg Railroad? *A.* I have.

Q. How often? *A.* Whenever they have been on the track, or side of the track, at North & Merriam's place.

Q. Do you lay it entirely to North, Merriam, & Co.'s? *A.* I have frequently smelt the hog smell, but don't recollect any particular case except where the cars have been standing near their place.

Q. But you know the Grand Junction Railroad passes between these two establishments, one being on either side of the track. You don't mean to say you never smelt the hogs except when they were going into North & Merriam's? *A.* I have no recollection of smelling live hogs except in those cases I have mentioned.

Q. You don't think the hogs that go into Squire's are any sweeter than those that go into North, Merriam, & Co.'s? *A.* No, sir.

The Chairman. The Board will now adjourn until to-morrow morning at 9 o'clock.

Mr. Derby. And we hope to finish our case in one day more.

The Chairman. That will close the evidence, then.

Mr. McIntire. I should like to say that the testimony may be closed on their part, but the evidence brought in here by the respondents will necessitate the bringing in of testimony in rebuttal. I would express the hope that the hearing of testimony would not be closed peremptorily upon the conclusion of the evidence for the respondents.

The Chairman. The Board will not prevent you from entering any testimony you may wish.

Adjourned.

ELEVENTH DAY.

Saturday, December 20, 1873.

The Chairman. Before proceeding, I want to state in behalf of the Board that we have been extraordinarily patient in regard to some of the witnesses who have been examined. I hope therefore counsel will be careful to tell us about subjects of which the Board may be supposed to know nothing. As to the opinions of persons about carrying on work in similar places we hope the time of the Board will be spared.

Testimony of Hon. Horatio G. Parker.

Q. (*by Mr. Muzzey*). You have been an Alderman of the city of Cambridge, and were City Solicitor, and had had official charge of the matters which resulted in the legislation of last year as to the Miller's River valley? *A.* I have, except in a very few instances, helped to bring about all the legislation that was enacted.

Q. And you are one of the Commissioners appointed under the Act of last winter to superintend the building of the great sewer? *A.* I am, sir.

Q. Now, I wish you would give to the Board your views, in your own way, of the subject which is now under consideration. *A.* The first time that I was called to Miller's River was on the complaint of an agent of an estate situated a little this side of Bridge Street Bridge. His complaint was laid before the Mayor and Aldermen of Cambridge, and as Chairman of the Committee on Health I was deputed to go to visit the place. That was my first introduction to Miller's River.

The Chairman. When was that? *A.* In June, 1870, I think, though I may not be exactly right. I went there and went outside the place. I did n't go into Mr. Squire's establishment then. I looked about for some time, and then I concluded that I ought to go and see this estate and see in what way it was affected by Mr. Squire's works. I found that estate had seven necessaries dripping immediately upon the flats of Miller's River basins. I concluded that he could stand Mr. Squire as long as Mr. Squire could stand him.

The Chairman. I want to know what this has got to do with it?

Witness. Just to show my experience in examining into complaints of this kind.

Mr. Muzzey. The contest is between this establishment and the true sources of nuisance.

The Chairman. I suppose every privy smells somewhat.

Witness. I was going to show that the stench arising from the basin was terribly increased by the emptying of the privies into it.

Mr. McIntire. There is no denial that the basins stink terribly.

Mr. Muzzey. Mr. Parker will please proceed.

The Chairman. Try and keep to the subject which we are discussing.

Mr. Derby. We will try and finish this morning.

Mr. Muzzey. The Board will recollect that we put in twenty witnesses yesterday.

Witness. The same year, I think in August, another complaint came against Mr. Squire to our Board, and that was referred to me as Chairman of the Committee on Health. I then went into a considerable investigation, making the examination personally and by means of the police officers and health officers that I had to aid and assist me. I made a report to the city government stating what were my views, — and the other members of the Committee on Health agreed with me as to what was the principal difficulty and trouble there, — and showing the number of drains which entered into Miller's River, and the number of privies and the number of boarding-houses which discharged there; and a copy of that report I have here in this volume, but if the Committee don't wish to know the other sources which, in my view, principally cause this difficulty, why, of course, I am very desirous of being relieved from stating anything.

The Chairman. You don't want to read the whole report?

Mr. Muzzey. We will put the report in.

Witness. What I wanted to read in that report is the part in relation to the amount of sewage drained into the basins.

Mr. Derby. It is very important to us.

The Chairman. Please go on.

Witness. This is in the printed proceedings of the Board of Aldermen, October 1, 1870. It is this: —

"Alderman Parker, for the Committee on Health, to whom were referred petitions asking for the abatement of a nuisance in Miller's River, caused by sewer deposits and the collection of refuse matter from slaughter-houses, etc., made the following report: —

"Through the efforts and faithfulness of Henry Kinsley, the Health Officer of Ward 3, who has been for some time specially employed for the purpose, they are able to furnish the following information upon which this report is based:

"Miller's River, so called, is properly no river, but an arm of the sea, having flats on each side of some portions of it, with quite a body of water at high tide, and when the flats are left entirely bare of water, and only a very narrow water channel left. The drains emptying into this recess of water are none of them carried beyond the edge of the stream, thus leaving their discharges upon dry land when the tide is low, — and the tide does not carry with it all the discharges made while the water is high, which are thus left on the flats exposed to the sun, and have their odors borne abroad considerable distances by the winds. The territory in Cambridge draining into this stream is bounded by commencing at the corner of Bridge and Third Streets, thence running south to Cambridge Street, thence west to Elm Street, thence south to Hampshire Street, thence west to Oak Street, thence north to Somerville line, thence east to the point begun at. In Cambridge there are seventeen common sewers which empty into Miller's River. Five hundred and sixty-eight houses, containing seven hundred and six families, are accommodated by the drains. On Cambridge and Norfolk Streets alone, stables occupied by one hundred and twenty-five horses are also accommodated by the same drains. There are also in Cambridge ten private

drains which discharge into Miller's River. These private drains accommodate nineteen houses, containing twenty-three families. Add to these the private drains of Squire's slaughter-house, North & Merriam's slaughter-house, Boynton's slaughter-house, Lincoln & Chamberlain's lard-works, and Sortwell's distillery, and you have fifteen private drains so discharging. There are twenty-one privies which discharge directly into Miller's River. These privies accommodate sixteen private houses, containing nineteen families, and factories, slaughter-houses, etc., which regularly employ two hundred and twenty-six men. Of other causes of nuisance which drip into Miller's River, we may mention five stables, accommodating fifty-four horses, hog-pens, in which are accommodated about ninety thousand hogs during the year, one slaughter-house, sixteen hundred cattle a year. From Somerville there are the lard-factory, with a privy for ten men, and six hundred private houses, all of which drain into Miller's River. We should also mention the Bleachery in Somerville, the drainings from which are sure death to every fish and eel that reaches them, and also kill the ducks and geese that venture therein. Mr. Kinsley, in his report to the Committee, says: —

" 'You will notice that I have mentioned *drippings* from the *hog-pens*. This is seemingly as great a nuisance as there is in the river. There are cords of it floating up and down the stream, — on flood tide it is carried up stream, on ebb tide it is carried to the basin formed by the filling in of Bridge Street, and what does not escape down the river settles in the dock. I have collected some of these drippings and put them on the flats where the sun strikes them. I find that when they have been baked by the sun they remain, and the tide will not wash them away.'

" Mr. Kinsley adds: —

" 'In watching the operations of things in the river, I am well satisfied that the great cause of stench from the dock is the filling up of Bridge Street, thereby leaving so small a space for the ebb tide to escape. The water rising to that point strikes the sides of the opening and is thrown back, forming an eddy by which the animal and other matter is carried into still, shallow water, and settles on the flats. I have no doubt that this matter is filling up the dock at the rate of one or two inches a year. The same trouble exists where a similar filling has been made by the Fitchburg Railroad Company near Gore Street, and Somerville will soon have the same trouble to contend with that Cambridge now has.'

" Your Committee agree with Mr. Kinsley in his conclusions. The stream has been narrowed where bridges have been constructed, thus preventing a free ebb and flow of the tide, and the result inevitably follows, that while the causes of filth and nuisance are continually increasing, the means provided by nature for carrying the filth away are constantly being rendered less and less effective. Your Committee need not enlarge upon the serious magnitude of the unhealthful and offensive nuisance which Miller's River now is to the inhabitants of the Third Ward. The plain facts reported by Mr. Kinsley speak with a sufficiently emphatic and warning voice to those who have the comfort and health of the city in charge. The question is, What is the remedy? Your Committee do not believe that the proprietors of slaughter-houses and other places of like nature are sufficiently careful. *They* think they do what they should; they however should do more, and train every man in their employ to exercise the greatest care to prevent anything of an offensive character reaching the river. This your Committee know is not done. They cannot point out exactly where the fault lies, but it lies somewhere. The hog-pens of the large slaughter-houses should not be permitted to remain longer as they are. It will be a large expense to change them, but changed they should be. Something can be done in this way, but the great trouble still remains. Miller's River must serve for draining the large territory we have described. How can it be best made to perform this office? Your Committee see but one way, which is to fill up the flats, making a narrow channel which shall always contain a reasonable depth of water, and extend all sewers out into that channel. There will then be no lodging or resting place for the offensive matter which to a considerable amount must be discharged by the thirty-two public and private drains now emptying into the stream. This is a

very great and very expensive undertaking. But the inhabitants to be protected are a large proportion of the inhabitants of our city. The very hot and very dry sesason we have experienced this year has undoubtedly added much to the offensiveness of the nuisances mentioned. But the population in the vicinity of Miller's River is rapidly increasing. The necessary causes of nuisance must increase, and the amount of offensive matter which must lodge and putrefy upon the flats of the river, if permitted to remain as it is, will largely multiply. Your Committee see no other course than the one recommended."

The Chairman. How many hogs? *A.* It is put in here at 90,000. The great matter which was then complained of was the drippings from the hog-pens. We put the average of what would be a fair number every day, as we thought, then, — that is, we averaged it at 90,000 hogs during the year.

Q. (*by Mr. Derby*). There were a great many kept in private pens at that time? *A.* We put in what we thought would be a fair average of hogs during the year.

Q. (*by a member of the Board*). Do they average 90,000 a year? *A.* Yes, sir.

Q. (*by Mr. Derby*). It has increased very much then? A great many are kept in private pens? *A.* Yes, sir. We made this estimate at that time from just over the line in Somerville. It was the same in a very short distance and in a small area. The hogs and pigs I found in there were something like 500, regularly kept by people living right on the streets there. But this 90,000 includes the whole number of hogs.

Q. (*by Mr. Muzzey*). It must be for the year (we slaughter but 1,200 a day). *A.* It is during the year.

Dr. Derby. Then the number would be too small.

Witness. We will call it too small then.

Mr. Muzzey. I think it would be probably right to divide it by 300.

Mr. McIntire. That was what we reckoned a year ago.

Witness. It is a subject that this committee has dwelt upon a great deal. The thing very much complained of then was the dripping from the hog-pens. I will say that an examination of this matter during that summer and fall brought me to this conclusion, and I stated it just about as I shall state it now. In my opening of this case before the Committee on Harbors, when we applied to the Legislature in 1871 to fill up those basins, I made up my mind that there was a great deal of mistake about it; that a great deal was charged to the operations of Squire's slaughter-house which did n't belong to it. I stated it then in this way: If you were to take the slaughter-houses away, and leave the basins as they are, more than nineteen twentieths of the nuisance would be left. I believed they would be awfully mistaken in regard to these odors. Why, I would be up at the square, and people would say, "There is the odor coming from Squire's slaughter-house." Then I would go down there; but I could not trace it to Mr. Squire's. I could not get at the top of the chimneys, and smell to see if it would come out there. I have been in there many times, and I could not detect any such thing in there, but it would be the regular old basin-dock smell; and I know very frequently that people were mistaken, and charged it to Mr. Squire when it was nothing that could be traced to or could come from his establishment. I know of many times when they were mistaken in that respect; and I made up my mind that the thing to move for and accomplish was the filling up

of the basins, and, that being done, everything else could in time be arranged and cured, so that Mr. Squire could carry on his business without injury or prejudice to health. And he has very much improved the methods of carrying on his business since that time; and I wish to state that I think, if you remove Mr. Squire's slaughter-house and let those basins remain, there would not be any perceptible difference in the complaints of nuisances from what there are now. It is generally asked, In what respect has Mr. Squire improved his place? Well, the first time I went upon those premises the hogs were yarded there, and those that were not yarded were in pens, and those pens not covered, and were washed out with water; and that was what caused this large amount of hog drippings, as it was called. We felt that that was what produced a great deal of this nuisance. At that time a great deal of the blood went into the stream. I find that all that is stopped now. Then, following out the matter of pens, it seems to me that since they have commenced putting charcoal in the pens, if anything is washed into the stream, the charcoal being with it, so far as the nuisance is concerned the charcoal would do quite as much good as harm. Then in regard to taking care of the offal, that is improved. I think these slaughter-houses should be charged with their share of making this nuisance. In past years a great deal of the offal, blood, etc., went into the basin. The first summer I went down there I stood upon the wharf when the tide was going out. You could see every minute or two pieces of flesh and clots of blood as large as your hand floating down the river. A great deal of that was due to the carelessness of the men instead of the proprietors. This matter has been practically cured, and nothing of the kind has been seen at later periods of time. As I said before, the basins being removed, there is no practical difficulty in the carrying on of this business there. It is a great business, desirable to be carried on, if it can be carried on without being a nuisance. In regard to this question of nuisance, when you have disposed of the nuisance in Miller's River, you have hardly begun. At the end of West Boston Bridge, those flats on the Cambridge side are as bad as those flats on Miller's River were five years ago, and are increasing at a terrible ratio. One element that has been overlooked is the immense amount of offal that is floated up with the incoming tide. The Boston shore is now deep water; on the Cambridge shore are all the flats. And here is the sewage of Boston, increasing as it has every year, floating from the Back Bay just the same; and when the tide comes up and meets this sewage, it has no other place to float it except on the Cambridge flats. I think that in a few years you will have as great a cry of nuisance from there, beginning perhaps at Craigie's Bridge and extending on both sides of West Boston Bridge. I have been up there in a boat to test this stuff that is lodging on the flats; and you would think it is a part of Miller's River over again, and that a part of the bottom of Miller's River had been transferred there. In short, I believe that with this sewer built and the basin properly drained there can't be any difficulty in Mr. Squire conducting his business so that it shall not be unhealthful. If you can have an abattoir at Brighton, you can have it at East Cambridge. I think that to shut up Mr. Squire's, who is now doing so much to fill the basins, would be a great injustice to him, and would also be of but little, if any, use in removing the nuisance so generally complained of.

Cross-Examination.

Q. (*by Mr. McIntire*). Did you think the sewage from these sewers did n't run into the basin at that time? *A.* I was new in the business, and did n't know about it.

Q. Some of the sewers have been carried into it recently? *A.* One of them has, but the others I don't know about.

Q. I don't see that you reckoned the privies of Mr. Squire's and the other establishments in that record? *A.* Yes, sir; I did. I never intended to say that the slaughter-houses did n't have their share.

Q. But I was going to say that the privies from the slaughtering establishments, the scalding-water and refuse matter, — don't they contribute more to that nuisance than all the sewers put together? *A.* I was of the opinion that the slaughter-houses had caused more of the nuisance than the sewers; and that was why I thought they should bear their proportion of the expense of filling.

Q. At this time the attention was drawn to the stench from the basin, was n't it? *A.* Yes, sir; but as their complaints were drawn, they were against the slaughter-houses.

Q. But your attention was called to the nuisance from the basins? *A.* No; my attention was called to the slaughter-houses first, and my conclusion after investigation was that there could be no cure until the flats were covered, and I recommended bringing them down to a straight and narrow channel. Our attention was never drawn to the basins as such.

Q. But you did conclude at that time that those basins should be filled; then there was a fight between you and the establishments, who thought the basins had better be left as catch-basins? *A.* Yes, sir.

Q. After that you were in the Board as Alderman, and after that City Solicitor? *A.* Yes, sir.

Q. At the time the order was passed by the Board of Aldermen as a Board of Health? *A.* I never knew exactly what the determination was.

Q. Since that time, — since November or December, 1872, — do you know of anything that has been done at this establishment which would prevent it from being a nuisance if it was a nuisance then? *A.* As I understand this thing which I hear stated by Mr. Squire, there are the pens; I do think this addition of charcoal has pretty much cured that.

Q. If the Board of Health at that time determined that the business of rendering pork and fat and trying lard is a nuisance, what is there now in the method that will cure this nuisance? *A.* I don't know when Mr. Squire put in this last apparatus for consuming gases.

Q. That was but within two or three months. *A.* I think that must remove substantially all offence. I don't mean the smell of trying lard; that can't of course be done until he has close vats, etc.; I think that must remain so long as he tries in open vats.

Q. Don't you know that the people have complained of the night odor? *A.* I have been there at all times.

Q. Do you know about that odor people distinguish between the dock odors and the intense rendering odor which comes up in the night, — an odor that is like the smell of putrid matter, — have you smelt that? *A.* I have smelt putrid matter, but from another source.

Q. Have you smelt that odor from the basins? *A.* No, sir.

Q. And you have distinguished the smell of rendering fresh lard? *A.* Yes, sir.

Q. Have you ever smelt it from the outside? *A.* I have smelt it, and I think it is difficult to trace it, and there is danger of doing injustice. Now I have smelt what you might call burnt lard; then I have gone over the establishment and found that there was not any lard heated there.

Q. You say you found no lard heated there at all? *A.* No, sir. It was trying. I meant to say that that pungent smell of lard was n't there.

Q. Do you know whether there was any on the outside or on top of the kettles? *A.* I went in and looked all about and tried to smell it. I was following Mr. Squire up pretty closely, as closely as I could.

Q. Another thing; did you ever discover any kettles under the ventilators? *A.* I never did.

Q. Did you go up there at that time? *A.* Not at that time.

Re-direct Examination.

Q. (*by Mr. Muzzey*). You say you have sometimes smelt a burnt putrid smell, and that you did not detect it at Mr. Squire's place. Did you ever trace it to any other place? *A.* The putrid smell?

Q. Yes, sir. *A.* I was able to trace that to Merrill's establishment; the burnt-lard smell I did n't trace to its source, but I went and examined Mr. Squire's establishment from beginning to end. I suppose I have been through Mr. Squire's establishment fifty times during the past two years. I have always gone in there whenever I thought it might have something to do with the odor which prevailed.

Q. And you often ascertained that its source was not within his works? *A.* Not that I could see; I put my nose in his vats, and tried to see if I could detect that stifling smell of burnt lard, but could not.

Q. As to the chimney, were you not aware that the vapors from the open kettles diffuse themselves into the establishment? *A.* Yes, sir.

Q. And that the gases were not discharged into the chimney? *A.* I never supposed that they could. I have had some experience on the other side of those chimneys, and I knew about those tall chimneys.

Q. (*by a member of the Board*). You don't think any rendering smell could get up these tall chimneys? *A.* No, sir, I don't think so.

Q. Are you aware that these chimneys are ordered to be cut down in New York in order that the smell might be confined to the locality where it was made? *A.* Yes, sir; but I know the fact that the open lard of course could n't get into the chimney, and that that was tried in close tanks was conducted down into the water and we smelt it there. I don't mean to say that the odor can't be carried up the chimneys.

Q. (*by Mr. McIntire*). Are you quite sure that this smell was n't carried from the close tanks up the chimneys in 1872? *A.* I made a very close examination and could not detect it.

Q. I don't know the time, exactly, but it was n't far from October, 1872, that that apparatus was put in. *A.* I could not state.

Mr. Webster. I have in my hand the report of the Superintendent of Health, of Providence, on the subject of rendering lard. I find a paragraph which says: —

"The greater portion of the odor of the boiling fat is carried upwards by the chimney and ventilating draughts, so that there are no odors which may be perceived in the establishment which are specially offensive."

Then the report says : —

"If we inquire on the spot of owners, they scout the idea that there is any nuisance in the business. They would have the idea that their business is the healthiest in the world ; that no person engaged in it is ever known to be sick ; and they will tell you that you might as well complain of frying crullers. This is nearly the language used at one of the establishments in my investigations on the subject. But on the very same day I was informed, by parties of the highest respectability and character, living twenty, thirty, and more rods from this establishment, that the odor from it is extremely offensive, that it is perceived almost every day in the year, except when the wind is strong in the opposite direction, and they are often compelled to close their windows to avoid it ; that women and children are made sick by it, and that some persons have been obliged to leave their rooms entirely on account of it. These parties are ready to make these statements before your Board themselves."

Witness. But the man should have gone and seen, and thoroughly examined for himself, and not taken the statement of other people. It is not safe. I have seen too much of that. It is unreliable.

Mr. Webster. I did not know but what your attention had not been called to it.

Witness. I will not say anything but what I know myself. When I was in New York I purchased a number of pamphlets and went to a number of experts, and they sent me down to the city buildings. I had, therefore, heard those theories and heard what was said. I think that, under certain circumstances, it may be true that there is no smell in an establishment, but that smells will be noticed outside which will be terrible. I satisfied myself that that smell did n't come from Mr. Squire's building, though it may not have satisfied anybody else. I would give more for my own experience of a smell than anybody else's. The only safety of any physician or set of men is to go themselves.

Q. (*by Mr. Muzzey*). Are there not in the vicinity of Mr. Squire's establishment many places where there are kettles which give forth a bad smell ? *A.* I think if you were to search diligently you would find more than people generally have an idea of. There is Reardon's establishment at the Port, which was often complained of. I have been down there several times at 12 o'clock at night, and was a long time puzzled to tell where the bad odors came from. If you found a smell, and would follow it up, you would find a small kettle and a dozen or fifteen pails full of grease, with a little pipe coming out from the back side of the building ; and you can find half a dozen such places going on. I rather think if you go around and inspect that vicinity, you will find many more than you think.

Q. (*by Mr. McIntire*). But is n't that business more concentrated now than it was, — men buy from others and try themselves ? *A.* These men are doing it secretly, and trying to get all the profit they can.

Q. Are not you aware that twenty years ago in that whole district around there on the low land, nearly every person had a horse and wagon, and used to go round and collect his own grease and try it himself, and make his own profit ; whereas now one party does the trying, and the others collect the grease. *A.* I am aware that that is the general system ; still these parties think they can make a little by collecting their grease and trying it themselves.

Q. Twenty-six years ago, when every person who lived in that locality

tried his own grease, was there anything like the complaint there is now, or has been within the last five years, in regard to that burnt putrid odor among the inhabitants there? *A.* Not that I know of. I don't know anything about twenty years ago. I know you could try out a little grease then without so many people knowing it.

Q. You are pretty well aware that they did try out a great deal without much complaint? *A.* That may be.

Mr. Muzzey. There has been a great increase in population since then.

TESTIMONY OF GEORGE UPTON.

Q. (*by Mr. Muzzey*). What is your business? *A.* Manufacturing glue and superphosphates.

Q. Where is it carried on? *A.* At Peabody and Brighton.

Q. Have you entered into any contract with J. P. Squire & Co., for the removal of soup-liquor from the tanks, etc.? *A.* I have.

Q. Will you read your proposition, and its acceptance?

"WAREHOUSE OF GEO. UPTON, GLUE MANUFACTURER,
Removed to No. 104 Water Street,
BOSTON, December 8, 1873.

"J. P. SQUIRE, ESQ.: Dear Sir, — I believe your soup-liquor can be profitably made use of in connection with the accompanying scrap, by manufacturing the same into a superphosphate, and doing so without giving offence to any one.

"Noticing from reports of the present hearing at the State House that the liquors are mentioned as being objectionable if sent into the river, I will say, if you desire the same removed, I will take them in connection with the scrap, and continue to do so by contract.

"Very truly yours, "GEO. UPTON."

"We accept the above proposition. J. P. SQUIRE & Co."

Cross-Examination.

Q. (*by Mr. McIntire*). What is it you take, — the soup-liquor and tankage? *A.* Yes, sir.

Q. (*by Mr. Muzzey*). How do you propose to remove it from the establishment? *A.* We shall remove it in tight vessels.

Q. How frequently? *A.* Daily.

The Chairman. What do you mean by tight vessels? *A.* Vessels which would be so tight that nothing would escape from them.

Q. Air-tight? *A.* Yes, sir.

Q. No odors? *A.* No, sir, — no odors would escape.

Q. There is some evidence that from these tight vessels odors could escape? *A.* I would say that oil of vitriol is carried across the city in tight vessels. That is most difficult to handle. It is transported in iron vessels.

Q. (*by Dr. Derby*). Is this contract in operation? *A.* I have taken it in some lots.

Q. Where is it carried, — to Peabody or Brighton? *A.* Some I have carried to Peabody; but the most I have taken to Brighton. That which I took to Peabody, I made glue of.

Q. (*by Mr. Derby*). And succeeded in making it into glue? *A.* Yes, sir.

Q. (*by Mr. Muzzey*). Am I right in supposing that the soup-liquor removed by you has no offensive odor? *A.* I think, if I left the top of the vessel open, it might be offensive; but I don't propose to take the risk.

Q. Is this contract to go into immediate effect? *Q.* I take it so.

Cross-Examination.

Q. (*by Mr. McIntire*). You have not at present any such vessels to take away this liquor in? *A.* I have those in view that I can use.

Q. What kind have you in view? *A.* I have in view such vessels as wooden tanks, which would be tight.

Q. Would the covers be tight? *A.* Yes, sir; they are very tight. It has got to be let into the top by taking out the iron bushing and securing the iron plug in it.

Q. How would it be let out? *A.* It has got to be let out by hose into what we call the phosphate tanks, which contain a solution of oil of vitriol and bone-black, which has a deodorizing effect upon them.

Q. You don't mean that you put the scrap or refuse matter from the tank into the vessels? *A.* We do. We run the soup into it and deodorize it first, — I mean into this carriage or tank that has the solid matter.

Q. Is n't there a bad odor from it? *A.* It is what we call the tankage, and has the same odor that there would be to boiling meat.

Q. You could n't carry that away in such a vessel as you speak of drawing it off into? *A.* That would be run off into the building and shovelled off into the tank.

Q. I am asking, now, what sort of a cart you are to use? *A.* That would be the same sort of carts as are now used in removing the same material. They have covers to lift up on the top.

Q. Such as the city offal-carts? *A.* On that principle. That is for the tankage.

Q. You have been taking away some of that now? *A.* I have, somewhat.

Q. Do you know what has been done with the rest of it? *A.* I have taken it for granted that the material has been running away into Miller's River.

Q. All that you have n't taken away has been disposed of at the establishment? *A.* I should say so.

Q. And thus far you have taken away how much and at what intervals? *A.* I have taken away a few loads of it to satisfy myself of the feasibility of taking it away.

Q. How do you take it from the wagon? *A.* The wagon is driven up in the shed. We have a suction floor which perfectly controls any smell or gas, or anything of that kind, — it is taken care of and consumed.

Q. Has there been any complaint made of your place? *A.* None at all.

Q. Neither at Peabody nor Brighton? *A.* I would say, in Peabody, last winter, I took some material and converted it into glue, and I did it without burning up the gases. There was some complaint about the odor; but I put in a burner, and since then I have had no complaint. I believe that smell went a mile.

Q. And you have had no complaint since then? *A.* Have had no

complaint since then. The Board of Health came up and looked around my place, and I told them what I was going to do.

Q. (*by Mr. Derby.*). You don't propose to utilize the blood? *A.* No, sir.

Q. Then, as I understand it, the tanking, which now goes to Mr. Bradley, will go to you; and, in addition to that, the soup-liquor? *A.* Yes, sir.

Q. Whose machine do you use? *A.* We are using Lockwood & Everett's process for superheating, and in burning the gas we are using George F. Wilson's process for utilizing all kinds of waste and converting it into fertilizers. Further than that, we have got a specialty in that neighborhood; so we prefer that, on account of letting it lie in package and removing it without complaint.

Q. (*by Mr. Newhall*). You say, sir, the soup is deodorized? *A.* It is.

Q. How is that done? *A.* By running it through a solution of bone-black, oil of vitriol, and chamber acid. Bone-black and chamber acid make dried phosphate.

Q. Is n't there a great deal of gas? *A.* There is no gas. We have pipes run from the condenser and burner, — large pipes attached to a suction-blower, — which, as that vapor and gas rise, take the whole of it and carry it away.

Q. Is that gas combustible? *A.* Not unless superheated; then it will burn, in connection with air, the same as ordinary gas. We utilize it, in generating steam, under our boilers. It is a matter of economy to burn it up instead of letting it run off.

Q. It is combustible after being superheated? *A.* It is. We can see it burn in a blue flame. Our place is open at all times, and I invite the most sceptical to come and see it.

Q. (*by Mr. Derby*). Where is your place, sir? *A.* Within a stone's throw of Riverside Park, at Brighton.

Q. (*by Mr. McIntire*). Has n't that machine been condemned by the Board of Health of New York? *A.* It has, sir; and the reason was, because they were so economical of gas in the boilers that they did n't run it as it should be. It is just the same as though you were to condemn steam-boilers, because they will blow up when the water gets low. It was false economy.

Q. Is there a meter in there? *A.* Our experience is that a cast-iron meter would last not over three or four years. Our Argand-burner would last fifteen or twenty years. We utilize our waste heat, after it is in the boiler, for superheating the gases. It is not exposed to so high a degree of heat.

Q. I have been informed that those meters would burn out in daily use? *A.* We can burn out a meter in half an hour. When there is no outlet at the top it would generate as high a heat as the old meter. We have got one now which we have been running a year, and it was examined the other day and found just as good as it was when it was put in.

Q. I have been informed that they would cost three or five hundred dollars? *A.* They do cost from three to five hundred dollars.

The Chairman. What do you use for deodorizing? *A.* Bone-black, oil of vitriol, and chamber acid.

Q. What do you mean by chamber acid? *A.* Chamber acid is a solution of oil of vitriol and bone-black.

TESTIMONY OF EVERETT L. COLSON (*recalled*).

Q. (*by Mr. Muzzey*). Were you present at a trial of an experiment under Professor Horsford's direction for destroying the odors from the live animals? *A.* I was.

Q. What was used? *A.* I am not chemist enough to know what it is.

Q. Was it the same that he put into your hands? What was the effect? *A.* We first took three hogs into a tight place and sprinkled them all over with this liquid. There was no hog smell perceptible after that. Then we took an entire pen, with perhaps forty or fifty hogs in it, — one of the regular pens, — it was full. I went in amongst them and sprinkled them thoroughly, and in that pen of fifty hogs I don't think anybody could detect any hog smell. I could n't detect a particle.

Q. In consequence of the success of that experiment, has Mr. Squire sent to Europe for a large quantity of the preparation? *A.* I believe he has.

Q. Do you know whether he has been notified of the arrival of it in New York? *A.* I think he has.

Cross-examined.

Q. (*by Mr. McIntire*). Did you ever smell it before? *A.* I have smelt it some.

Q. Did not I understand you to say that the smell of live hogs is not agreeable to you? *A.* I don't consider it disagreeable.

Q. Do you consider it agreeable? *A.* I don't think it is disagreeable.

Q. But is it agreeable to you? *A.* I don't notice it at all.

Q. Well, if you do not notice it at all, how did you notice any difference? *A.* Because it had a kind of sweet smell.

Q. A sort of cologne smell, referred to by Mr. Derby? *A.* Not like cologne, but something like the smell of soapsuds.

Q. How large a quantity did you sprinkle? *A.* Probably twelve quarts.

Q. You put twelve quarts on these fifty hogs? *A.* Yes, sir.

Q. (*by Mr. Newhall*). Was that the condition in which it came or did you dilute it? *A.* It was mixed together.

Q. How much of the basis did you use to that twelve quarts? *A.* We simply took it and used it.

Q. But did you dilute that stuff he gave you or was it prepared? *A.* It was prepared.

Q. How much stuff did it take to prepare that twelve quarts? *A.* I don't know.

Q. Do you know how long it succeeded in deodorizing, in preventing the smell of the hog? How long after that was the hog killed? *A.* He was there perhaps half an hour.

Q. How long after you put it on the other hogs were they killed? *A.* I don't know.

Q. You don't know whether it disappeared very soon after that? *A.* I don't know.

TESTIMONY OF PROFESSOR E. N. HORSFORD (*recalled*).

Q. (*by Mr. Muzzey*). Will you be good enough to give an account of this disinfecting agent? *A.* I brought with me from London a couple of

cakes of prepared carbolic acid, a sort of soap. I do not know that that is its name, but it indicates its quality for removing odors. It was prepared for transportation in the form of cakes of soap. I dissolved it in about a hundred parts of boiling water, — yes, much more than that, — probably one hundred and fifty or two hundred parts of boiling water, — that is the way the article was prepared. I immediately wrote to parties in London asking if it could be furnished in quantity, and they wrote me in reply that it could, and that they used it for kindred purposes, in purifying stables, etc. I think it would cost about half a penny to a penny a gallon in the condition in which it is to be used. I thought it might be put on the hogs at some point between here and Albany, so that the smell exhaled in unloading could be prevented. But the delay of the notice of its having been received has prevented its being tried. I hope to be able to make experiments of sufficient magnitude to justify me in speaking with confidence of its effects.

Q. What was the result of such an experiment as could be made? *A.* The smell was immediately relieved. We put three hogs into a room about twelve feet square, and sprinkled them, and it seemed to relieve the smell at once. Then we went to one of the large pens, and sprinkled the hogs with the material that remained, and it seemed to me that the odor of the swine was extinguished while I was there. I cannot help thinking that the carbolic acid might neutralize the hog-smell. It arrests fermentation and the production of odors.

Q. Have you engaged with Mr. Squire to pursue experiments for the purpose of destroying this odor? *A.* Yes, sir, I have.

Q. What confidence have you that you can find a remedy? *A.* My conviction is strong that it will not be difficult to find a remedy.

Q. Are you not in communication with persons in Europe who are pursuing this investigation? *A.* I am in correspondence with parties who are pursuing it there. This purifying of stables, etc., has been practised for some time there, and I think carbolic acid is the agent at the bottom of the experiments that have been made.

Cross-Examination.

Q. (*by Mr. McIntire*). What is the chemical effect of this deodorizer? *A.* It arrests decay if carbolic acid is used in weak solution.

Q. What would be the effect of carbolic acid upon ammonia? *A.* It would form carbolate of ammonia.

Q. Have you ever made the experiment? *A.* We have it in combination in gas liquor.

Q. Is n't it offensive to the smell? *A.* I think it is, when concentrated; but as diluted, it would be much less so.

Q. Do you think the sprinkling of car-loads of hogs two stories high with your preparation of carbolic acid, or any preparation, would so completely deodorize them that when they arrived at Cambridge there would be no smell? *A.* I cannot say until I have tried it. I propose to do it at Framingham. I think it might effect that result.

Q. Would this carbolic acid have any effect upon the meat? *A.* It would not appreciably. The carbolic acid is a very small proportion of the diluted solution. It is used for preserving meat.

The Chairman. What would be the effect of this carbolic acid upon the animals, — I mean would it not be the occasion of suffering by getting into their eyes? *A.* Not severely. It is used as a toilet soap.

Q. What would be the effect of it upon your own eye? *A.* I do not know about that. I have not tried it.

Q. What would be the effect of common soap? *A.* Very trifling in such diluted condition. The statement that it is necessary should be the justification for its use.

Q. Would you like to sprinkle this soap upon your eye? *A.* I should not like to put any soap in my eye.

Q. Would n't the sprinkling of this matter on the animals be intense torture to them? *A.* I do not believe it would be intense torture. I know that some of the finest and most beautiful cows we saw at Vienna last summer were washed with water containing soap every day. The eyes were cleansed with soap-suds. I have no doubt that the carbolic preparation would make the eyes smart a little if it got into them.

Testimony of Captain Thomas Cunningham.

Q. (*by Mr. Muzzey*). Where do you live? *A.* In Somerville, at the corner of Oak and Prospect Streets; have lived there sixteen years.

Q. What is your occupation? *A.* It has been various. Previously to that time, I followed the sea. Soon after my coming to Somerville I was a partner with Mr. Sortwell in the distillery business.

Q. Have you held important offices in Somerville? *A.* I have, from 1859 to the present time. I have been three years on the Board of Health, from 1860 to 1863.

Q. How familiar have you been with the establishments on Miller's River? *A.* I believe I know every individual on that territory.

Q. Now, will you tell what has led you to form an opinion as to the bad odors from that territory? *A.* Commencing as far back as 1859 or 1860, we were then troubled very much. I lived about two hundred yards from the upper basin, so that the east wind would bring everything from the basins or slaughtering establishments directly to my house. We have always since 1860 been troubled, more or less, with the odors. At certain times it was so intense as to oblige us to shut the house up. Frequently it would make my wife sick. In my official character as a member of the Board of Health I had occasion to search out these gases, and as an individual since that time, I have frequently traced those gases to their source. In the early part of 1859 or '60 a boat could float on the upper basin, or Union Pond, at low tide. Now at half tide the whole place is bare, and the sediment at the present time is from two to four feet deep, consisting of the most obnoxious mixture that could be accumulated.

The Chairman. What is the upper basin? *A.* It is the upper part of the basin, — a continuation of the basin. It is an extension of the Miller's River basins. There are various little private sewers and privies which empty into Union Pond. At Oak Street, where I live, there was a sewer put in by Mr. Amory Houghton at the glass-house, which emptied into the pond directly east of my house. At that time there was a slaughter-house kept by John O'Brien at the same place, and various other small places, and particularly Sortwell's distillery, all draining into it. There is in addition a molasses sediment called "cistern bottom." In a cistern of about sixteen feet diameter and six feet deep there will be a bottom from four to six inches deep, that the suction-pump would n't

take out. Ever since 1857 that has been emptying into that basin, and I think I can give you an idea of what that sediment is. A gentleman was there one day from Arlington, and finding that it was vegetable matter, he thought it might be a good thing for agricultural purposes. We sold him two or three empty hogsheads and got the boys to fill them out of this cistern-bottom. It stayed there three or four weeks. We began to smell an intense smell that we could n't trace. When that gentleman came to take his cistern-bottom away, we put a shovel into it, and it proved to be the most offensive smell we ever smelt. That has been accumulating in that basin ever since. In that basin we have from four to six feet of sediment, and probably as much in the middle basin. There have been from sixty to seventy thousand hogsheads of molasses used at the distillery in that time, every seven of which will give a hogshead of cistern-bottom. There has also been a continual increase in all these causes. Mr. Parker has described the piggeries. One season, while on the Board of Health, we took an excursion around up through what we call the "Russian Empire," and we found in Somerville twelve hundred pigs in private piggeries, all of which were emptying into and were the cause of a large accumulation of matter in those basins. The pigs were fed on city swill, one barrel of which Dr. Knight said would produce gas enough to poison a whole neighborhood.

Q. (*by Mr. Muzzey*). Were those all private establishments? *A.* Yes, sir. Dr. Knight was on the Board of Health at that time. He did n't care for the pigs, but he said it was the outrageous stuff on which they were fed. This stuff has continued to increase every year, and I have no doubt that the piggeries have contributed their share of filling up the basins. Indeed, I have no doubt that Mr. Squire has, too. In regard to the offensive colorings in 1860, early in April or the latter part of March I had my house painted white. On the 4th day of May, after a heavy, hanging atmosphere, I went out on my piazza, and there was a gentleman looking at his house, the color of which was changed from white to black, and when I went out I found my own house the same way. At that time it was hardly known in Somerville that such an establishment as Mr. Squire's existed. I have found in all places bordering on the basins discolorations of paint, which I have traced to the dock smell. In my experience as a ship-master I used to command a packet coming in at City Wharf, at which place a sewer emptied. I have had my vessel discolored outside frequently. In those days we used to have a vessel painted rather fancy, and sometimes when we came down in the morning we could n't see a white spot on her. That is in my opinion the only cause of the discolorations along Miller's River. It is a little remarkable that during all the time we have had a continued trouble in regard to the smell and the odors, but never did I hear the name of Mr. Squire till about 1870. Then they began to talk about Squire, and since then in Somerville and East Cambridge they seem to have Squire on the brain. They even pledge candidates before election to go against Mr. Squire. They seem to think that he is the cause of the whole thing. Now as to Mr. Squire. I have been in his place frequently; have visited it this year and in 1872, as one of the Board of Assessors; went there three times this year, and once last year, — twice in May, once in June, and once in September. I believe that, except one man, none had ever been in Mr. Squire's place before. Some of these gentlemen had had

Squire on the brain before that. Well, we went there to find out the value of property. We went through it very thoroughly because there had been a dispute in regard to the valuation. After coming away it was the opinion of those gentlemen that they had been mistaken, and that Mr. Squire's place was n't as much a nuisance as they had thought it. We found everything carefully neat, clean, and every effort seemed to be made to preserve things in that way. About eight years ago I was summoned, with twenty citizens of Somerville and perhaps Cambridge, by the Trustees of the McLean Asylum to prove that all the stench came from Merrill's. They put Merrill under bonds not to do certain things, but the name of Squire was n't heard of then. The whole thing, in regard to Mr. Squire, seems to have come about since 1870, and I think Mr. Squire has been about there since 1856.

Q. To what source have you traced the odors? *A.* To the smell of the basin and to the grease establishments. Mr. Parker gave a very good description of the grease establishments in Cambridge, and we have a good many in Somerville, but not so many as formerly.

Q. Well, but is there not just as much putrid grease tried out on Somerville territory as there ever was? *A.* I should say there was.

Q. Has the atmosphere gained anything by these places being gathered into larger establishments? *A.* You have the thing condensed into a larger body. I have been requested by North & Merriam to trace out any of those odors. We have them tremendously sometimes, and I have made it my business to follow this thing up. I found that Mr. O'Neil's place is an inveterate cause of stench. We also have Mr. O'Brien's place. One of the most disagreeable smells that ever occurred was in the evening, and at Union Square it was so very bad that a dancing assembly were obliged to close their windows. It was a very warm evening. That thing came from the removal of a blood-tank which Mr. O'Brien had. It is a tank that holds part of his blood; but once in five or six months he takes a notion to clean it out. When he does it is awful. I can't tell exactly how far that smell went. It went to Spring Hill and Winter Hill, and I traced it positively to the removal of that blood-tank at O'Brien's slaughter-house.

The Chairman. You went yourself and saw it? *A.* I went myself and saw it. That was one cause of the inveterate smells and "Squire's stinks" we have there. If you inquire of any of the old inhabitants who live near O'Neil's, they will tell you that the smell from his rendering there is outrageous. In passing up and down Milk Street and up and down the Fitchburg Railroad, if that can't give you an idea of the O'Neil smell, I am surprised. It is, without question, the worst thing we have in Somerville. Mr. Squire's place has come to my notice since 1870, in connection with this smell. As I stated before, Mr. Squire has contributed his share to the foulness of the basins, and more in the early part of his being there than now, and of late years more than now.

Q. He has contributed to the basins and not to the smell? *A.* Yes, sir.

Q. You say you traced out what it was contributed to the smells in the basin? *A.* I was asked by Mr. Merriam to trace those smells. I once did catch Mr. Merriam's place foul, as he called it. I had occasion to go there one Sunday. It was this inveterate smell. I traced it out, starting about five o'clock, going after church and following

it down by the Fitchburg Railroad, examining the piggeries, and passing down the road till I came to Medford Street, where Merriam's place is. As I crossed Medford Street going down the Fitchburg Railroad, we walked out of the smell entirely. When we came abreast of Merriam's pens we got a little smell of the hogs, but nothing more than from a country hog-pen. We then turned back, and going above Medford Street we struck that smell again. I traced that smell to Merriam's place, and that was the only time I ever found a smell in any of the slaughtering establishments, or what we call the Sunday smell, when they are not in operation. It appears that Mr. Merriam has a cylindrical boiler and a machine to turn the matter into guano. Some of the machinery got out of order on Tuesday; he got it ready on Friday, but it broke again. On Saturday night he got it in order again, and as Mr. Merriam and the men told me, they volunteered to work on Sunday. I found them there. I wrote a letter to the firm that day. The members of the firm visited me, and stated the reason of it and assured me that they should never be caught that way again. They said they had contracted with one of the railroads to transport the stuff in case of another accident. That is the only time I ever traced this smell directly to that establishment. That was the rendering of the putrid stuff kept over from Tuesday till Sunday. That was about a year ago last September, I think, though I could n't say exactly whether it was the last of September, — it may have been the first of October.

Q. You have paid a great deal of attention to this subject as an officer of the Board of Health of Somerville; I wish to ask you whether you think the health, comfort, and convenience of the inhabitants of Somerville demand the suppression of Mr. Squire's establishment? *A.* I don't think it does, provided they carry out what they are doing there. In two years I cannot help thinking that Mr. Squire will be held as a public benefactor. He has spent thousands of dollars to fill those basins. Fill those basins and you get rid of nineteen twentieths of that trouble. In travelling about last summer in the "Russian Empire," I was in that district two days, taking the valuation of the property. I was not in Mr. Squire's establishment, but I was once at North & Merriam's. I had two silver half-dollars in my pocket and a pair of gold spectacles in a case. Those spectacles were in the case all the time, and they were turned black in going over that ground; also my money in my pocket was turned black while going backward and forward on that place three days in taking the census. I was n't near Mr. Squire's either. In regard to Mr. Squire, I agree fully with what Ex-Mayor Houghton said yesterday, — that the flat lands around there must be used by manufacturing establishments of some kind. I recollect when all the lands where the depots in Boston now are were just such a piece of land as that. I believe that all of that land must be used for business purposes and for the employees of the places. They say that Mr. Squire's slaughtering establishment has deteriorated property there. I don't exactly see it, as an assessor. We formerly valued the land at from eight to ten cents per foot; last year it was taxed at a dollar a foot. Mr. Squire's land was taxed at a dollar a foot this year, and near there it is from sixty cents to a dollar a foot.

Q. What gives it this value? Is not it this business? *A.* It is this business and the residences. But that is n't all; there is a general

increase in the valuation of property throughout Somerville, and this property has risen with it. That kind of property would n't increase without some cause, and it is evident to me that Mr. Squire's has n't deteriorated it. Nearly all the property there has increased in the same proportion. Two years ago the marsh land near Lincoln's was sold at from twelve to fifteen cents a foot, and this year it has been bought by Lincoln and Boynton for twenty-two cents for the water and twenty-six for the land.

Q. You know that from taking the census? *A.* Yes, sir. I took the census in 1870, when I valued every piece of property, and have had to examine it every year since as an assessor.

Cross-Examination.

Q. (*by Mr. McIntire*). Has other land increased in the same ratio that it has there? *A.* It has not.

Q. And not in the high grounds as it has there? *A.* It has in some places. At Union Square land has increased from half a dollar a foot to a dollar and forty cents a foot.

Q. Do you think it has increased on Miller's River as it has in other localities? *A.* I think it has. I think the land that is partly filled is taxed for a dollar a foot. Before Merriam's place was filled it was from twelve to fifteen cents a foot, now it has increased from that to a dollar.

The Chairman. I don't see what this has to do with the case.

Mr. McIntire. It will be argued that it is a benefit to the locality. We hold that it is an argument against themselves. (*To witness.*) You say there has been considerable talk among the inhabitants of Somerville since 1870 against Mr. Squire. Were you ever one of those who talked against Mr. Squire's or the other slaughtering establishments? Did n't you ever make a complaint of the slaughter-house yourself, and have n't you in conversation with people made an extreme complaint against those slaughtering establishments on the basins? *A.* I don't know that I ever did.

Q. You won't say that you have n't? *A.* I won't say that I have n't. I have thought they contribute to the foulness of the basins.

Q. Whether you have n't complained of the establishments contributing to the odors since 1870, when Mr. Lincoln was City Solicitor? *A.* I was summoned in 1872 to come over there to give testimony in opposition to Mr. Squire. Mr. Lincoln was then working for the town of Somerville. He asked me what line of testimony I should give; I stated that my testimony would be in Mr. Squire's favor, and he sent me home.

Q. Were you not a member of the Board of Health in 1871? *A.* It was from 1860 to 1863.

Q. Were you an officer of the town government in 1871? *A.* No, sir. I was City Treasurer and Collector.

Q. Don't you know that at that time there were certain resolutions passed in town meeting — or I should say in selectmen's meeting — relating to the slaughtering establishments? *A.* I don't know.

Q. You don't know that they were condemned by the selectmen? *A.* I should n't wonder. As I tell you they have had Squire on the brain since 1870. You can't find an old resident there but will tell you now that this action of some of the inhabitants of East Cambridge is

looked upon as direct persecution of Mr. Squire. That same gentleman has abused me because I would not bring this matter before your own Board at the City Hall.

Q. You say that the old residents think this is a persecution of Mr. Squire, and yet a moment ago you said most of them had Squire on the brain? *A.* They have had it. We have had a large increase of population there. New people have come there, and they are told the odors are from Squire's place. There is Mr. Clark Bennett —

The Chairman. Pardon me, but you cannot make personal allusions before this Board; we cannot have it.

Q. (*by Mr. McIntire*). They are told by the old residents that it is from Squire's, and they take it up in that way? *A.* It is talked in that way by everybody. The papers have taken it up too.

Q. You don't believe that these inhabitants have any personal feeling against Mr. Squire; you don't think there is any cause for ill-feeling against him? *A.* I don't think they have, but I think they get and accept the idea that it is from Mr. Squire's, without investigating where it is from.

Q. But you think they are actuated by honest motives? *A.* I think they are.

Q. Now you speak of the odors from the kettles; do I understand you to say that you think a thousand pounds of putrid grease melted in one kettle is as great a nuisance to the inhabitants of a locality as if that same quantity of grease were distributed among ten kettles? *A.* If that were done at one time in open kettles, as at O'Neil's rendering establishment, — though I think he has got new machinery now, — it would make a greater stench, and a smaller quantity would make a smaller stench. But with ten small kettles scattered about, it is n't to be supposed that they would be running at the same time. When you get a thousand pounds in one kettle, you get a pretty severe stench.

Q. Grant it; but do you believe there is as much stench from ten small kettles as there is from one large one? *A.* I am not scientific enough to give you an answer on that question.

Q. What is your idea, as a member of the Board of Health, who has investigated these different things? *A.* I don't think there is much improvement in concentrating it. It is spread over a large territory. The larger the body the more kettles. I think O'Neil ran two or three kettles.

Q. But your city of Somerville have forbidden O'Neil from running any close tanks? *A.* I think they have. He has been at a large expense putting in close tanks, and complains that he is assessed for them, and yet is not allowed to use them. I don't know whether it has been arranged or not.

Q. Do you ever get the smell at City Hall, in Somerville, during meetings of the city government? *A.* I don't recollect.

Q. Do you recollect of any complaint being made by the city officials that during a meeting of the city government they got those smells? *A.* I think they have, but I don't know whether they got the rendering smells or not.

Q. You are acquainted with the signature of Mr. Gilman, the City Clerk? *A.* Yes, sir.

Q. Is that it? *A.* Yes, sir.

TESTIMONY OF HON. HAMLIN R. HARDING.

Q. (*by Mr. Muzzey*). When were you the Mayor of Cambridge? *A.* In 1870 and 1871.

Q. Had you previous connection with the city government? *A.* Yes, sir; I have been president of the Council.

Q. And are at present an Alderman? *A.* I am, sir.

Q. Have you visited Mr. Squire's establishment? *A.* I have visited his establishment four or five times, last summer for the first time. The subject of the odors of Miller's River came before the city government in 1870, but I never visited this establishment or the locality until last summer.

Q. The Committee on Health, of which Mr. Parker was Chairman, made a very thorough examination in 1870 and 1871. That was during your administration? Yes, sir.

Q. You made a thorough investigation at that time; certain measures were taken; application was made to the Legislature; a commission was appointed, and their work has been put into law. Now, sir, state in what condition you found Mr. Squire's establishment, in and about it, and how thorough that inspection has been? *A.* At Mr. Squire's solicitation, the matter being before the Board of Aldermen as a Board of Health, I visited his place on several occasions, as I have stated. I spent, I think, on the first occasion, about an hour and a half in and about the building. I was agreeably surprised to find it in such good condition as I did, having heard so much about it. Everything seemed to be conducted in a systematic and orderly way, and in as cleanly a manner as it seemed possible that it could be. On the first visit I observed no odors of an offensive character, except on the platform where the hogs were delivered, as Mr. Squire told me, from the car. I think there was a train of cars standing there at the time, which had arrived immediately before. Going along that platform I found there was a hog smell, of the live animal. I was taken into the pens where the hogs had been during that day, and found the floors covered with charcoal, and there was no offensive smell whatever. I went all over the building and examined it thoroughly, and I think the hog smell that I perceived on the platform where the cars stood was the only offensive smell I experienced. I was told that there was carbolic acid in connection with the charcoal upon the floors of the pens, but I saw nothing of it. At any rate, there was no offensive odor there. In one locality I had experienced a very bad smell, which reminded me pretty forcibly of what has frequently been mentioned here as the odor which used to come up from between Long and Central Wharves before the Custom House Block was built. I used to be rather addicted to boating, and there I often smelt a smell coming up, apparently from the river or creek, which I remembered very well as coming up near the old Custom House, or near where the present Custom House now stands. I afterward visited the place three or four times by myself, and Mr. Squire showed me every place, and I observed the same condition of things. Just previous to the 31st of July we were notified by the Mayor to meet at Mr. Squire's place about eight o'clock in the evening, as Mr. Squire had complied with an order of the Board, requiring him to put in an apparatus for burning the gas generated from the rendering process. There were present the whole Board of Aldermen, and several other gentlemen.

We went through the place pretty thoroughly. In going through the yard I noticed a very bad smell between the boiler-room and the place where the hogs seem to come down an inclined plane. In that yard we experienced a pretty bad smell, at least I did. The experiment seemed to be a failure, as far as the burning of the gas was concerned. I could not see any burning of it at all. I was there till about nine o'clock, and then went away. The next day I saw the Mayor, and he told me that after I left the experiment was successful. In order to satisfy myself, I went down there that evening, or the evening subsequent to that, and saw the process, and at that time there was no bad smell whatever. The gas seemed to be perfectly consumed. There was a bright blaze, and everything seemed to be right.

Q. To what, sir, do you trace the offensive odors that prevail in the neighborhood? *A.* So far as I could judge from my investigation there, they came from the basins. There was this hog smell, of course, that I have mentioned. They came from the basins; whether they came from other establishments near by, I could not say. I ought to have said that going home that evening I took a car on Cambridge Street, and went in a westerly direction toward my home, and there was a pretty offensive smell on the way down in the car. I remember a lady spoke about it particularly. At that time the wind was southeast, and was blowing from the car toward Mr. Squire's establishment, therefore I did not attribute that very bad smell to him. I think that the principal cause is the condition of these basins, and also the ditches or open places on the marsh, like Broad Canal, some near the House of Correction, near the Grand Junction Railroad, and possibly some of these other establishments; I could not say about that. So far as I have observed, I don't trace anything to Mr. Squire's establishment, or to North & Merriam's.

Q. Now take Boston and Charlestown. Do you know about the seats of pollution in these places? *A.* Yes, sir. I have given some attention to that. I am quite satisfied that Boston is putting into Charles River an enormous amount of filth. After putting in the changes which have been made in regard to the disposition of water-closet matter, privies, etc., within the last few years, since the introduction of water, that all goes into the river, while formerly it was carried off in carts from Boston, Cambridge, Somerville, and Charlestown, and there is an immense mass of that material poured into the river.

Q. Have you made any estimate of the number of individuals that contribute to the contents of the river? *A.* Not carefully, but I should say at least 100,000.

Q. Well, Mr. Harding, you were in London in 1860 and in 1872. Did you notice the condition of the Thames River at those two periods? *A.* I did. I took particular occasion to observe it in 1872, because I remembered it very well as it was in 1860, previous to the establishment of that system of sewers which they have established there since.

Q. How did you find the river? *A.* The river at that time was about the color of coffee with which there had been no milk mixed. It was very offensive, not only to the eye, but to the sense of smell. I suppose it is a well-known fact that don't require any testimony, that the condition of the Thames was perfectly abominable at that time. In 1872 the condition of that river was very different. It looked more like a river,

more as it did above the city. At Richmond and those places above the city, the river is comparatively pure; not perfectly pure, but comparatively pure, and the appearance of it at London was more like that. There is no offensive smell there.

Q. Well, sir, what is your expectation as to the removing of the dreadful nuisance and bad ödors in the vicinity of Miller's River upon the filling of the flats and the completion of the sewer? *A.* I am convinced that when that filling is completed, and the sewer is finished, that then at least we shall know where the smells come from. At present there is in the minds of some people a great deal of doubt about it; but when this sewer is completed and the basin is filled, there can then be no doubt about it. The odors can be traced.

Q. As a member of the Board of Health of Cambridge, is it your opinion that the health, comfort, and convenience of the community require the suppression, at the present time, of the Squire establishment? *A.* I have felt that question pressing on my mind a great deal the last year. The matter has been before the Council all through the year, and I have felt it my duty to investigate it in the most thorough manner possible, for the purpose of deciding in my own mind that question. I felt constrained, under all circumstances, not to vote for the suppression of this establishment, — did n't do so, — and hold that opinion still. I would say, in regard to another great city in Great Britain, that there was placed in my hands the official report of the Commissioners appointed to investigate the cause of the offensive odors in the city of Glasgow, which were very great. The report seemed to be there as it is here with regard to Miller's River.

The Chairman. You have visited this establishment at other times than when specially invited? *A.* Yes, sir. I took pains to do that, because I did not know but that there might be some preparations made when gentlemen were invited. I found it running always in about the same way.

Q. Are you editor of the Cambridge Press? *A.* I am, sir.

Cross-Examination.

Q. (*by Mr. McIntire*). Mr. Harding, in London on the Thames in 1860, did you notice the boys playing in the mud on the banks of the stream? *A.* I don't remember that.

Q. They call them mud-larks. I was going to ask you what the effect was upon those boys, if there were any?

The Chairman. Pardon me, but of what advantage is this?

Mr. McIntire. None, but it has been put in, and I don't know why I cannot ask a question about it.

Q. Did you notice any smell away from the banks of the river? *A.* No, sir, I did not.

Q. Did you notice any discoloration of the houses near the bank? *A.* The houses in London are always colored. They are very smoky.

Q. You say you have given considerable attention to the sewerage around Boston and Cambridge. You have written up the matter somewhat for the "Press," have you not? *A.* I have considered it as a matter of local interest, and I have done all I could in that way, of course.

Q. Did you write it up entirely on this account, or was it done to benefit Mr. Squire, or any of these establishments?

Mr. Harding. I don't know what you mean by that.

Mr. McIntire. I mean whether, as editor of the Press, Mr. Squire has employed you to search into these things, and write articles upon the subject?

Mr. Harding. He has not.

Mr. McIntire. Or has paid for articles put in?

Mr. Harding. He has not. I think at one time he paid for the publication of the argument of his counsel. Nothing beyond that; and that I had nothing to do with. I am not the publisher. Mr. Squire may have advertised in the paper. I am not interested in the paper in any way, except as an editor. I have no pecuniary interest beyond my stipend.

Q. You say Mr. Squire has put in an apparatus, obedient to the commands of the Board of Health? Then the Board of Health did direct him to put this apparatus in by some official action? *A.* Yes, sir. The Committee on Health reported that it should be done. I think they had seen the apparatus.

Q. When was that order passed? *A.* I cannot remember. It was in June or in July of the present year. It was the 31st of July that we went down there. I think the time was short.

Q. But the Board of Health thought it necessary for such an apparatus to be put in, and so reported; and the order was adopted, and it finished the investigation? *A.* I thought that Mr. Squire ought to be required to do everything that he could to prevent this nuisance. If there was anything that he had contributed or was contributing to it, that he should stop it.

Q. Do I understand you that when you make up your mind that the health, comfort, and convenience of the people do not require the removal of the establishment, — do I understand that you mean to say that the establishment does not generate any bad odors? Or do you mean that the people should bear the odors for the sake of the taxation, or for the sake of the business which is there carried on? *A.* Well, I don't think they should bear such odors as they have borne. But I don't feel at all satisfied that Mr. Squire has contributed to such odors to that extent and in the way that has been described. I think formerly his establishment was probably carried on in a careless manner. If I remember, Mr. Parker, in his Report two or three years ago, — I was looking it over last evening, — said that there was almost everything in the basin; and I have no doubt that Mr. Squire contributed his share. I will state that my preferences were all against Mr. Squire before I went down there; but when I saw how the thing was, I began to look into it more carefully.

Q. You discovered any of these odors arising from the establishment? *A.* Not that I remember. This odor on the 31st of July which was so much complained of, I remember it still, because I was coming down in a car, or rather going up to Old Cambridge; and I remember the odor, and the lady's speaking of it in a very indignant way. I also remember that the wind was blowing southeast.

Q. What time? *A.* At nine o'clock.

Q. Then, if I understand you, if you should be convinced that the odors complained of by the people of Somerville, East Cambridge, Bos-

ton, and Charlestown were proven conclusively to your mind to emanate largely from the establishment of J. P. Squire & Co., you don't think that the people should stand it, and do think that the establishment should be removed? *A.* Well, sir, I should say that everything ought to be done in the first place to remedy the evil. And when it is found, if ever it is found, it should be remedied if it is possible; and if it cannot be remedied, and it is complained of, I should put an end to him right off. I have always said so, and I will always stand by it.

Q. Whether if it should not extend as far as Charlestown or Boston, but should affect the people of East Cambridge? *A.* I think the people of Ward 3 have their rights, and they should be maintained. I would do it with the utmost caution. I would be absolutely sure that the odor came from that place. I would be absolutely sure that he could not put a stop to it. If he could, I would make him do it.

Q. But if you could not make him do it, I suppose your opinion would still be the same? *A.* Yes, sir, of course.

The Chairman. Did you trace the origin of that which you smelt on the 31st? I think you said you went into the yard, and smelt something which was very bad? *A.* I have no doubt that originated on his premises, but I could not say. I think that ought to be qualified with an explanation. They said that at that time the apparatus was not in working order. I went around the next evening, and found this gas burning, and no smell accompanying it.

Q. (*by a member of the Board*). Was the air very still on the 31st? *A.* Yes, sir; what wind there was was very light.

A. Is it not possible that there was a current of air above the lower current moving in another direction? *A.* That is often the case. This was a heavy damp evening, — one of the heavy evenings we have during dog-day weather, — with the wind light from the east, I think, all day; and in the evening it settled around to southeast, and finally to south.

Q. Is it not a common thing that the air moves in a different direction above than below? *A.* Yes, sir.

Q. It was very slight this night? *A.* Yes, sir; it was very light from the southeast.

Q. Do you think it was possible for the offensive odors to have arisen from the neighborhood of these basins or slaughtering establishments, and been carried up into a higher current by the atmosphere, and carried over toward Boston, and settle down as they gradually could, and then be taken back again? *A.* I don't know what the possibility might be; that is not for me to say. So far as I ascertained, it came from the direction of Boston. How it got there, I don't know. There are plenty of causes on the Boston side for that.

Q. Was it the rendering odor that you smelt that night, or the dock odor? *A.* I was not able to trace it. I have said before that it reminded me very much of the smell of Long Wharf.

Q. That year? *A.* Yes, sir, as well as on a former occasion which I have spoken of. There is a very bad place there at the southeast of East Cambridge House of Correction.

Q. Could you trace these smells any great distance in old times? *A.* No, sir.

Q. Have you been able to smell exactly the same smell that you got at the dock? *A.* I could not say.

TESTIMONY OF WATSON B. HASTINGS.

Q. (*by Mr. Muzzey*). Where do you live, Mr. Hastings? *A.* In East Cambridge.

Q. How long have you lived there? *A.* Forty-three years.

Q. Were you born there? *A.* No, sir; I was born on Cape Cod.

Q. Have you been a member of the city government of Cambridge? *A.* I have.

Q. Both Councilman and Alderman? *A.* I have.

Q. Now, sir, come right to the matter. What do you know about the origin of the Miller's River nuisance? *A.* I have been acquainted with the river from a boy. I have lived near the corner of Sixth and Cambridge Streets for twenty-five years. The first observable trouble came, I think, from the building or filling of Bridge Street and making the culverts, and also the running of the Fitchburg Railroad across the culverts at angles with the street, making these basins — especially the third or upper basin — open cesspools, which received the drainage of the whole territory. You need not take my testimony only in regard to that, for it will compare pretty closely with that of Captain Cunningham, who is thoroughly acquainted with the facts. As far back as 1855 and 1856, during that time along there the upper part of the basin was a nuisance. Another noticeable fact was that when these culverts were put in, the bottoms of the culverts were several feet above the bed of the stream. Now the mud has filled up, so that I think they are about level. Before the change was made the material that flowed in there would not all flow out.

Q. To what do you trace the bad odors that prevail? *A.* Perhaps I could tell by going back and giving a little of my experience which led me to inquire into the cause of it.

Q. I will ask you if you have been a Boarding Officer at the Custom House? *A.* I was appointed Boarding Officer at the Custom House in 1860, and held that position about eight years, and during three years of that time was on duty both day and night. Our boat was kept on the south side of the dock there. Our attention was early called to the effect of the sewage of one of the sewers that came into the dock there. Our boat-house was on the south side, and at the high course of tides, which run out generally two feet more than the lower tides, it would leave one half perhaps of the dock bare, — that was before Atlantic Avenue was built, — and the odors arising from it were very offensive.

The Chairman. We all agree upon that point. If you will please speak of this particular nuisance it will be much better.

Mr. Hastings. Well, if you would let me tell in a few words how my attention was called to it from that fact, that before being elected to the Board of Aldermen and the Board of Health I got men on the Board of Health to look at the open sewers which we had in our vicinity. The Otis, Thorndike, and Cambridge Street sewers emptying on the marsh formed an open cesspool from north to south, almost from Broad Canal and across to Cambridge Street. Then we commenced upon this, and after considerable work had it covered up. When that had been done, Mr. Squire, by building between Cambridge Street and Gore Street, covered one of the most offensive places where the old Cambridge Street sewer came in. What first led my attention to the effects of sewage was the effect which I myself suffered in our boat at this dock by the Custom

House. I was made sick one night, and the doctor who attended me said we must lay out of that dock. I noticed that the offensive odors which came from the marsh during this year came from the direction of the sewers; and I think the inhabitants will testify that these main sewers which open into empty ditches upon the marshes were the occasion of it. I believe, from my examination of the subject, that the sewage from the different establishments, the sewage from the thousands of water-closets since the introduction of Fresh Pond and Mystic water into Cambridge and Somerville, have had the effect to make an open cesspool of the basins, and have been the main cause of the trouble.

Q. Have you been into Mr. Squire's establishment? *A.* I have been there officially as one of the Board of Aldermen and as an insurance man, because I have done some insurance for Mr. Squire. Also, in doing insurance on the Brighton Abattoir I have had occasion to visit that. I have visited it myself, and have taken perhaps some twenty or thirty different travelling agents there to examine it, who, after thorough examination, found nothing existing that would make a nuisance as objectionable to subject of insurance. I have never found anybody who has been there who ever saw inside the place anything which he considered a nuisance to affect it as far as insurance is concerned. I never had a policy cancelled on that account. The same with regard to the one at Brighton. I see nothing there which I think could not be done at Mr. Squire's with the same apparatus. I think that is as nearly perfect as anything could be of the kind. I cannot see, nor can my former partner, who does a great deal there, — and we have compared notes together, — I cannot see anything that is done at the Brighton Abattoir that could not be done at Mr. Squire's. I put on some $ 20,000 at the Brighton Abattoir place last week.

Q. We have heard your statement about Mr. Squire's establishment. Please state whether or not the unpleasant odors that prevail in that neighborhood, in your opinion, come from it? *A.* I don't think that the odors which have prevailed there and which have been described here have come from the work which is carried on. Previous to a year ago last June, I think, Mr. Squire rendered tallow there for a party in Boston. At that time it was transferred from his establishment; and I transferred some of the policies I had on it to a party in Roxbury. I have a number of places in Boston which I insure where rendering is done. I think there is nothing, so far as rendering is concerned, that is objectionable, especially if they use the coil and the close tanks as the Boynton Packing Company use. I think they use more offensive matter at Brighton than here. I think if they can overcome what they have at Brighton they can overcome what they have here. I would state, with regard to the prejudice which exists there, — I happened to be at home on the evening of the 31st of July, and about fifteen minutes past nine o'clock my wife, who has been an invalid for eighteen or twenty years, remarked, "What a terrible smell there is!" I went around to the rear windows on the east side, and it was coming in through those windows. It smelt as if a thousand water-closets were being stirred up at once. It was a tremendous smell and was coming from the flats; it was during the low course of tides: I think the tide the second day was the lowest of all the year, and left the flats bare. This was coming in with a southeast wind. I judged of the wind by noticing that the curtain at the west window

blew out and that at the east window blew in. The odor was very strong, coming from Charles River, and we closed the windows at fifteen minutes past nine o'clock.

The Chairman. Was the tide quite low at that time? *A.* I should judge that it was low water about eight or nine o'clock. I judge of the second day, because I was at Wier River, and left there at the usual time on board the Rose Standish, at about quarter past eight o'clock, and we got aground between tides on the river. The common remark on board was, "This is as bad as Miller's River."

Q. (*by Mr. Muzzey*). Did the odor you got at Nantasket resemble the odor of Miller's River? *A.* It was not so intense. It was the same pungent smell, and the passengers very generally remarked that it was as bad as Miller's River. It was the dock smell, and was owing to the low state of the tide and the peculiar state of the atmosphere.

Q. What do you look for as the effect of the building of the sewer and the filling of the basins? *A.* When the famous Oxford Street sewer was built to the mouth of Charles River I was in favor of running down through Somerville, the natural course of Miller's River. I was in the city government at that time. I think if a main sewer is built and carried out in the water at Bridge Street to strike that current, which is about one hundred feet from the shore, is twenty feet deep, and runs at the rate of four miles an hour, with the whole force of an ebb tide, it would entirely obviate the trouble. In connection with this building of sewers, I will state that, while I was Boarding Officer in the harbor, I remember that the Portland steamships would arrive in that dock in the morning, and that the passengers who arrived at four o'clock were made sick before six o'clock.

Q. Has there been relief by extending the sewer? *A.* There has certainly; by carrying it to a stronger current. I would state another instance with regard to this smell in fixing it in my own mind. I was on the Charles River one evening. I own a boat, and often row out in the evening. I invited a member of the city government with me one evening in July, and we pulled along on the Beacon Street side, where the tide rises above the flats only about a foot. I pulled along and said nothing, and there was a band of music pretty near us. Very soon my friend said, "Let us get out of this! It is worse than East Cambridge."

The Chairman. It is hardly worth while to go into that.

Mr. Hastings. I only state that to show that we got the same odor there that we get in East Cambridge. We crossed back, and he said East Cambridge was quite a sweet place.

Cross-Examination.

Q. (*by Mr. McIntire*). Do you think the sewage had anything to do with the smell at Nantasket flats? *A.* No, sir. I think the cause of that odor was the decomposition of the clams, worms, and sea-weeds which were piled up by the side of the channel, and which were affected by the action of the sun.

Q. Would it not be a greater advantage to have that sewer go out nearer deep water? *A.* I think it is just as good where there is deeper water. But at Craigie's Bridge there is more water than at the entrance to the harbor. A vessel that could lie at Craigie's Bridge could not get in to the harbor.

Q. I understood you to say in your direct examination that on account of the basin being deeper than the bottom of the culverts there is naturally an accumulation of filth there. Would not that work the same way in this case? *A.* Deep stagnant water is different from a deep current.

Q. Well, sewage has organic matter in it which will settle. Do you think that if it was left to fall in a basin that was deeper than its outlet that the current would take the organic matter out over the bottom? *A.* I think it would come out with the wash of the six hours. If you ever tried to row against the current of Charles River you have found that the twenty feet current would carry that sewage out to sea.

Q. After it has fallen two or three hundred feet from the mouth of the sewer, do you think it would be carried up over the bottom of the river? *A.* I have no doubt of it.

Q. You are generally conversant with the condition of the houses in Ward Three. Have you noticed the state of the houses on Vine, Charles, Thorndike, and Spring Streets to see whether there is any discoloration there? *A.* I have not. I have noticed on the south side of Cambridge Street down as far as Second Street, that there was discoloration there.

Q. Have you noticed it farther down, nearer the bridge? *A.* Yes, sir; I have noticed it down to the bridge.

Q. To the same extent? *A.* Yes, sir. More, and to a greater extent there at the end of the wharf at Craigie's Bridge. There was a light discoloration on the night of this very low tide which left some fifteen feet bare at Craigie's Bridge.

Q. Well, you don't claim that these discolorations came from the opposite side of the river? *A.* They would come from wherever there was a flat.

Q. It has been said by Mr. Derby in his argument that these boards were discolored from these gases which come from the Boston side. *A.* My idea is that these gases come from the dock, for I have seen them bubble up and break in bubbles as large as that inkstand. I consider that wherever the flats are exposed at low tide, there the gases are generated.

Q. Well, where? *A.* There was enough anywhere. There was a sewer then at the bridge, which of course gave them out to some extent, and there is a sewer there near the Lowell Railroad property.

Q. You don't mean to say that these boards were discolored in one, two, or three nights? *A.* I say the most of it. I noticed that the most of it was done in that low course of tides, within three or four nights.

Q. You did n't find any discolorations for more than twenty-five feet? *A.* Because the gas had n't anything to feed upon.

Q. Well, the fence of that building runs, I should say, seventy-five or one hundred feet. The building itself is two stories high, and is painted the same color, and is almost entirely free from discolorations? *A.* The tide strikes off at this place that is left under the bridge, and this substance very naturally collects there and makes the gas.

The Chairman. I wish you would confine yourself more closely to the subject.

Mr. Derby. I would suggest that we have five or six witnesses yet to examine.

Mr. McIntire. It has been contended that the gas of that night discolored everything in that way, and caused the discolorations on Cambridge Street. I was only pursuing the inquiry.

Q. Have you found any discolorations that were not in the same line as the witnesses for Mr. Squire testify? *A.* That block of Mr. Bell's opposite First Street was considerably discolored from the odor coming up First Street from the sewer of Thorndike and Otis Streets which empties down near Dana's Wharf.

Q. Did you find anything like the discolorations found on Sixth and Cambridge Streets? *A.* No, sir, because there were no flats bare there. There are four feet of deposit there under the water.

Q. Now state what side of your house is discolored? *A.* My house is painted white, and I have noticed that white paint does not discolor like other kinds.

Q. It is quite near Charles River? *A.* It is the nearest of any dwelling-house. There is a large brick building between which would stop the gases from passing to us. I have noticed that at Mr. Squire's place the houses were not discolored. His buildings broke it off from the basin.

Q. Was the east side of your house discolored? *A.* No, sir, it was not.

Q. Might not this smell that you experienced at your house have come from the direction of Mr. Squire's and struck that brick building and come back to your house? *A.* No, sir; because I went out on Cambridge Street and walked down toward Mr. Pettingill's place and satisfied myself that it was coming from Charles River. I knew that it would be credited to Mr. Squire, and I was anxious to see where it came from.

Q. You have not inquired in regard to the state of those houses on Charles Street? *A.* I don't know that I have had occasion to go through these streets since that time.

Q. What amount of insurance do you do for Mr. Squire during the year? *A.* Perhaps to the amount of $200,000 or $300,000.

Q. Substantially all that he has? *A.* No, sir; I don't do half of it. My former partner in Boston does perhaps more than I do. I have other and larger customers on the other side of this controversy.

Testimony of Nathaniel Jackson.

Q. (*by Mr. Derby*). Where do you do business? *A.* In Brighton.

Q. You are one of the occupants of the Abattoir? *A.* I am.

Q. What business do you pursue there, sir? Do you supply the market at all with meat? *A.* We carry on the slaughtering business, and slaughter neat-cattle.

Q. You are well acquainted with the new Abattoir? *A.* Yes, sir.

Q. And are you acquainted with the establishment of Mr. Squire? *A.* Yes, sir.

Q. Will you state how they compare as respects the processes conducted, and the condition of the work? *A.* I can state the condition of Mr. Squire's place when I was there last summer. I had often been asked about the place, and knew nothing about it. Last summer I went to Mr. Squire's place, and I found the condition of his business what I should call *perfect*. The sanitary part of our business is conducted on an entirely different principle. I found that his offal was put into tight

wagons and carted away, and also his blood. I examined thoroughly the place where the blood was received, — and that in slaughtering we always find to be the most offensive, especially in warm weather, — and I could discover no waste of the blood. There was a little spattered out, perhaps a quart or such a matter.

The Chairman. I suppose the Board is well acquainted with the processes at the Abattoir.

Mr. Derby. I want to show that the same precautions are taken here as at the Abattoir.

Q. With regard to anything that runs into the stream, is there any comparison that you could make? *A.* I could not say as to Mr. Squire's establishment. I have no knowledge of that.

Q. How is it with your own with regard to anything going into the stream? *A.* Well, our washings go into the river.

Q. As respects the offal? *A.* The matter is taken every day before it is decomposed into the digester, and the fat and grease is taken out of it, and the residue of the scrap goes into the apparatus and becomes a fertilizer which looks like ground coffee. That is done within the space of twenty-four hours.

Q. How is it with regard to tallow at your place? *A.* We render that to a considerable extent. Mr. Reardon renders a large amount of tallow there at the present time.

Q. That is tallow collected in other places? *A.* I think the tallow that he renders there is partly taken from our establishment in its pure state. There is nothing allowed there of an offensive nature. It is under the restrictions of the State Board of Health.

Q. With regard to any precaution taken with regard to liquids, sir; are there any liquids that come from the rendering of tallow? *A.* I think the liquid is always condensed and goes away.

The Chairman. We are all acquainted with the Abattoir. It is hardly worth while to go into any explanation of it.

Mr. Derby. Very well. You may confine yourself to a comparison between the two. Whether there are any processes at the Abattoir that are not in substantial operation at Mr. Squire's? *A.* Well, sir, there is no comparison in a sanitary point of view, because the offal is entirely carted away from Mr. Squire's establishment, while we make ours into a fertilizer. So far as regards his business and the manner of conducting it, it is perfectly conducted, I think.

Mr. Derby. That is all that I have to ask you.

Testimony of William Bliss.

Q. (*by Mr. Derby*). Are you Superintendent of the Freight Department of the Boston and Albany Railroad? *A.* I am Manager of the road.

The Chairman. Pardon me, but what do you propose to show by this witness?

Mr. Derby. I understand the question is submitted whether the convenience of the public demands the removal of this establishment. That is one of the questions, I understand. I am going to confine him entirely to the question of convenience in the supply of food for the Boston market. I will ask him what the effect of the removal of this establish-

ment would be upon the convenience of supplying provisions for the markets of the city of Boston? *A.* I can only say what I think the general effect would be if Mr. Squire moved off the line of a road where he has the choice of two or more.

Q. With regard to the effect of interrupting him, whether, sir, it would break up the business? *A.* I think the effect would be to very seriously interrupt him, and perhaps to break up the establishment altogether.

Q. As to the arrangement made between Mr. Squire and the road? *A.* He has a rate which is dependent upon New York, and in order to get at that —

Mr. McIntire. It seems to me that he is testifying as to his own convenience.

Mr. Derby. Not at all. It is a question of price. It is whether he will pursue the business.

Mr. Newhall. The whole question would resolve itself into what would be the effect of removing this establishment farther from the city and farther from railroad convenience upon the price of meat.

Mr. Derby. Very well. (*To Mr. Bliss.*) You may state that.

Mr. Bliss. It would be to increase the price of transportation.

Q. Would it injure the business, in your opinion? *A.* So far as the export trade is concerned it would, at least.

Q. Do you think there would be a risk of losing that trade? *A.* I should think there would be serious loss.

Q. Where would the competition be? Where would it go? Whether it would be driven back to Chicago, the West, or to New York? *A.* It is only very recently that this business has been done here.

Q. Then as I understand you, sir, the effect of breaking up the business here would be to jeopardize the interests of the business? *A.* In my opinion it would, unless he could find some other place equally as advantageous.

Q. Well, there are peculiar facilities in this place, sir. He has the advantage of making rates for transportation of freight directly to the steamer at a very small additional cost over the rate to New York. He pays five cents on freight more than is paid to New York. He gets some advantage in cartage, and can so compete with New York packers. And his advantage as to position enables him to overcome that? *A.* I should say so.

Q. Well, sir, the facilities that can be given him are important? *A.* So far as the export trade is concerned.

Q. Well, sir, as respects the supply of the Boston market? *A.* Well, I suppose the market would be supplied at some price.

Q. But his proximity to the market gives him an advantage with regard to supplying the market at the lowest price? *A.* I should say so.

Q. Will you have the kindness to state, aside from the export trade conducted through you, how much it has increased? *A.* I am unable to say how much. The receipts of hogs perhaps would come nearer to it.

The Chairman. I don't know that it is worth while to go into that.

Mr. Derby. I will ask him no more questions beside.

Mr. Bliss. I think there were only about eleven hundred cars in 1870, and there have been six thousand this year.

Mr. Newhall. What particular portion of the business? *A.* From the West to the establishments of the packers in East Cambridge.

Q. That is a large increase? *A.* Yes, sir, very large. I should think that according to an average estimate he had taken half of the Cunard steamships. Possibly more.

Cross-Examination.

Q. (*by Mr. McIntire*). Do you say that he pays five cents more for transportation here than they do in New York? *A.* Yes, sir.

Q. Well, is that enforced? *A.* Certainly, sir.

Q. Don't you have a lower rate? *A.* No, sir.

Q. Well, the effect of this removal would depend upon where the removal should be? *A.* Doubtless it would.

Q. Well, I suppose your road is desirous of keeping him on its line as much as possible? *A.* Certainly.

Q. You don't have any personal interest in this matter? *A.* No, sir; I don't.

Q. I understand that you have said that some one would be sued at the end of this investigation for bringing it forward? *A.* I never made such a remark. A gentleman remarked to me that he thought it was a question of damages, and I told him I supposed it was. I said if it were my case I should sue for damages. That was only a private opinion, however.

Testimony of Edward Kendall.

Q. (*by Mr. Derby*). Whether you have held the office of Alderman in Cambridge, and are in that position to-day? *A.* I have, and am, sir.

Q. Are you a member, and have you been, of the Committee on Health? *A.* I have been, sir.

Q. Your occupation is what? *A.* I am a constructing machinist.

Q. I will ask you whether you have been, in the position of Alderman as one of the Board of Health, engaged in any investigation in regard to these smells? *A.* I have, sir. I have been there several times in the last three years; first, in 1871.

The Chairman. We have had testimony in regard to this.

Mr. Derby. Certain intimations have been made that the votes of this Board on this question were for political effect.

Mr. McIntire. That has been ruled out.

The Chairman. I don't know that the whole Board of Aldermen of Cambridge should be called upon. I think we have decided once that they should not be called.

Mr. Derby. We are going into some explanation with regard to this machine by the gentleman who constructed it. I was asking him as a preliminary whether he made any investigation. I understand that he has said that he has ascertained that the smells did not come from —

The Chairman. We don't want to go into the matter of machinery. We don't wish to settle upon the point whether the machinery is good.

The question is whether he has any testimony to give further than we have already got in regard to the so-called objectionable features of Mr. Squire's establishment.

Mr. Derby. I propose to ask him whether he is responsible for this machine; whether it works perfectly now, and carries off and consumes the gases.

The Chairman. We have had evidence upon that.

Mr. Derby. We have had the evidence of an inferior class of witnesses. Here is the builder of the machine, and I want to ask him whether it is perfect or not.

Mr. Newhall. Ask him whether it effects its object.

The Chairman. Of course he would say it was perfect.

Mr. Derby. I am not sure of that. I will risk the question, however.

Q. Will you have the kindness to say whether it effects its object, — whether it consumes the gases? *A.* I think it does.

Q. Have you examined it while in operation? *A.* Yes, sir; we have put in a branch pipe that comes out into the open air, with a valve, to shut the gas off, so that we may apply a match to the gas, and set it on fire.

Q. I wish to ask whether the gases are consumed? *A.* Well, sir, the flame, when the machine is in full operation, is a foot wide and six feet long.

Q. Is it a perfect combustion? *A.* It seems to be. Also, when the gas is burned through the branch pipe outside, the flame, I should say, would rise up as high as six or seven feet.

Q. Well, whether it is a possible thing that these gases which are carried in through the furnace can be carried up through the chimney and distributed through the open air, and give offence, as now conducted? *A.* I think they could be, unless, perhaps, they are run through gasoline in passing, to make it inflammable. Another method of burning it is used in several places, which is to blow it under the grate and have it come up through the fire. When there is a good, bright, clean fire, I have no doubt it consumes it all; but sometimes it happens that there is a large place of coal consumed, perhaps a foot square, and there would be but very little coal. Whether the sulphur of the coal would destroy the gas, or whether there would be heat sufficient, there might be a question.

Q. That is where it goes in without gasoline? *A.* Yes, sir.

Q. Where it goes with this gasoline, and is mingled with it, and is carried into the furnace, it has, as far as you have observed, been perfectly consumed, and the process will prevent its being diffused in the atmosphere and making its effects objectionable? *A.* I have no doubt that it is a perfect combustion.

The Chairman. Have you any proof of it? *A.* The proof is this: when we close the valves that allow the gas to go into the furnace, and allow it to come out into the room and be burned there, we discover no smell. If it comes into the room without burning, it creates an intense odor. The man who invented this process burns the gas in his own parlor, and uses it to light his establishment.

Q. (*by a member of the Board*). Could not that be ignited readily before it was charged with gasoline? *A.* We never have tried it. At least I have not.

The Chairman. You have made no chemical analysis to prove that these gases are burned? *A.* I know that before it is ignited there is an intense odor about it, and after it is ignited there is no odor.

Q. (*by Mr. Derby.*) I will ask you in regard to the condensed steam that goes off through the pipes, — what quantity passes off? *A.* It is very small. The gases are taken off into a small pipe from the large tank. These valves are merely opened to let off the gas, and not to let off the steam; because it would take so much live steam from the boilers to supply the heat in the tank that there would be a great waste of steam if all these tanks were open.

Q. Let me ask you whether a quarter of an inch pipe would carry all that water, in your opinion? *A.* There are four tanks connected with it. I should say that when the four tanks were in operation a half-inch pipe would carry all four.

Q. So that the quantity from each must be very inconsiderable. It is simply the condensed steam. Could it be enough, if carried into the water, to effect any unpleasant odors? *A.* I don't think it could.

Q. Whether you are making close tanks to take the place of open kettles? *A.* We are, sir.

Q. You made the machine at the Abattoir. It is different from this, is it not? *A.* It is different. The condenser at the Abattoir is a tank about eight feet long by four feet in diameter.

Q. I will ask you whether gasoline is there mingled with the gases? *A.* No, sir; the gas is consumed under the grate.

Q. The combustion then is not so perfect as with this machine? *A.* I cannot say it is so perfect. I should not think it would be likely to be. With a good bright fire it might be perfect.

Q. At the time the very strong smell was perceptible in Cambridge, about the 31st of July, did you visit any of the sewers in Boston? *A.* I did. I could not say whether it was the next morning after the 31st of July, but it was soon afterward. I was told in East Cambridge that there was an exceedingly strong smell from Mr. Squire's establishment, and I said it could not be. I had been there, and knew there was no smell except when the machine was first put in operation. I don't know, but I hardly believe that many people know the cause of the odor at the time that experiment was tried.

The Chairman. You admit that it was imperfection of the machine, and that afterward it went well? *A.* Yes, sir; but I wish to give the cause of the odor at that time. Between the coil and the purifier there is a pipe, a half-inch pipe, that comes up with a valve so arranged that people may try the gas.

The Chairman. We have heard that before.

Mr. Kendall. It was told me that the tank was nearly free from gas; that they commenced very early to exhibit the gas, and there was very little left. I told them that I thought they had better shut the valve so that the gas might collect in the tank. There was some mistake, so that the steam was shut off and there was very little pressure. The flame at that time was very short, — not more than three or four inches long. We opened this valve to see whether there was any pressure there, and

kept it open to see if it did n't come from the pipe, or somewhere else. We did n't know what the trouble was for some time, and the gas escaped into the room. Afterward we found that the steam was shut off from the tank and we opened the valve and let it on, and it burned readily.

Mr. Derby. I will refer you to Boston. You were going to say something about the sewers of Boston.

Mr. Kendall. I looked around to see if I could satisfy myself where these smells came from. I came over to Boston and went out toward Brookline and all around there. I saw that the door-plates all along the street toward the Milldam were all black as in East Cambridge. I went on up toward Roxbury, to the outlet of a sewer that comes down from Stony Brook. As I went along up I saw a large sewer made of stone, and near by I met a man with whom I spoke about sewers.

Q. The stench was powerful about there; was it? *A.* Yes, sir. I told him I had come there to examine, and he told me they had experienced them around there and he thought if it was any worse in East Cambridge than there, it must be pretty bad. While we were talking the superintendent of sewers came along, out of the sewer. I went up to him and was talking with him when he took out his watch, and it had been turned black. I asked him how that came so.

The Chairman. I don't know what the purpose is in pursuing this investigation any further in this direction. It seems to me to be a waste of time.

Mr. Derby (to Mr. Kendall). That is sufficient on that point. I will ask you whether you are on the committee in charge of the drains of Cambridge? *A.* I am chairman of that committee.

Q. I will ask you whether there is any difficulty in draining from these works down to Craigie's Bridge, so as to carry off any liquids that come from this establishment? *A.* I should not think there was, sir. I think that so far as the liquid matter that is turned into the drain is concerned, that could be very easily extracted from it by running the liquid through a filter of sand or charcoal.

Q. Well, is there fall enough to carry off the liquids? *A.* The fall in the new drain is three quarters of an inch per one hundred feet.

Mr. Derby. That is much greater than the fall of our great rivers. The fall of the Ohio is, I think, only twelve inches per mile.

Mr. Kendall. The water that comes from Brookline, about four miles, has a fall of only one foot in ten thousand feet, or about one foot in two miles. That is sufficient to bring the water from the aqueduct.

Cross-Examination.

Q. (by Mr. McIntire). On the night of the 31st of July did you have a trap in that machine such as has been marked out upon the board? *A.* No, sir; we had a siphon, but no trap.

Mr. McIntire. I asked several of Mr. Squire's men that question and they said they had.

Mr. Kendall. There was something better than that trap. There was a siphon two inches in diameter, the longer arm being, I think, five feet.

Q. There was a valve there somewhere. Did n't a great deal of odor come out of that valve? *A.* The odor came out of the pipe that was put up for people to try the gas.

Q. Then, if I understand you, the odors of that evening of July 31

were largely due to the letting off of gas through these valves? *A.* The odors that were there I attribute to that, but the odors in East Cambridge and in other places I do not.

Q. You heard Mr. Harding speak of the smell in the yard? *A.* Yes, sir. Every person that went down through the building was obliged to go almost directly over this, so that they would be just in position to get all this gas.

Q. Well, it was pretty offensive, was it not? *A.* Yes, sir.

Q. You have done work more or less for this establishment? *A.* Yes, sir.

Q. Did you ever have an instance of a man who was at work on some of the pipes being made sick so that he had to leave? *A.* No, sir, I never heard of it. When we built the tanks on the opposite side, at the oil place above Merrill's, nearer North & Merriam's, there were two of them that were obliged to go home.

Q. You were a member of the city government in 1872, and were one of that committee that drew up that report? *A.* No, sir; I was not one of the Committee on Health last year.

Q. But you were a member of the Board of Aldermen, and of the Board of Health? *A.* Yes, sir.

Q. Have you seen anything, or do you know of anything that has been done by Mr. Squire which would remove a nuisance if one were found there, since that time? *A.* Yes, sir.

Q. What is it? *A.* In the first place there have been two close tight tanks introduced for rendering matter, in the place of open kettles. Another improvement has been the removal of the offal in tight carts every day.

Q. How many close tanks did he have at the time of the hearing before the Board of Health in 1872? *A.* I think he had two. Now he has four.

Mr. Derby. And has three more building.

Q. Was it not before that time that they had put in these tanks and this other apparatus? *A.* No, sir; I think it was since then.

Q. (*by Mr. Frothingham*). You have testified that this machine which you have built now does its work perfectly. How long has it done its work so perfectly? *A.* I think always since that first night when the operation was not successful for a few minutes, so far as gas is concerned. So far as the using up of the water is concerned it does not have any effect upon it any more than to condense it in the same way that it is done at the Abattoir, at Mr. Winchester's, and at every other place I know of except Mr. Usher's.

Mr. Frothingham. I simply want an answer to the question I put. I merely asked you how long it has done its work perfectly.

Mr. Kendall. Ever since the commencement, — that night, I think.

Q. (*by Mr. McIntire*). In the hearing before the Board of Health last year, don't you remember that Mr. Squire testified that the apparatus which he then had in connection with a tank to get rid of the vapors was as perfect as anything could be made; and that he said all the odors were taken care of? *A.* That was supposed to be perfect at the time.

Q. Well now do you think he was wrong or mistaken in his idea? *A.* I think it was only condensed then, the same as it is at North & Merriam's. It was a thirty-inch boiler.

Q. Never mind that. Whether he did n't as strongly contend there for that machine as he contends here for this? *A.* I don't think that he contended as strongly.

Q. Well did n't he contend as strongly by his witnessess that he got rid of his gases as surely as he does now? I am speaking of his position at that time, and not of what he did. *A.* I will tell you what his position was then; it was that these gases went into the water and were so diluted that they were not offensive.

Q. Well, he contended that he thoroughly disposed of all the gases. Did n't he say that it was a better machine than that used by North & Merriam? *A.* North & Merriam used the same thing.

Mr. Muzzey. I think you misapprehend: you are speaking of the showering-machine, and Mr. Kendall of the machine which discharged under the building.

Q. (*by Mr. McIntire*). It had recently been put in, had n't it, and the pipe extended to tide-water? Did n't he contend that the machine did entirely dispose of all the gases? *A.* It was contended that they were disposed of in this way.

Q. Well now I understood you to say something about the coal in the furnace, that it might have some effect upon the burning of the gases. Do you think that fresh coal being put on in the furnace would affect the burning of the gas which comes through in that pipe so that it would escape up the chimney without being burned? *A.* When coal is put on fresh a great deal of sulphur is excluded from it. English engineers claim that that sulphur destroys the gas.

Q. It would put the fire out, would it not? *A.* No, sir. The sulphur mixing with the gas would destroy it.

Q. You don't know whether fresh coal would have the effect to destroy the fire or not? *Q.* It would if the fire was low and a large quantity of coal was put on at once.

Q. Have n't you given it as your opinion that that machine leaked all or a greater part of the night of the 31st of July? *A.* Not a particle leaked except what came from that valve, not that I discovered. I don't think any escaped except when I opened it to see whether it would work.

Q. (*by Mr. Derby*). If coal were put into the furnace it would not prevent this flame at the end of this pipe from burning? *A.* It would not affect that at all. I was only speaking in that connection of the gas as it is discharged under the grate. It would not affect this at all.

Testimony of Knowlton S. Chaffee.

Q. (*by Mr. Muzzey*). You have been a member of both boards of the city government of Cambridge; a Senator of the Commonwealth; a Representative, and are at present the President of the Union Horse Railway Company. How long have you resided in Cambridge, and where? *A.* For sixteen or seventeen years, on Cambridge Street, until within a few months. Formerly, and previous to that time, I resided over near Somerville, near Miller's River.

Q. Take your house on Cambridge Street which was exposed toward the establishment, on the northerly side; was that ever discolored? *A.* My house was a brick house, and so is the present one. The woodwork around the door was never discolored.

Q. Take your present house, where you have a southerly exposure? *A.* That I found discolored so badly that it was a pretty good job for the painters to scrape it off.

Q. How long did you occupy the house on Cambridge Street which had a northerly exposure, which was never discolored? *A.* Fifteen years.

Q. Now, in your official capacity and as a citizen have you followed the cause of this trouble, or the foul odors, and traced them to their source? *A.* I have taken some pains to look into that.

Q. Will you state what you have discovered in connection with those odors, and particularly in connection with the cause and source of them? *A.* Go back fully eight years before I moved into Cambridge. I lived in Somerville near the McLean Asylum. To describe it more particularly, I lived in a little lot formed like the letter V at the crossing of the tracks of the Boston and Lowell Railroad.

Q. Where the change has been made? *A.* Yes, sir. At that time Miller's River basin, back of Mr. Squire's, was comparatively clean.

The Chairman. When was that? *A.* We moved to Cambridge Street some sixteen or seventeen years ago. The boys went in swimming there, they dug clams there, and everything was comparatively clean. Mr. Merrill was trying lard and tallow there.

The Chairman. It seems to me this is too far back for our consideration.

Mr. Muzzey. I wish to show where these troubles proceeded from. This witness will be a very valuable one to the Board.

Mr. Chaffee. Mr. Merrill was trying lard and tallow there, and there was a great deal of complaint about it. I suppose I have been there with Dr. Bell to remonstrate against the trying of tallow a great many times.

Q. Dr. Bell was Superintendent of the McLean Asylum? *A.* Yes, sir.

The Chairman. Open tanks of course? *A.* Open kettles, and very offensive. His building that he did the trying in was a very comfortable one inside, was painted, and his house opposite was always kept nicely painted, and the paint was as bright on these buildings as on anybody's.

Q. (*by Mr. Muzzey*). Not discolored? *A.* No, sir. The same region now is all colored. The houses on that basin are colored blue-black. Before I left there, there had begun to be some talk about blood accumulating in there. And after I left I still owned the property, and there was more or less fault found about the blood being found there. By and by it was seen that the basin was filling up, and in the summer would come the odors. Formerly when I went there it was the dock odor. I hear them talk about the dock odor here. I think that odor is changed. I don't think it should be called the dock odor unless it is a dock where sewage comes in. It is a different odor than we got from that basin. Mr. Squire had also commenced trying there before I moved away from there, and I suppose his blood came in there, and there began to be an accumulation of animal matter.

Q. How about the sewage? *A.* The sewage of Cambridge and Somerville ran into it, but they did n't have so many sewers in early days. Since the people began to complain of it, the policy of the government

has been to get the sewage out of Miller's River, and that has been done to such an extent that very little now enters it. The basin finally got to be so foul that the city of Cambridge attempted to do something to keep the river clear, and with that idea they built the dam at Bridge Street.

Q. What was its effect? It was to keep the water in there, was it not? *A.* I don't know. The first I heard of it I was at Union Square, Somerville, in conversation with a gentleman, who said that the complaint was, that dead dogs were scattered about there, and there was not current enough to take the filth off.

The Chairman. I must object to this line of inquiry.

Mr. Muzzey. I will pass that.

Q. You have been into Mr. Squire's establishment, and around it, and have inspected it? *A.* Quite a number of times.

Q. In what condition have you found it? *A.* I have always found it very cleanly.

Q. In your opinion, from your investigation, do the odors that prevail in East Cambridge come from that establishment or not? *A.* I don't believe (this is my judgment) that the people of East Cambridge ever smell anything from Mr. Squire's establishment, more than the trying of sweet lard, which they may get at some particular times.

Q. What is the source of the bad smell? *A.* I have never had any doubt about it at all. We have got slight smells from the outside drainage; I mean outside of Miller's River, when there has been a current sufficient to bring them from the south and southeast. But, in my own mind, I feel perfectly sure that the odor that colors the houses, and of which the people complain, comes from Miller's River and its basins.

Q. Have you found any offence from any of these smells except in the immediate vicinity? *A.* Yes, sir; when I have come down from my office in Harvard Square, on the last car at night, I have experienced the odor, and, getting up to see where I was, I found myself just this side of Webster Avenue.

Q. That is how far from Mr. Squire's establishment? *A.* About one third of a mile.

Q. Now, after passing by that and travelling east, getting nearer to Mr. Squire's establishment, what about the smell? *A.* We lost it. There was no trace of it when I got down to East Cambridge.

Q. In travelling east, toward Boston, you came near to the very walls of Mr. Squire's establishment? *A.* Yes, sir.

Q. Now, you remember the 31st of July. Was there any smell on that occasion? *A.* Yes, sir.

Q. Please state what you know about it? *A.* I came out of the jail office; there were four of us, I think, and I stood in the door.

The Chairman. At what time? *A.* At nine o'clock in the evening. We perceived an odor there, and one of the parties said something, — I don't remember what it was, — but the inference was, that it was not from Squire's, because the wind was south or southeast. We knew that there was to be new machinery tried there, and I was hesitating whether I would go down or not, when one of the gentlemen made this remark.

Q. Did you observe the direction of the wind? *A.* Yes, sir; we looked up at the vane.

Q. (*by Mr. Muzzey*). There was a light wind, but it was enough to turn

the vane? *A.* There was a southerly wind all day. I urged the matter of going out to see whether that odor came from Mr. Squire's or not, and having a view of the new machinery. Two of the party would not go. Captain Adams and myself went. I would say that the moment the gentlemen spoke of this smell, when I was standing in the door, I did n't perceive it. As I got out on the sidewalk I caught it. It appeared to me that it was not a rendering smell. Mr. Adams said he would go up with me, and we started to walk up. We lost it all before we got by the Court House. We went up to the establishment, saw a great many people there, and saw what was professed to be the burning of the gas, and came home and went to bed. The smell did n't affect me.

Q. You slept in a room facing the north? *A.* No, sir; my room faces the east. Well, within a week after that, probably within that time, on a very lowery day with a heavy atmosphere, I was coming down from Harvard Square; talking with a gentleman who had come to pay me a visit, — a minister who formerly preached for us, — we came to speak about this subject. I was noticing the coloring of those buildings every morning as I went by there.

Q. Where were they? *A.* On the south side of Cambridge Street, near Sixth Street; we got the awfullest stench there, and the passengers in the cars caught their noses in an instant. I looked right out to Mr. Jones's house, which looked as though the discoloration had been thrown there in blotches, and I remarked to this minister, Rev. Mr. Spaulding, and said, "No doubt that house is being colored this moment. I can see that it has changed since this morning." It was a horrid stench. I got down to Fourth Street, near where I lived, and I saw the gentleman who had just bought the house, and I told him to go up and see how it had changed since morning.

Q. (*by a member of the Board*). What time of day was this? *A.* Somewhere from three to five o'clock in the afternoon. I know that I went home earlier than usual, on Mr. Spaulding's account.

Q. Have you heard any of the petitioners who are here before this Board admit that Mr. Squire was not chargeable with the odors of the 31st of July, — any of the petitioners, — anybody concerned in this prosecution against us now? *A.* Well, on a certain occasion I was talking with three or four gentlemen, and one gentleman — I don't know whether one of the petitioners or not — said, "Charlie," referring to Mr. McIntire —

Q. (*by Mr. Muzzey*). Was that Mr. Coveney? *A.* Yes, sir.

Q. He was one of the petitioners?

Mr. McIntire. The gentleman is mistaken, — he is not one of the petitioners.

Mr. Chaffee proceeded: He said, "There is no use of talking about laying this thing to Mr. Squire, for I was in Ben McCormick's back room, and it came in there so perfectly horrible that I hauled the window down and told him to get a light and go out and fix his cesspool, for there must be something the matter with it." He got the light and went out, and came back and said his cesspool was all right.

Mr. Derby. Mr. Coveney was one of the Committee of Ten appointed to prosecute.

Mr. McIntire. The gentleman is mistaken again. Mr. Coveney is not a member of that Committee of Ten.

Mr. Chaffee. I have got through with these remarks pretty much. Mr. McIntire replied, "Well, I will be fair. I will exonerate Mr. Squire's works from the stench of that night. That undoubtedly came from the basin." I congratulated Mr. McIntire on what he said, and said I was glad to see him honest and right.

Mr. McIntire. Did you doubt his honesty before? *A.* Well, I don't know. Without speaking of the history of this question of smell, Mr. Squire has undoubtedly tried there for twelve or fifteen years. But I don't believe that any person in East Cambridge has supplied the smell. Sometimes they have been talking about Miller's River. I had begun to hear a good deal of fault found on account of the filling up of the basin with accumulated filth, and so it was to be with the rendering if they were allowed to go on; and some would say there were a great many dead hogs in the basin, etc.; but the real vengeance came down upon John P. Squire's establishment after the hearing at the State House upon the question of filling up the basin.

Mr. Muzzey. That is all.

The Chairman. Did you trace that horrible smell that you spoke of? *A.* No, sir, I had no occasion to trace it. I think I can distinguish between the rendering smell, whether it is of putrid matter or fresh, and the smell of that basin.

Q. (*by Mr. Muzzey*). Well, do you know that it came from the basin? *A.* It was perfectly clear that it came from the basin.

Cross-Examination.

Q. (*by Mr. McIntire*). Ever since there has been any complaint against Mr. Squire you have championed him, have n't you? *A.* Well, sir, Mr. Squire was a man that I did n't think much about previously; I may have spoken to him, but I never had any conversation with him, and I did n't know him, except by sight, until they began to talk about these basins that are being filled up. As soon as they began to turn the stench from the basin on to Mr. Squire, I found myself taking, very naturally, what I believe to be the true side of the question. He is no friend of mine.

Q. He used to do business at your bank? *A.* No, sir.

Q. In past days? *A.* No, sir.

Q. Well, you have since that time defended his cause among the people? *A.* I have defended his cause no more than I defend anybody's cause when I see a pressure being brought to bear on any particular man that I think is bad and wrong. I defended him.

Q. Then you say that you were so interested that you took up his case and valiantly defended it? *A.* I don't think Mr. Squire hardly knew me, but I answer it plainly and clearly. I defended what I thought to be his right. It was so perfectly conclusive to me. I have no interest in it whatever.

Q. Well, now, in any measures that have been taken against him have n't you always taken the same position, — for instance, in keeping open the basins? Where certain issues have been brought to bear against him, have not you always taken his side? *A.* No, sir, not at all. I think he was all wrong in his opposition to the filling up of the basins. I felt that they should be filled up.

Q. Did you want the basins filled up, or did you advocate that? *A.* I had nothing to do with it. I did n't know for a fortnight that it was going on.

Q. Were not your views first in favor of open basins? *A.* I don't know that I have any recollections of having anything to do with it. I was not acquainted, as I have said, with Mr. Squire at that time.

Q. You were one of the witnesses from the Third Ward in favor of Mr. Squire a year ago before the Board of Aldermen? *A.* Yes, sir.

Q. And at that time testified substantially as now? *A.* I presume so.

Q. I believe that at that time you testified that yourself and wife were in the country a large part of the summer season, so that during the hot season you did not experience these terrible odors that we have experienced there? *A.* I recollect your asking me that question very ingeniously. I think I said I was away about three weeks.

Q. And your family were away most of the time? *A.* About six weeks.

Q. Last summer how was it? Were your family at home on the 31st? *A.* No, sir.

Q. Were they at home in the hot season? *A.* I might say they were not. They left in July and came home the 1st of September.

Q. Has not the odor affected your wife considerably? *A.* No, sir, it has not.

Q. Has she complained of the odors much? *A.* No, sir.

Q. Has she at all? *A.* Yes, sir; we all complained on a certain night. That was during the hearing before the Board of Aldermen. I had company at my house, or one gentleman from the country, and a very strong smell came in upon us, because I had got up a little too much heat in the furnace, and we were obliged to open the windows a little.

Q. At what time was that? *A.* It was during that hearing in the latter part of October, 1872. The case was finished on one side —

Mr. McIntire. The case I had special reference to was last summer.

Mr. Muzzey. Let him finish. Do not interrupt him.

Mr. McIntire. I don't think it is necessary.

Mr. Muzzey. Well, I shall ask him the question, if you do not.

Mr. McIntire (*to Mr. Chaffee*). You may answer it if you please.

Mr. Chaffee. It was the strongest kind of a regular sewage smell, and the gentleman said, "Why, your sewer is coming right up into your house."

Q. (*by Mr. McIntire*). Then you of yourself never got what is termed the rendering odors at your house? *A.* I don't think I ever got the rendering odor at my house. I would not say that I had not. I know sometimes in the streets of Cambridge we get the rendering odor. My impression is that that rendering odor which we get there, which is the lard odor, we get more in cold weather than in warm.

Q. But I mean this rendering odor that is complained of; the strong, pungent rendering odor. *A.* If you refer to such an odor, I have not smelt it.

Q. You make it all the basin smell? *A.* I make it all basin smell.

Q. Have you had it recently? *A.* We have had it two nights since

this hearing commenced, one night pretty strong. I think that was last Tuesday night.

Q. (*by Mr. Derby*). You speak of one other strong smell, when a gentleman said the sewer was coming into your window. What was it? *A.* It was Miller's River; not quite so intense. I went out into the street and called people's attention to it. It was so plain that there was no difficulty in distinguishing it.

The Chairman. Did you trace it to Miller's River? *A.* Well, sir, the wind was right that way.

Q. (*by Mr. Derby*). It was blowing right from the river? *A.* Certainly. Nobody can talk about the rendering odor with such a smell as that around.

Q. (*by Mr. McIntire*). Well, have you smelt the rendering smell with it at Thurston's, on Cambridge Street, near Fourth Street? *A.* I could not say that I had, but I would not say I had not.

Q. Whenever you get that rendering smell it comes lightly? *A.* It is something we hardly notice.

Q. Did n't you one night, — in order to refresh your recollection, — did n't you one night, in company with Mr. Hastings, in tracing the rendering odor near Fourth Street, go to the establishment and find it emanating from there; what you call the pleasant rendering smell? *A.* Yes, sir; Mr. Hastings came along one evening and met Mr. Sortwell and myself, and said, "Can you smell anything?" We smelt and could not smell anything; and I said, "If you have got the smell of it, let 's follow it and see where it is." We went, but were unable to get any smell whatever until we got clear up to Mr. Squire's place.

Q. Mr. Sortwell and yourself could not get any smell of it? *A.* No, sir; not till we got directly outside. Then Mr. Hastings took us around to Miller's River, and I think he got smell enough to satisfy him when he got around there. He did n't talk about its being the rendering smell.

Q. Don't you know that Mr. Sortwell has a pecuniary interest in one of these establishments? *A.* I do not. My impression is that he has not. I think he is interested in one of the slaughtering establishments in a way that would not affect him one way or the other; that is, he has furnished them a considerable amount of money, for which they have given him good security. All I know is from conversation that I have heard.

Mr. McIntire. That is all.

Mr. Muzzey. I still have half a dozen witnesses, and I assure you, Mr. Chairman, that we have taken forty or fifty names off our list since yesterday, and have reduced it to the smallest possible number.

The Chairman. Will you give us the number and the names of the witnesses?

Mr. Muzzey. Yes, sir. They are Rev. Mr. McDaniel, Messrs. Aldermen Sawin and McSorley, Mr. Chase, the City Engineer, Mr. John L. Porter, Mr. John H. Stevens, and Mr. J. P. R. Squire.

The Chairman. What do you intend to show?

Mr. Muzzey. Do you mean that I shall take up each witness and state what I intend to show by him? It would take almost as much

time as to call them. It is not altogether cumulative evidence. There are some special facts known to each witness. I should not call in any testimony, simply cumulative. We have done with that. We have every desire on our part to shorten the case.

Adjourned.

TWELFTH DAY.

Monday, December 22, 1873.

TESTIMONY OF J. G. CHASE.

Q. (*by Mr. Derby*). Where do you reside? *A.* In Cambridge, sir.

Q. What is your occupation? *A.* I am a civil engineer.

The Chairman. Anywhere near the establishment of Mr. Squire? *A.* In Cambridge or in Cambridgeport, so called.

Q. How long have you resided there and pursued your occupation? *A.* Since 1859.

Q. For the last fourteen years? *A.* Yes, sir.

Q. Have you been accustomed, sir, to make surveys for drains? *A.* Yes, sir, that has been a part of the duties I have had.

Q. Some for the city of Somerville, and some for Cambridge? *A.* Yes, sir.

Q. You are familiar with the territory? *A.* Yes, sir.

Q. As to the facility, sir, for making a drain from the point where Mr. Squire carries on his business down to Craigie's Bridge, that distance. Take the line proposed by the Legislature. *A.* The distance from Craigie's Bridge to Cambridge Street is 3,150 feet, I think, and the line is near Mr. Squire's establishment.

Q. From Craigie's Bridge to Somerville line on Bridge Street; how would that compare with the distance from Mr. Squire's? *A.* It is somewhat less. Mr. Squire's establishment is situated at the place of the termination of this drain on the Somerville line to the southwest.

Q. How much farther would it be to his place? *A.* Probably not far from five hundred feet.

Q. Making an aggregate of three thousand six hundred feet? *A.* Yes, sir.

Q. Well, now, sir, as to the material that is to be drained from there, can you make an effective drain to carry off the liquids? *A.* Yes, sir, there is no difficulty about that.

The Chairman. The Board admits all that, so far as I know.

Mr. Derby. Some suggestions were made, I think, by the Secretary that there would be difficulty in effecting this drainage. If the Board are satisfied on that question I have nothing more to say upon it.

Dr. Derby. I referred to the special forms of sewage which would go into the drain. The Joint Commission has fixed certain methods and lines of drainage suited to ordinary sewage, for dwelling and manufactur-

ing purposes, without any special reference to special forms of sewage from noxious and offensive trades which it is proposed to carry through there.

Mr. Derby. I will call his attention to this particular subject.

Q. I will ask you whether the condensed steam, the blood and offal being carted off, whether there would be any difficulty in carrying that through the sewer that would be constructed there? *A.* Not any, sir.

Q. That would be efficient to drain the establishment of J. P. Squire & Co.? *A.* Yes, sir.

The Chairman. In order to get at the matter definitely I would like to know if he has made any drains connected with just such establishments, and knows definitely that the points Dr. Derby made are met. I don't understand that he does by his statement. Whether he has made any drains in connection with such establishments and can prove to us that he knows about them.

Q. (*by Mr. Derby*). I will ask you whether you have made any drains that have been connected more or less with such establishments? *A.* I have not.

Q. I will ask you with regard to Mr. Sortwell's place, whether you have made a drain connected with that? *A.* No, sir.

Q. I will then ask you if there is in the liquids from such places as Mr. Squire's anything more difficult to deal with than the human fæces that come down from the water-closets? *A.* Not to my knowledge.

Q. I will ask with reference to this slaughtering-business whether there is anything connected with it as now conducted, the blood and offal being carried away, — whether there is anything to prevent effective drainage being carried out there? *A.* Not so far as my observation goes, sir.

Q. I would inquire, sir, whether you are the engineer charged by the Commissioners with the construction of the new sewer? *A.* I am, sir.

Q. It would be your idea, would it, sir, to construct it for the requirements of that particular business? You will adapt it to the uses it is to accommodate? *A.* Yes, sir, for that business and for all other businesses.

Q. You entertain no doubt that you could make it effective? *A.* Not in the least.

Q. (*by Mr. Newhall*). That drain is to empty where, sir? *A.* At Craigie's Bridge.

Q. At what grade? *A.* The grade of the drain for the first 4,000 feet is one half of an inch per 100 feet, or 1 foot in 2,500. The remaining portion of the distance, extending from the Grand Junction Railroad to Prospect Street is one inch per 100 feet, or 1 foot in 1,250.

Q. (*by Mr. Derby*). For what length is that? *A.* The full length of the drain is 7,000 feet. The distance from Craigie's Bridge to the Grand Junction Railroad is 4,250 feet.

Q. Well, for that 4,250 feet the grade is 1 foot in 2,500 feet? *A.* Yes, sir.

Q. That is at the rate of 2 feet to the mile? *A.* Yes, sir.

Q. You gave us the grade of Prospect Street. *A.* That was 1 foot in 1,250. It is half an inch in the 100 feet for the first 4,250 feet, and an inch in the 100 feet for the remaining distance.

Q. And the mouth of the sewer is at what grade compared with low water? *A.* It is 3 inches above mean low water.

Q. (*by Mr. Derby*). The mean height of the drain is 8 feet and 4 inches, so that the top of the drain would be 8 feet and 7 inches? *A.* Yes, sir.

Q. (*by Dr. Derby*). Mr. Chase, does it follow the grade given in Mr. Ball's report? *A.* I think not exactly, but nearly so.

Q. It is a little more elevated at the mouth? *A.* Yes, sir.

Q. It is within 3 inches of mean low water? *A.* Yes, sir.

Q. Will you tell me the elevation above mean low water at the bottom of the drain, at the corner of Milk and Prospect Streets? About 6 feet, is it not? *A.* The total rise of the drain is 4.38 feet.

Q. Then the drain must be filled with sea-water at the corner of Milk and Prospect Streets, 7,000 feet from its opening, at half-tide certainly?

Mr. Derby. That is, the water must enter, but not fill it? *A.* Yes, sir.

Q. It would be filled at high water at the most elevated point, at the corner of Milk and Prospect Streets, would it not? *A.* It would without provision being made to prevent the sea-water from running into it, that is, with gates.

Q. Well then, if Mr. Squire's place is about midway, the drain would there be filled much sooner? *A.* Yes, sir.

Q. The sewer there would be filled at three quarters tide, would it not? *A.* Yes, sir, about three quarters tide.

Q. Then, if gates were placed at the opening at Craigie's Bridge, the sewage, or whatever might be drained into it, would be retained until nearly low water? *A.* It would be retained until the accumulations in the sewer during the time that the gates were shut by the tide were sufficient to open the gates and allow the matter to be discharged.

Q. That would occur probably at what stage of the tide? *A.* It would depend very much upon the tide. The tide differs so much that it would be difficult to determine.

Q. With an average tide? *A.* That would depend upon the head of water, the accumulations in the sewer, and the surface-water in the sewer. It would be much sooner in wet than in dry weather.

Q. Suppose there were no rain? *A.* Supposing there were no rain at all, it would be about one quarter tide. The accumulation of sewer-water would be quite small independent of anything else. The sewer matter during the tide would not fill the sewer an eighth part full.

Q. Well now, in dry seasons, with no rainfall, the sewage would be retained in the sewer until the tide was at what stage? *A.* About three quarters out. Then the gates would open and the contents of the sewer would be discharged at low water.

Q. The capacity is so great at 8 feet that it would hold a very large amount? *A.* Yes, sir.

Q. (*by Mr. Newhall*). What is the capacity of the sewer?

Mr. Chase. Do you mean the whole quantity of the sewer itself?

Mr. Newhall. I mean the inside capacity of the sewer.

Mr. Chase. It is 8 feet wide and 8 feet 4 inches high.

Mr. Newhall. Well, the rise is 4 feet as I understand it? *A.* Yes, sir, 4.38 feet.

Q. Its entire rise would be 12 feet 4 inches? *A.* It does not follow this size the entire distance. It diminishes at the Grand Junction Railroad to 7 feet diameter, and at Milk Street to 6 feet diameter.

Q. (*by Mr. Derby*). How with regard to the elevation, sir? Is it carried to a higher or a lower level? Do you take this from the top or the bottom? *A.* This is from the bottom.

Q. So that the height would be corresponding. It would be gradually ascending? *A.* Yes, sir.

Q. Then the height at the upper end would be 4 feet and 8 feet and 4 inches, making 12 feet 4 inches? And commencing 7 inches above extreme low water, it would be about 13 feet above low water? *A.* The top of the drain at the upper end would be 11 feet 3 inches above mean low water.

Q. What is the ordinary rise of the tide, sir? *A.* Ten feet.

Q. So that it would be something like a foot above the top of the tide? *A.* About 1 foot and 3 inches above the top of the tide.

Q. The fall of which you speak corresponds how with the fall of the Aqueduct which brings the water from Boston? *A.* I could not say, sir.

Q. How does it correspond with the fall of the great rivers of the country? Take the Ohio. *A.* It is much greater.

Q. It is sufficient, is it not, sir, to carry off the drainage? *A.* Yes, sir.

Q. You apprehend no difficulty, sir, with regard to the gates? I understand you that gates are to be used. Are they to be used at both ends or only at the lower end? *A.* Only at the lower end, to prevent the flowing in of the tide.

Q. With regard to the surface water, do you direct it all into the sewer or allow only part to go into it? *A.* We direct it all into the sewer.

Q. Do you see any difficulty from occasional rains in the summer that would fill this up so as to make trouble, and so make it offensive? *A.* Yes, sir, there may be times when this sewer would be more than filled by extremely heavy rains.

Q. How often do you think it would occur? *A.* That is a difficult matter. It would be a rare occurrence.

Q. Nothing to affect the comfort and convenience of the people? *A.* No, sir; I do'nt think it would be.

Q. Would it hold half an inch rainfall for this surface? *A.* No, sir, it will not. My calculation is made upon the capacity of the sewer, and that is based upon an eighth of an inch rainfall. That is the usual formula used upon this territory. It will not even cover that years hence when the territory becomes more densely settled, it being now so sparsely settled that a large quantity of the rainfall is taken up by the ground. If it were densely populated like Boston, it would not be of sufficient capacity to provide for that territory. It would be many years, however, before that time will arrive when it will be necessary to provide increased and additional drainage.

The Chairman. How many years do you estimate? *A.* Well, it may be anywhere from five to ten years.

Q. (*by Mr. Derby*). You would then remedy it by additional drains? *A.* Yes, sir; I would remedy it in that way rather than enlarge the capacity of this drain.

Q. You think this is quite large enough? *A.* Yes, sir. There are many outlets that may be as good as this for the same region when it becomes necessary to adopt them.

Q. I would inquire whether the present system which you are trying to improve is not a defective one? Whether there is not an accumulation of offensive matter at Broad Canal? *A.* Yes, sir, there is at all points where drains are discharged.

Q. Are you trying to remove these evils in your system of sewerage? *A.* Yes, sir, we are hoping to do it in time.

Q. I would ask you with regard to the deposit east of the House of Correction and the Broad Canal; is there not a considerable deposit there as well as in Miller's River? *A.* Yes, sir.

Q. (*by Dr. Derby*). Do you say that the drain is sufficient for the next five years? *A.* Well, sir, that is an estimate as to time. It would depend wholly upon the occupation of the territory. It may be ten years, and it may be less than that.

Q. Well, when you speak of five years, do you refer to population? *A.* Yes, sir, and to the covering of the territory with buildings as it becomes more densely populated.

Q. Well, suppose the number of swine received at the slaughtering and packing houses were trebled in five years, and, looking to the growth of the business in the last five years, it would not be extraordinary, — would this sewer be sufficient? *A.* I think it would.

Q. (*by Mr. Muzzey*). Supposing the fluid contents of the scalding-tub and the daily washings to give a contribution to the sewer of two thousand gallons, what proportional part of the sewer would it occupy? *A.* It would not be perceptible.

Cross-Examination.

Q. (*by Mr. McIntire*). The city of Cambridge, at great expense, built a sewer, which is called the Ninth Street sewer, which runs across from Mr. Squire's, or about there, and empties into Broad Canal, did it not? *A.* Yes, sir.

Q. What is the dimension of that sewer? *A.* Four and one half by four feet.

Q. They have lately decided to run it through Potter Street into Charles River, and out to the channel? *A.* Yes, sir.

Q. I will ask you, if that sewer were completed to run through Potter Street into Charles River, would the sewage be carried away, provided this territory was drained into it, as well as by the contemplated sewer emptying in at Craigie's Bridge? *A.* No, sir; I don't think it would.

Q. Why not? *A.* Because I think it desirable to discharge all sewers as near ocean, or the mouth of Charles River, as possible. I would not desire to discharge sewers up the river, where the contents would come down.

Q. Well, then, with that idea it would be better if the sewer which it is contemplated to enter under Craigie's Bridge were carried farther down, for instance, to some point in Charlestown? *A.* Undoubtedly it would be.

Q. You know what different lines were given by Mr. Ball for the contemplated sewers, I suppose? *A.* Yes, sir.

The Chairman. I would merely ask what particular benefit you wish to gain by this?

Mr. McIntire. It has relation to this establishment, whether it will be properly drained or not.

The Chairman. It seems to me that you are asking with regard to points that might have been discussed by the Joint Commission. I cannot see, with regard to several questions which have been already asked him, what precise bearing they have upon the subject of this investigation. For one, I want to get through it, if I can.

Mr. McIntire. I don't think, Mr. Chairman, that he has touched upon the question of the organic matter which is in that sewage. Suppose the organic matter from the sewer which empties under Craigie's Bridge should be washed upon the flats, would not that have something to do with determining whether this establishment would be a nuisance even after that sewer is built?

The Chairman. Certainly.

Mr. McIntire. That was where my question was to be ultimately directed.

Q. (*to Mr. Chase*). I wish to ask you whether the organic matter from the sewage from this establishment and from the population which would contribute to the sewer to empty under Craigie's Bridge would not wash up upon the flats? *A.* A portion of it would; to a certain extent.

Q. With the quantity which might be put into the sewer from this population and these establishments, how long do you think it would take to make the flats extremely foul above the bridge? *A.* A large portion of them are extremely foul at this present time. They probably would increase in their foulness as time passed, from a combination of gases and sewage, perhaps.

Re-direct Examination.

Q. (*by Mr. Derby*). I omitted to ask one question with regard to the sewer or drain across Mr. Squire's premises to connect with the main drain; are you building that? *A.* Yes, sir.

Q. How is that to be constructed? Are there to be any cesspools to catch the solid matter and prevent its going into the drain? *A.* The design is, in constructing the sewer across Mr. Squire's premises, to construct in connection with it three catch-basins, the object of which is to take the solid matter that may be discharged into his drain, so that it may be taken out without being absorbed in the water.

Q. The catch-basins you think would be sufficient? *A.* Yes, sir; with proper care.

Q. Let me ask you, then, if they should prove not to be entirely sufficient, whether an addition might not be made of charcoal filters, or something of that kind, as in England? *A.* Well, sir, I have n't given that any consideration at all. I should not apprehend any difficulty in discharging all the matter that might be turned into it, even if carelessness took place.

Q. You would not apprehend any difficulty on that score? *A.* This sewer possesses a scouring capacity at the lowest grade of 2.65 feet per

second, and a part of it 3.75 feet per second. That is the velocity of the current of the sewer. That is sufficient to take out almost any matter that might be discharged into the sewer. Two feet will scour out what we term shingle, or rounded stones, an inch in diameter. Three feet will scour out angular stones two or two and a half inches in diameter. I should not anticipate, with the grade of this sewer, any difficulty in taking care of any matter that might be discharged into it from any establishment or from any drainage.

Q. That which would pass the catch-basins would be inevitably diluted? *A.* Yes, sir. This sewer is also provided with gates. In case of any deposit occurring in the sewer during the high tide, these flushing-gates can be used to aid in the process of scouring it out.

Q. (*by a member of the Board*). How is this done? *A.* At high tide the sewer is allowed to fill with sea-water; the gates are shut till low tide, and then opened instantly.

Q. Is the mouth of this sewer left open under the bridge? *A.* No, sir; there are self-acting tide-gates near the mouth, probably twenty or twenty-five feet from the mouth of the sewer.

Q. Do they close the sewer so that you will get exhalations from it at low tide? *A.* No, sir. The provision made for that is a roof built over the mouth of the sewer discharging into low water. The arched roof over the mouth of the sewer terminates below low-water mark and prevents the wind from driving off obnoxious gases into the sewer.

Q. Is that effectual? *A.* I think it will prove so.

Q. (*by Mr. Derby*). They have been introduced at the South End of Boston? *A.* I have so understood.

Q. And it has been found effective elsewhere? *A.* It can hardly prove otherwise.

Q. Is it your plan to admit the tide at the upper end at all? *A.* No, sir.

Q. You entertain no doubt, sir, that all the sewage, both liquid and gas-like, will be carried off? *A.* I do not.

Q. (*by Mr. Muzzey*). Mr. Chase, would it not be easy to contrive something by which you could fasten the tide-gates at any time when you wished to accumulate the storm waters. *A.* Yes, sir.

Q. (*by Mr. McIntire*). One question suggests itself to me. Mr. Hastings testified here last week that the basin of the river there at Craigie's Bridge, down perhaps as far as the Lowell Bridge, was deeper than almost any other part of the river; deeper than some portion of the harbor even. I would ask you whether that would be of any advantage to the sewer if it had to run into a deep basin, as low and perhaps lower, of any other portion of the river? *A.* At the point of immediate discharge of this sewer, it is not deeper. If it were extended out to deeper water, it would undoubtedly be a slight advantage; but I should not consider it a material one.

Q. Would it not have the effect of catching that organic matter unless there was a rapid tidal current to take it up? *A.* No, sir; I don't think the effect would be very material.

Q. (*by Mr. Derby*). A rival sewer is to Craigie's Point? *A.* Yes, sir.

Q. The County Commissioners have asked for funds for the extension of the sewer near the House of Correction? *A.* I am not aware of that.

Q. (*by Mr. Newhall*). Won't you explain the roof, Mr. Chase, by which

you expect to prevent the escape of the gases? *A.* The sewer at low tide, the extreme lower end of it, would be exposed. The tide being out, this sewer, terminating at the bottom of the bridge, would be exposed. So from the top of the sewer there is a shelving roof, reaching down into the water. This is provided with a flood-gate so that in case the sewer is to be flushed out the discharge water shall not force that off.

Q. (*by a member of the Committee*). Is there a ditch dug in the flats? *A.* No, sir; there are no flats there. There is no ground exposed at Craigie's Bridge at low water.

Q. Well, the water does not drop off suddenly deep? *A.* It does n't until you get off several hundred feet.

Q. (*by Mr. Derby*). The water stands there at low tide? *A.* Yes, sir.

Q. (*by Mr. McIntire*). How much water is there, Mr. Chase? *A.* There may be five feet, possibly ten.

Q. Where this sewer comes in at the corner of the bridge, it is all laid bare at low water? *A.* Well, that would be prevented in the construction of the sewer so that there would be none at low water.

Testimony of J. R. N. Squire.

Mr. Muzzey. Before asking any questions, I desire to read the following, which is the call for the meeting at which the Committee were appointed to appear here: —

"Citizens of Cambridge, — You are notified to attend a meeting at Institute Hall, Cambridge Street, East Cambridge, on Monday evening next, August 4, at 8 o'clock, to take such action as may seem necessary for the stoppage of the nuisance of Miller's River and its surroundings."

Q. (*by Mr. Muzzey*). Did you attend that meeting? *A.* Yes, sir. I was present at the meeting, supposed to be the second one.

Q. Now I wish to know how many citizens of East Cambridge were excluded from taking part in that meeting?

The Chairman. Mr. Muzzey, what can that possibly have to do with the proposition before us as to Mr. Squire's establishment?

Mr. Muzzey. I offered it for this purpose: we want to show what we have already endeavored in some ways to make known to this Board, that this petition comes to you merely as a petition of the opponents of Mr. Squire, who pretended to call an open meeting of the people of East Cambridge, but drove out from that meeting a majority of the citizens of East Cambridge, and then acted for themselves. I offer it for this purpose. When we first assembled before your Honors, you will remember that your Honors addressed to us a communication containing, in substance, this: —

"We cannot ignore the fact that public sentiment condemns your establishments."

We want to show your Honors that a majority of the people were adverse to this action. We have shown you that the city governments of Cambridge and Somerville were against it; now we wish to show you

that a majority of the citizens of East Cambridge opposed it. These gentlemen are here to prove that public sentiment is against us.

The Chairman. If any person can show by a public meeting what public sentiment is, that might be admissible as evidence; but I can't see how it can be done.

Mr. Muzzey. Then I will put in the report of that meeting from the "Cambridge Press." Mr. Squire, you are excused.

The Chairman. We all know what public meetings are.

TESTIMONY OF JOHN L. PORTER.

(*To Mr. Muzzey.*) I reside in Cambridgeport, and have lived there about seventeen years.

Q. Have you owned any land in the vicinity of Miller's River, and had occasion to fill and prepare it for sale? *A.* I, together with Mr. B. F. Nourse and Mr. Livermore, bought four and a half acres.

The Chairman. What is the object of this?

Mr. Muzzey. The object is to show the general character of Miller's River surroundings where not affected by the tide.

Mr. McIntire. It seems rather evident to me, in regard to the evidence concerning the public meeting —

The Chairman. It is n't necessary to go into that again.

Mr. McIntire. But I wish to call your Honors' attention to one thing. The respondents in this case have shorthand reporters here, and your Honors have been notified that a record of the case is to be printed. I wish your Honors to instruct them that that evidence shall not be put into the record.

Mr. Muzzey. The witness has been ruled out; but I don't see how any one can control our reporters. Mr. Porter, will you proceed?

Witness. In 1867 we bought a portion of the land near Mr. Squire's factory for $4,100. We found it in a filthy condition, full of pit-holes.

Q. How near was it to the basin? *A.* One portion of it was about 500 feet.

Q. Please describe the condition of the land, and its foulness. *A.* We found it impossible to use the land.

Q. How did the odors compare with those in the vicinity of the factory? *A.* The odors seemed to come from the dock, such as we get on the South Cove. The smell was similar, and there is no doubt about its coming from the dock. The land was located between Cambridge and Gore Streets, adjoining the Grand Junction Railroad.

Q. About what distance from Mr. Squire's works? *A.* One portion of it was about 250 or 300 feet.

Q. You compared the odors, and say they were like those from the basins? You also say they were like the odors on the South Bay? What do you know about the odors on the South Bay? *A.* I had occasion,

being in the real-estate business, to be more or less on the South Cove. The paint on the houses was discolored, and some houses had been vacated. The discolorations were in black-blue streaks, running up and down ; and I was told that people would n't live in them.

The Chairman. It seems to me that we are having statements from him that have been made before.

Mr. Muzzey. I will ask him another question. (*To witness.*) Were there any houses colored like these on the Back Bay ? *A.* There were.

TESTIMONY OF J. G. CHASE (*recalled*).

Q. (*by Mr. Derby*). I learn that you have with you a statement of the number of miles of drain in Cambridge ? *A.* We have, previous to the constructions of this year, forty-one miles.

Q. How do they compare, in regard to grade, with the one you propose to construct ? *A.* Most of our drains in Cambridge are constructed upon the same grade, — about one inch in a hundred feet.

Q. You have some long drains there ? *A.* Yes, sir.

Q. Which is the longest ? *A.* The Ninth Street drain is the longest. It is about 1,000 feet in length.

Q. (*by a member of the Board*). I think the filthy condition of the low land was described by the last witness. I should like to ask you if there are any restrictions on building on certain land up to a certain grade ? *A.* None whatever.

Q. The city government nor the Legislature has never taken any action whatever to prevent building on these filthy low spots ? *A.* The only remedy ever offered by the Legislature was last winter, when power was given to the city to order all lands to be filled up to grade. Previous to that there were no restrictions whatever.

Q. The city of Cambridge is now acting on that authority ? *A.* Yes, sir ; we are filling up five different sections under that authority. There was an Act five years ago in regard to filling up one district, and giving them power to do it.

Q. But no action until last winter in regard to the land on this side of the river ? *A.* It was given last winter, and it is now being done.

Mr. Derby. We shall bring on one gentleman familiar with the contract, presently.

Q. (*by a member of the Board*). Are the street grades established there ? *A.* Yes, sir, by the same Act.

Q. What grade does the new Act contemplate ? *A.* The new Act contemplates three feet above low water.

Q. (*by Mr. Derby*). I will ask you whether, when this levelling is done, you do not think these difficulties in regard to offensive odors will be cured ? *A.* I have no doubt about that in my mind.

TESTIMONY OF WILLIAM M. RICHINGS.

Mr. Derby to Mr. McIntire. This is the fireman that you asked to have called. I will ask him a few questions.

Q. (*to witness*). It appears there have been some questions about a

fireman. Have you been a fireman in the employ of Mr. Squire? *A.* I have, sir.

Q. Have you taken charge of the fire under the boilers where the gas which comes from the close tanks is introduced? *A.* Yes, sir.

Q. I will ask you whether you have noticed the flame of that jet, and whether it has been kept constantly burning since it was introduced? *A.* Yes, sir.

Q. What time have you been in that fire-room, — how many months? *A.* About six months in the fire-room.

Q. Were you there in July? *A.* I was.

Q. Did you continue there until September or October? *A.* About three months afterwards.

Q. The flame of the gas was carried in over the furnace? *A.* About the centre of the furnace.

Q. How freely did it burn? *A.* About five or six, perhaps seven, feet in length.

Q. Was it independent of the fire of the furnace? *A.* Yes, sir.

The Chairman. We have had this evidence introduced before.

Mr. Derby. Not by this witness.

The Chairman. We have had it from other witnesses.

Mr. Derby. But we want to show it by this man, who had charge of the fires.

The Chairman. We have had all this evidence from experts, before.

Mr. Derby. We wish to prove it by another expert.

The Chairman. The question is whether this gas is combustible.

Q. (*by Mr. Derby*). Then I will ask him if the gas is brought into a close room, whether it will illuminate? *A.* It will, sir.

Q. Can you detect anything offensive in the room? *A.* Nothing, whatever.

Q. How much flame? *A.* About six or seven feet. We were almost afraid it would set the place on fire.

Q. Did it make any more smell than common gas in a house? *A.* No, sir.

Q. You have seen it and tried it yourself? *A.* Yes, sir, I have tried it myself.

Q. Your fire-room is detached from the building? *A.* Yes, sir.

Q. There are no tanks in that part of the premises? *A.* No, sir.

Q. And no flame except from the boilers and flame of this gas? *A.* No, sir.

Q. You have so tried it that you are satisfied that there is no smell in the room? *A.* I have, sir.

Q. Never had any smells, whatever? *A.* No, sir.

Q. In this insulated building there is no flame except from the boilers and this gas? *A.* None, whatever.

Q. And this gas is carried from the close tanks into that furnace? *A.* Yes, sir.

Q. And you noticed no offensive smells in that part of the premises? *A.* None, whatever.

Cross-Examination.

Q. (*by Mr. McIntire*). Are you in charge of the rendering room now? *A.* I am night watchman.

Q. You are still in the employ of Mr. Squire? *A.* Yes, sir.

Q. You had charge of the fire on that night of the 31st? *A.* I had charge of the fires; but I don't have charge of the furnace except to look after the fires.

Q. How long did you have charge of the fires? *A.* Until I went away.

Q. Who has charge of them now? *A.* A man named Sumner.

Q. Why did you leave that work? *A.* It was too hard work for me.

Q. Did you ask to be relieved? *A.* Yes, sir. The work was too hard, and I had to give up the job or get another place.

Q. Who had charge of the tanks on the 31st of July? *A.* I don't know.

Q. Who has had since then? *A.* A man named Brannagan.

Q. Where is he now? *A.* He is away, sir, — I don't know where.

Q. Why did he leave, — because he was sick? *A.* It was owing to his pay being cut down and his not liking his job.

Q. Who had charge before Brannagan? *A.* I don't know. Brannagan had charge of them for two years. He had charge of them during my time.

Q. Did he have charge of the pipes above the fires? *A.* He did.

Q. Was there not some trouble about the way he took care of the valves? *A.* On the night of the 31st there was a fresh man put in his place, and he allowed the water to get too much heated, and the steam condensed; and that did n't allow the gas to go through the furnace.

Q. Has n't there been trouble since then with some one? *Q.* None, whatever. It has burned satisfactorily in my time. I watch it now.

Q. You don't know where Brannagan is now.

Mr. Derby. You shall have him if you wish. We will bring him here.

Q. (*by Mr. McIntire*). Do you know whether they have been moved? *A.* I believe they were moved within a day or two to make it perfectly tight, which it is at the present time.

Q. (*by Mr. Derby*). Is there a part of the night when the rendering process is not going on, when these gases are not lighted? *A.* The pipe is always kept open.

Q. The rendering always goes on during the night? *A.* Always.

Q. (*by Mr. McIntire*). Have you been sick since you have been there at night? *A.* I am on during the night and have been for two or three months. I have gained twelve pounds in flesh.

TESTIMONY OF JOHN MCSORLEY.

Q. (*by Mr. Derby*). Where do you reside? *A.* In East Cambridge.

Q. I would inquire whether you are a member of the Board of Aldermen of Cambridge? *A.* I am an Alderman elect.

Q. You have had occasion to visit this district which is infested with these bad smells? *A.* Yes, sir.

Q. Are you familiar with the contract for filling up a part of that district? *A.* My brother has a contract to fill up the Cambridge Street

district which is bounded by the Somerville line, Webster Avenue, and Cambridge Street, and the Grand Junction Railroad.

Q. You have had occasion to visit this district? *A.* I am there every day.

Q. Will you describe the condition in which you found this land when you first went there? *A.* I have nothing to do with the basin. This contract is for the land. My brother's contract is for the Cambridge Street district, so called.

The Chairman. Where is that? *A.* It is bounded by the Grand Junction Railroad, within a hundred feet of the line of Mr. Squire's factory. There is nothing but the Grand Junction Railroad between that and Mr. Squire's establishment. Then we go up the Somerville line, along Gore Street, taking in Webster Avenue, over to Cambridge Street, and back to the Grand Junction Railroad.

Q. Will you describe the condition, in respect to filthiness, in which you found this river? *A.* My brother contracted with the Fitchburg Railroad to furnish gravel for filling up this district. He had fillings to make to make way for the train and let the railroad come in, to lay the sleepers to Huntington Street. We had to come through a large pool of water. That water was almost sickening, being filled with dead hogs, dead cats and pigs, and I don't know how many fish. There were people in that district who kept fish until it was n't fit to be sold, and then threw it into the pools. I found the relics there.

Q. You found many pieces there? *A.* I think there were thousands of fish there. There are cellars around there with from two to three feet of water in them, and the sinks and water-closets running into the same cellars. It is not a very agreeable place to be in.

Q. But did you find any cellars there, while you were laboring, where people became sickened by the smells coming up? *A.* I have become sick there myself.

Q. Have you known of others becoming sick? *A.* All I do know I went into Mr. McCabe's cellar, which is possibly within five hundred feet of Mr. Squire's property. I went in there to give the men the grade. My brother had been in, and, finding a not very agreeable odor, told me to put a plank in. When they did put the plank in it disturbed the surface of the water. My stomach has always been considered a pretty strong one, but this was the first time I found it was necessary to discharge. I did n't come back the next day, and my brother told me every man had to quit work.

Q. Are there many cellars in this condition? *A.* About nine out of ten.

Q. About how many such cellars? *A.* On the district there are possibly two hundred and fifty houses.

Q. And nine out of ten in that condition? *A.* Yes, sir, but not all as bad as that. They had enough in their cellars to make anybody sick who wanted to take the benefit of it.

Q. Now state what is being done in regard to filling up that district? *A.* That part of the district is now about half filled.

Q. The gravel is brought down on the Fitchburg Railroad and distributed? *A.* It is, sir.

The Chairman. It has been suggested that this is unnecessarily taking up the time of the Board.

Mr. Derby. I only wish the Board to understand the scale on which Mr. Squire is filling up. That is the only point, but it is important to us.

The Chairman. We will admit that Mr. Squire is doing everything, — that he is doing more than all the rest.

Q. (*by Mr. Derby*). Will you in a few words just give a general idea of the scale on which the work is being done? *A.* There are four or five contracts now. There are three in the city of Cambridge, and Mr. Norcross has another in Somerville. My impression is that Mr. Squire has done more grading and filling than the four or five others put together.

Mr. Newhall. The whole of that is that the Legislature have required the basins to be filled, and they are filling the low land around them. You claim that you are filling all the low land there?

Mr. Derby. Yes, sir.

Mr. Newhall. Is n't that the whole of it?

Mr. Derby. We only wish to show the scale on which it is going on.

Mr. Newhall. Do you understand that all this low land is to be filled?

Mr. Derby. Up to the grade of thirteen feet above mean low water.

Mr. Muzzey. It is the intention to go to the Legislature for authority to oblige the filling of those flats this winter. It is recognized as necessary to be done.

Q. (*by Mr. McIntire*). Is n't that dark spot on the map where you are filling? *A.* Yes, sir.

Q. That is north of Cambridge Street? *A.* Yes, sir.

Q. (*by Mr. Newhall*). There has never been any action to prevent building houses on this territory? *A.* None whatever, except about five years ago, I remember an order of the city government to fill the Washington Street district. I amended that order so as to include all the low lands in this territory which my brother is filling now, but the city government saw fit not to adopt my proposition.

Q. And the city government never did anything to take care of this territory at all? *A.* No, sir.

Q. (*by Mr. Derby*). It has been greatly neglected? *A.* Yes, sir.

Q. Whence come the offensive smells in Cambridge and Somerville, do you think, — you having been among them? *A.* Well, sir, they came from various sources, but my opinion is that their greatest source is the low ground of the Miller's River basins.

Q. What is your opinion of the filling of that basin and low ground in regard to extinguishing the smells? *A.* My opinion is that the cause of the complaint will be done away with.

The Chairman. That is his opinion as an Alderman elect of Cambridge.

Q. (*by Mr. Derby*). That is the result of your observation, — you have been familiar with this country for twenty years? *A.* Yes, sir, I have lived in East Cambridge twenty-three years, or will have been next January, and I have lived within two hundred feet of the basin half of that time, — from 1859 to 1872.

Q. Do you know what discolors the paint? *A.* I could n't say that I know, but I think; I am not a chemist, but I am satisfied in my own mind that the discoloration comes from the nuisances that lay in the basins.

The Chairman. Have you ever smelt anything offensive from Mr. Squire's establishment? *A.* Yes, sir; I have smelt that which would be called offensive.

The Chairman. How often have you smelt anything offensive from Mr. Squire's establishment? *A.* That I could n't say.

The Chairman. Well, once a week or a month? *A.* I am not prepared to say.

Q. (*by Mr. Derby*). Take the past year, — have you perceived anything? *A.* I really could n't say; nothing that I would call offensive. I have been in many establishments and found smells there that I would not call agreeable.

Q. What do you call not agreeable, — the smell of the pig? *A.* The smell of the pig I don't like.

The Chairman. Have you smelt anything outside? *A.* I would n't say that I have, and would n't say that I have not.

Q. (*by Mr. Derby*). Do I understand that you have occasionally smelt the smell of the pig and the smell of the lard, but you have not smelt them inside of six months? *A.* Yes, sir; I have inside of four days. I have smelt the trying of lard there and the smell of the hog-pen.

The Chairman. Within three or four days? *A.* Yes, sir; and I must confess that I was perfectly astonished that so large a number of hog-pens could be there when there is so little smell from them.

Q. (*by Mr. Derby*). And you were astonished that there was so little smell? *A.* Yes, sir, I was.

Q. You do not smell anything offensive outside? *A.* No, sir.

The Chairman. He said two minutes ago that he could n't state whether he had or not.

Q. (*by Mr. Derby*). You have been there within these few days past; did you smell anything offensive? *A.* No, sir.

Q. Have you within the last month or two smelt anything outside, — you go by there every day? *A.* Yes, sir; half a dozen times a day.

Q. Now state whether you have seen anything offensive in that way. *A.* I am satisfied that I have not.

Cross-Examination.

Q. (*by Mr. McIntire*). You say you have smelt offensive smells from that establishment? *A.* I have been in there and have smelt smells that are offensive to me.

Q. Well, outside, — have you smelt anything offensive? *A.* I don't say that I could smell anything distinctly. I have smelt smells that were offensive.

Q. But did n't you distinguish smells while living so near the basins, — could n't you distinguish the smells from the establishment and the other smells? *A.* I don't really know that I could safely say that I have. I have smelt bad smells.

Q. But you don't know that you have distinguished one from the other? *A.* I could n't single it out that I know of.

Q. Do you remember a meeting we had a year ago before we went to

the Cambridge Board of Aldermen, which was an indignation meeting of the citizens who inaugurated this movement? *A.* I do.

Q. And you made some remarks in regard to this smell? *A.* Yes, sir.

Q. And that your remarks were directed to the establishment? *A.* No, sir. If I remember distinctly what my remarks were, I stated then that if the basin were filled the great cause of complaint would be done away with, and if, after that was filled up, the offensive odor continued, then I should say wipe John P. Squire & Co. out, and should say so to-day.

Q. Don't you remember the remarks of many of the parties were to the effect that these establishments should be wiped out, and the result of that meeting was that the citizens went before the Cambridge Board of Aldermen and commenced proceedings? *A.* Yes, sir.

Q. Don't you remember having been before the Mayor and Board of Aldermen, and made some remarks to the effect that if these establishments were not so extensive they would have been wiped out before? *A.* Yes, sir. I remember Mayor Houghton told me they were going to take some action against John P. Squire & Co., and that would be a strong inducement for me to be a friend of his. I told him that that was n't any inducement to me to vote for him. It was my opinion that if public sentiment were so strong against small institutions as it was against Mr. Squire they would be wiped out, and that is my opinion to-day.

Q. And you remarked that if they were done up into twenty-five dollar packages they would be wiped out? *A.* That is my opinion, and it is as I have stated.

Q. Have n't you smelt what has been testified to here as the rendering odor? *A.* Yes, sir.

Q. I mean the intense rendering odor? *A.* I have smelt it hundreds of times this past twenty years.

Q. Do you know where that comes from? *A.* I am satisfied that it comes from some of those institutions, but I have never traced it.

Q. And you have never traced it to its source, although you have smelt it a number of times? *A.* Yes, sir.

Q. Now, have n't you, at your place, often smelt the rendering of sweet lard? *A.* I may, possibly, but don't recollect.

Q. You never smelt the hog away from the institution? *A.* I have no idea of having smelt the hog smell at my house.

Q. Your house is almost due east from Mr. Squire's establishment? *A.* Yes, sir.

Q. And the hogs were delivered to the west of the establishment, so that his establishment would be between you and the place of delivery? *A.* Yes, sir.

Q. When did you leave the place where you lived so near the basin? *A.* A year ago, the latter part of last June.

Q. Where you live now is on Spring Street, on the corner of Third? *A.* Yes, sir; the lot is on the corner.

Q. At your house have you distinguished any odors during last summer? *A.* I have this last week.

Q. Did you distinguish any of those intense rendering odors last summer at the house you now live in? *A.* None of them at all.

Q. Or any of your folks? *A.* Not that I know of.

Q. You are over the hill that intervenes between you and the establishment? *A.* Yes, sir.

Q. So the hill rises between you and the establishment? *A.* Yes, sir.

Q. You have distinguished odors, but not rendering odors? *A.* No, sir.

Q. What kind of odors were they? *A.* I have distinguished the dock odors, which come from the House of Correction sewer; also an unpleasant odor, which comes from the filling in of Second Street, where the garbage from the city of Boston is deposited. At the corner of Spring Street they are filling in with garbage which the Health Department gathers up on the streets, and I have known a very offensive smell to come from that.

Q. That is where you get the smell? *A.* I have smelt that with the rest.

Q. (*by Mr. Derby*). The other smell is from the docks? *A.* The other smell is from the docks and basins.

Q. (*by Mr. McIntire*). Do you know whether any odors of the past summer have affected any member of your family, — your son, for instance; he sleeps in the front of the house? *A.* They have smelt a smell up in the attic of the house.

Q. He sleeps up there? *A.* I have three boys sleeping there.

Q. Which of them has been affected? *A.* The youngest one.

Q. How did it affect him? *A.* I could n't say that it came from this.

Q. Your son says he has smelt it? *A.* I would n't say that my son has smelt it. I say that part of the family have said they smelt it one or two nights.

Q. They did n't mean this garbage smell? *A.* They did n't go into details at all. I supposed it was the general smell in East Cambridge, but did n't make any direct examination of it.

Q. (*by Mr. Derby*). Have you in former times tried out soap? *A.* I have been the city collector, and collected the grease and tried it out twenty years ago.

Q. You know the smell, then; is there any difference between it and the smell of lard? *A.* There is as much difference as between chalk and cheese.

Q. Now, the smells that you have encountered in Cambridge, — have n't they come from this putrid grease? *A.* I think they have, invariably.

Q. And as you have taken it and tried it, you think you recognize it? *A.* I think so.

Q. There can be no mistake about it? *A.* I think not, sir.

Testimony of Perry Clark.

Q. (*by Mr. Muzzey*). Are you in the service of the city of Boston as a police-officer? *A.* I am, sir.

Q. Does your beat include Charles Street? *A.* It does not now, but used to.

Q. How recently? *A.* I was there in the summer.

Q. In passing along through that portion of your beat, have you noticed disagreeable odors? *A.* At low water I have.

Q. Have you been over to the establishment of Mr. Squire to ascertain whether you could trace those odors which you found in that neighborhood? *A.* I have.

Q. State the result of your observation. *A.* I went to Mr. Squire's with a friend, and was there something like an hour and a half or two hours; we went all over the place.

Q. What did you ascertain in regard to the origin of the smells? *A.* I could n't find any smell there except where they were trying lard.

Q. Did you find any odors whatever like the smells you distinguished in Charles Street? *A.* I did not.

Cross-Examination.

Q. (*by Mr. McIntire*). How came you to go there? *A.* I had seen so much in the papers about the place that I thought I would go there and look it over. There was a friend from the country with me.

Q. Did you go into the hog-pen? *A.* I did.

Q. Did you smell anything there? *A.* Nothing more than what I would smell where pigs were.

Q. Then you mean you did smell the pigs? *A.* Yes, sir. The pens were all charcoaled over where the pigs had been taken out.

TESTIMONY OF JOHN H. STEVENS.

Q. (*by Mr. Muzzey*). Where do you reside, and what is your business? *A.* I live in Cambridgeport, my business is plumbing, and I have been practically engaged in it twenty years.

Q. Does your business extend into Boston, over the Back Bay and into Charles Street? *A.* Yes, sir.

Q. What portion of your business has been in that vicinity? *A.* Perhaps twenty per cent in the last three or four years.

Q. Are you familiar with the general condition of the houses and drains on the Back Bay and the shore of Boston?

The Chairman. Is it in regard to his opinion only? The Board will admit there is excessive fæces on the West Boston shore.

Mr. Muzzey. I propose to show by Mr. Stevens, who is a man of great experience in his business, — he understands the philosophy of it better than any man I know, — I propose to show that the odors which infest the Back Bay are traceable to defects in the traps and sewers, and that sewers which are laid in the made land have broken away. I really believe it would be useful to this Board, outside of this case, to know about this.

Dr. Derby. It is the business of this Board to know about those things.

Mr. Muzzey. I know that, but I think it would be useful to this Board to hear his experience. It is a fresh point.

Dr. Derby. The patience of this Board may be exhausted.

Mr. Muzzey. We shall show that there are the same smells in Chestnut Street and on the Back Bay that have been observed on Miller's River. We shall show some strong points. We will show another thing.

This gentleman has a trap which could be applied to those houses and surely prevent trouble from the sewers.

Dr. Derby. Cannot he show us a drawing of this trap?

Q. (*by Mr. Muzzey*). Will you state in what particulars you have found the traps and sewers defective in this district? *A.* In regard to sewers, I have had but very little experience. In some cases we have found a defect in the trap, and that being connected directly with the sewer, the action of the tide in pressing back the atmosphere, if the hole is ever so small, makes the smell perceptible all over the house.

Q. (*by a member of the Board*). That is from the trap? *A.* No, sir, from the sewer; it is before being connected with the trap, after partially filling the sewer-pipe leading to it. When the tide goes out it is very apt to take away — and has taken away in many cases — the water from the trap. Then there is direct communication between the sewer where it discharges and the apartments.

The Chairman. This whole subject has been reported upon in the State Board of Health reports. You will remember that your own witness gave evidence in regard to the unsafeness of traps.

Mr. Muzzey. I will withdraw the witness then, and ask him to exhibit to the Board his drawing of a perfect trap.

The Chairman. Really it seems to me that this is n't a question which the Board has anything to do with. If the members of the Board wish to hear it, I shall not object.

Mr. Muzzey. It has been stated that it is not possible for the contents of Mr. Squire's establishment to go into the sewer, and that under certain conditions the odors of the sewer will go into the houses. I propose to show that it can be done without offence.

The Chairman. That has been shown.

Dr. Derby. Of making of traps, Mr. Muzzey, there is no end. I can show you whole volumes on the subject.

The Chairman. I understand it that the Board does n't wish to hear it, and I shall rule it out.

Mr. Muzzey. If there be no objection to its being left, I should like to hand the drawing to your Honors for examination.

The Chairman. There is no objection.

Testimony of John P. Squire (*recalled*).

Q. (*by Mr. Muzzey*). Before you began the business of trying lard in East Cambridge, where was it conducted? *A.* Principally in South Boston.

Q. In what manner did they try it? *A.* By open-fire kettles.

Q. In what neighborhood, as to the number of people? *A.* Densely populated.

TESTIMONY OF CHARLES E. AVERY (*recalled*).

Q. (*by Mr. Derby*). I would ask you whether you have made any investigations with regard to the security of drains and traps in keeping back odors? *A.* I have had occasion to make quite a large number of experiments in regard to traps, and have found that all, including S-traps, D-traps, water-closet traps, and bell-traps, are necessarily imperfect, except the improved form of bell-traps, as set by expert plumbers. If that is not rightly set it will siphon out as the others do. If properly set it will allow free passage of the air.

Q. Will you explain whether there is any perfect system of trap? *A.* I think there is a perfect system of trap in which a ventilating-pipe is carried to the top of the house. At the beginning of the intersection there is a T-joint that runs to the conducting-pipe, giving a natural chimney to carry off the draught.

The Chairman. This Board feel that this is of no use whatever; that they understand all about it that is necessary for their purpose.

Q. (*by Mr. Derby*). I will merely ask the method of consumption of putrid gases. *A.* I was engaged for three months in the investigation of methods of consuming putrid gases. There were multitudes of experiments. I have two perfect systems: first, by mingling air at a red heat with the putrid gases, by combustion. The result of this experiment showed that there was no need of passing these gases through the fire. They were destroyed, although they were not on fire; they did not take fire, but simply mingled with the hot draught. I had a great many men there, who stood to the leeward of the gases and all around them, and trying to smell them at a distance. We also found we could remove these gases by filtration through charcoal. We found that mixing with a hot column of fire we had the same thing. We tried pull-fires and a great many other contrivances. We found in all cases of experiments with putrid meats that forty pounds of coal on a grate in a brisk combustion would deodorize five hundred pounds of putrid meat, boiling on one half of a revertory furnace. We found this apparatus to give entire satisfaction without any visible combustion on the surface of the putrid gases. Some of the hottest flames known to chemistry are invisible in the light. I quote the Bunsen burner and the oxyhydrogen blow-pipe as instances. I have examined the gases at Mr. Squire's factory when burning in the boiler-room. It was not under the boiler. The flames reached up some ten feet. My nose is not an East Cambridge nose, but it is a tolerably good one, and I could smell nothing. The gases were completely burned. I am satisfied that the smell could n't be detected.

Q. I will ask you, with regard to the filtering of air through charcoal, whether the air must pass through it? *A.* There is no need of the removal of any factory on account of any gases tainting the air outside. I except chlorine and muriatic-acid gas. All putrid gases can readily be destroyed by ventilation through charcoal filterers. I quote Professor Tyndall and Dr. John Stenhouse: Nature, 1871 – 72, page 365, and the Proceedings of the Royal Institution for 1854 – 58, page 158. From these quotations it appears that many nuisances have been destroyed and done away with by this means.

Q. Are you convinced that you can take a close building, that has offensive odors inside, and, by charcoal filterers, prevent these vapors

from being perceived externally. *A.* It is not only possible, but extremely easy to do it.

Cross-Examination.

Q. (*by Mr. McIntire*). Who employed you to make these experiments on gases? *A.* Colonel J. J. Storer, at that time, but I was employed by others at different times.

Q. In consequence of those experiments, and, upon your recommendation, did he not make a machine that was afterwards torn to pieces by the people of Chicago? *A.* I am not aware of the fate of that machine. I did n't have anything to do with the operation of that machine.

Q. Are you not aware of the fact that Colonel Storer's machine was torn down? *A.* I am aware of the foul odors that machines of that kind can give out when improperly run, but I am not aware of the fate of Colonel Storer's machine. I did not refer to the combustion of the gases from close tanks, but to the machines for drying offal. Many of these give very offensive smells. I have been told that North & Merriam's have been smelt a mile, and I have smelt that at the Brighton Abattoir five hundred feet distant.

Q. Do you know that Colonel Storer's machine did n't give off any smell at all in the factory, but being smelt outside, it was torn down? *A.* I am aware that the draught through the chimney would prevent anything being smelt in the factory, but I did not look for that there. I am not here to defend Colonel Storer's machine, for I did not have anything to do with putting it up, I simply recommended an atmospheric reactionary furnace.

Dr. Derby. If this evidence is going into print, I should be sorry not to have the impression just conveyed corrected. This apparatus, which has been recently in use in Chicago for *trying* off blood, has been very successful. The impression that has been given, if put in print, might do some harm. I think, in justice, that it ought to be stated.

Mr. McIntire. I don't deny that the machine he has now has been very successful. But the machine that I alluded to was made upon the recommendation of Mr. Avery. It has been destroyed by the citizens of Chicago.

Mr. Webster. Perhaps it might be well for me to say that while in Chicago, last summer, I saw Mr. Storer's machine. He was trying the most putrid stuff, and there was absolutely no smell came from his chimney. It was as high as this State House, and there were ladders to get up to the top of it. The stuff, when it was tried, was without smell.

Testimony of Ald. Robert L. Sawin.

To Mr. Derby. I reside in East Cambridge; am an Alderman this year, and I know something of the slaughter-houses in East Cambridge.

Q. Will you state to what, in your opinion, the smells are due, — whether to the establishments for packing, or to the basins or flats? *A.* I think they are due to the basins, and to the imperfect sewerage in that neighborhood, and in East Cambridge generally.

Q. That sewerage you believe to have been imperfect in the past time? *A.* Yes, sir.

Q. And now they are in course of improvement? *A.* Yes, sir.

Q. And you would ascribe these smells rather to the basins and sewerage than to the packing establishments? *A.* Yes, sir.

Q. You have made some investigations in regard to it? *A.* In 1871 I was in the Board of Aldermen, and was associated with H. G. Parker in the Board of Health. We had all the land about Miller's River and that part of Somerville under investigation, and Mr. Parker and myself went through the territory on foot. I noticed that people had built there on the low land, that there were no sewers, and that large tracts of land were covered with water. The people applied to us for relief, but we found that we could get no relief until we could get the Legislature to pass a special act. We found a large number of private drains filled by the sewage from the bleachery and distillery, and that the natural outlet from the basin was cut off to some extent by the building of the piering of the Fitchburg Railroad, and partly by piering of the Lowell & Nashua Railroad at the outlet to the basin. We thought that if we could keep the water in that basin fresh until we could get this bill from the Legislature, we might to some extent relieve the community from this odor. The town of Somerville did n't agree with Mr. Parker and myself, and tore down a small dam which we built at Bridge Street, where the water ran under the bridge.

The Chairman. It is the one that has been spoken of? *A.* Yes, sir; it seemed to me that when this stuff first came into the basin it was a kind of pickle, but after a while the pickle got rotten and the gases were thrown up.

Q. (*by Mr. Derby*). I will inquire, sir, whether you agreed with Mr. Parker in the report which was made, in which he stated that if the factories were removed that nineteen twentieths of the gases would remain? *A.* I did; I signed the report.

Q. Where were you on the night of the 31st of July? *A.* I think I was in the factory of Mr. Squire; I got there a little later than the majority of the company, and saw that the apparatus was not working satisfactorily. I remained there till it did work satisfactorily.

Q. How long did you remain there? *A.* Till about half past eleven o'clock, — till most of the company had gone.

Q. You came out with some of the gentlemen? *A.* With Mr. Magoun, I think.

Q. Did you go with him? *A.* Yes, sir.

Q. With regard to any smell that evening, — did you come to the conclusion whether or not it came from the establishment of Mr. Squire? *A.* In regard to the smell that evening, I only speak of it by hearsay.

Q. Did you go through the works with Mr. Magoun? *A.* I went over the works with Mr. Magoun and Mr. Squire, who showed us the slaughtering-house, and the hog-pens, and we made a general survey of the premises in the short time that elapsed after the company left.

Q. Did you find anything offensive? *A.* I found nothing offensive.

Q. Did you perceive anything offensive as you walked toward home? *A.* No, sir; I found the air very sweet as we walked.

Q. With regard to the causes of the smell, — do you ascribe them to the basin or defective drains? *A.* The causes of the smell I attribute to both the basin and defective drains.

Q. You remain of the same opinion still with regard to the establishment of Mr. Squire, which you expressed in your report? *A.* Yes, sir. In fact, from what I have seen of Mr. Squire's establishment, — I have visited it many times within the last year; five or six times, more or less, — I notice every time I go there continued improvements, both in cleanliness and the general appearance of the place.

Q. I would inquire generally, then, whether you think it would be for the injury or benefit of Cambridge to have that establishment closed? *A.* I think it would be decidedly for the injury of East Cambridge.

Cross-Examination.

Q. (*by Mr. McIntire*). Have you always thought so? *A.* I believe I have, sir.

Q. What about the views you expressed in a public meeting in Cambridge a year ago, in the ward-room? *A.* I think I expressed nothing in the ward-room adverse to their remaining.

Q. Did n't you make a speech in regard to the discontinuance of Mr. Squire's establishment? *A.* I made some remarks, and told them the only way to settle the matter was to agitate; I then gave a short history of the matter, and rather reflected upon the conduct of Somerville in the matter.

Q. Don't you remember that you spoke entirely in regard to the slaughter-house, drawing attention to the fact that only a portion of Mr. Squire's place was in East Cambridge, and that was the only one you could act upon at the time? You were not a member of the city government then. *A.* I was not elected till that fall. I don't remember exactly what I said, — only the general tenor of my remarks, as I stated them just now. I don't remember that I have been of but one opinion, or had but one thing to say.

Q. Your disagreement with the people of East Cambridge has been rather since you were elected Alderman than before? *A.* I think not.

Q. You did n't seem to disagree with them that evening? *A.* I rather think that my remarks disagreed with those of the other speakers that evening. The impression I drew from the remarks of the other speakers were that they did n't agree with my opinions.

Q. Did anybody make any remarks that you did n't seem in accord with the meeting? *A.* I have heard of gentlemen saying that they did.

Q. Don't you think you owed your election to the city government in regard to your moving in this matter? *A.* No, I don't think I did.

Q. You have n't been returned? *A.* I have not.

Q. You have a brother employed in the establishment? *A.* I have a brother there.

Q. That was some time since the meeting? *A.* Yes, sir.

Q. Have n't you complained of these rendering smells? *A.* Not to my recollection.

Q. Are you troubled with catarrh? *A.* I am, somewhat.

Q. Might that not have affected your scent at the time you went through the establishment with Mr. Magoun? *A.* It might.

Q. You say you smelt nothing? *A.* I smelt nothing. I went over the place and looked it through, and could n't smell anything disagreeable.

Q. And you think you have n't laid any portion of the smells to this establishment? *A.* I don't think I have.

Q. Are you ever troubled at your house with these smells? *A.* I have moved since then.

Q. Did you move on account of those odors? *A.* No, sir; the condition of my wife's health caused me to move.

TESTIMONY OF REV. SAMUEL W. MCDANIEL.

Q. (*by Mr. Muzzey*). What is your profession? *A.* I am a clergyman, and am pastor of the Unitarian Society in East Cambridge. I have resided in East Cambridge about four years.

Q. Where has your residence been? *A.* Until about the middle of last June, on Thorndike Street, between Fourth and Fifth; since then, on the corner of Second and Otis Streets.

Q. When you were living on Thorndike Street, did you not receive some unpleasant odors through the windows which faced to the south? *A.* We may have occasionally. The impression of myself and family, in reference to the odors, is, that they came in the night into our chamber.

Q. On which side did that face? *A.* On the south side.

Q. You perceived odors that came into your chamber from the south? *A.* Yes, sir, very offensive odors.

Q. To what extent were you disturbed by them? *A.* To such an extent that my family were awakened from sleep, and we were obliged to open the windows. That, I ought to say, was generally in hot weather.

Q. Can you describe the nature of the odors? *A.* I should say that it was an odor as from water-closets, sewage, dense privy smells.

Q. Have you had any trouble with the vault in your present house? *A.* I have, sir.

Q. How did that smell, when the vault was out of order, compare with the smells you used to get in the south windows on Thorndike Street? *A.* It is much the same. The privy is in a two-story addition of an old frame building, separated about six inches from the main building, the intention being to have a circulation of air about it. I removed to that house about the middle of last June, and the odor was so bad from the boards being warped, that I was obliged to use charcoal, and sprinkle it quite freely in the vault and about the building. That has been an effectual remedy.

Q. Do you remember the foul odor of the night of the 31st of July? *A.* I do, sir.

Q. Please state what you know about that, and the direction from which it came. *A.* I am able to speak definitely in regard to that special odor, because on that occasion we had certain visitors from Boston at our house who had not been there before, and have not since. A little before the ringing of the nine-o'clock bell we were seated in the parlor, and the odor became so terribly offensive that we were obliged to close the parlor windows.

Q. Which direction did your parlor windows face, sir? *A.* To the west, I believe. About the time of the ringing of the nine-o'clock bell I proposed to my guests and family that we should retire to the library; and there we got very little of the odor. A little later my friends stated that they wanted to take the half-past-nine car to Boston; and I am able to fix the time by that fact. I went with them to the car, and when I returned the question was asked whether they got the half-past-

nine car, and I replied that "it is now twenty-five minutes of ten, and as I did n't have to wait long, they must have got it." There was a terrible odor that night on the street later, so it was reported; but I have no knowledge in relation to its nature and source. It did n't trouble us.

Q. What direction did your windows face? *A.* The house is on Second Street; but I am not sufficiently familiar with the locality to state positively the direction in which it faces.

Mr. Hastings. They face to the west.

Q. (*by Mr. Muzzey*). Which side of the street are you on? *A.* The side toward Boston.

Q. You were a member of the Legislature last year? *A.* I was.

Q. Were you chairman of the Committee on Water Supply and Drainage? *A.* I was chairman on the part of the House. The chairman of the joint committee was a senator, and he was away on account of sickness. I presided at every meeting of the committee during the consideration of the so-called Miller's River Bill.

Q. I want to ask you what the attitude of Mr. Squire was before that committee from the first?

The Chairman. What is the object of this?

Mr. Muzzey. All the testimony I have upon that point is from Mr. Squire himself, and I don't think his position has been fully understood.

The Chairman. I think the Board gives due justice to Mr. Squire, to say the least.

Mr. Newhall. He has apparently done all that he could.

Witness. The attitude of Mr. Squire and his counsel was this: they stood upon the Report of the Joint Commission, and were willing to do all that it required.

Mr. Muzzey. May I be allowed to ask the witness this question? There was pending before the Legislature last winter what is known as "Colonel Codman's Bill," which proposed to appoint a commission in reference to a common system of drainage, water-supply, and grade of roads, for the territory within ten miles around Boston. I wish to show that Mr. Squire went so far as to employ counsel to appear before the committee, and ask that he (Mr. Squire) be made a party to that proposition.

Witness. I believe that he did.

The Chairman. Did you trace that odor you smelt? *A.* I did not leave my house farther than to go to the corner of Cambridge and Second Streets, to accompany my friends to the horse-car.

Q. Where did it appear to come from? *A.* It appeared to come from the southeast. I speak of the odor as I experienced it from a little before nine o'clock until, perhaps, about a quarter of ten.

Q. You did n't trace it definitely? *A.* I did n't go farther than the corner of Second and Cambridge Streets.

Q. (*by Mr. Muzzey*). The direction of Mr. Squire's establishment from your house is about northwest? *A.* I should say it was.

Cross-Examination.

Q. (*by Mr. McIntire*). Did I understand by your direct testimony that

you never have smelt those rendering odors? *A.* I do not know what your understanding was. I did not testify on that point. That question was n't asked me. I testified in regard to the night of July 31 only.

Q. I shall have to ask you a question on that point. Have you ever smelt any of these rendering odors? *A.* I have.

Q. Where have you found them? *A.* I have not traced them, excepting in a single instance last week, on Thursday or Friday night. I spent the evening with my friend who sits upon your right (*referring to Mr. Hastings*). Going to his door, he asked me if I smelt anything. It was the smell of sweet lard. We had a little conversation, some of it facetious, to the effect that both were a little affected with catarrh. When I was going home, a few moments after leaving his door, it occurred to me that it would n't be right for me not to inform myself as to the source of that odor, as I was to testify here; so I turned about, and went toward Mr. Squire's establishment. When I got to Cambridge Street I had very little of that smell, and when I got to the establishment I found none of it.

Q. You found none of it? *A.* None at his establishment.

The Chairman. Did you go into the establishment? *A.* I went into the building, and found no one there but the night-watchman.

Q. (*by Mr. McIntire*). Was there anything in the kettles? *A.* I did n't go into the room where the kettles were.

Q. Have you smelt this rendering odor on Thorndike Street? *A.* We have somewhat.

Q. Has it troubled your family any? *A.* The rendering smells from putrid grease have troubled us.

Q. How often would you get them? *A.* I can't say how frequently. I have been all over Mr. Squire's establishment a number of times, and never got that smell of putrid grease there.

Q. Was it hot weather when you experienced that odor you first spoke of? *A.* Yes, sir.

Q. Do you know the direction of the wind that night? *A.* I do not, sir, except from report.

Q. Were your front windows on Thorndike Street — your north windows — open? *A.* No, sir; they were never open during the night. Those were the parlor windows.

Q. Did you notice whether it was a damp night? *A.* I could not say. It was not upon a single occasion that we got those odors. On the night of the 31st of July the smell came into the windows on Second Street.

Q. There was a very strong odor penetrating the atmosphere that night? *A.* Yes, sir; it was indeed a strong odor.

Q. Did you testify in regard to where the wind was that night? *A.* I did not positively. I thought it was about south of southeast.

Q. Were you at the meeting of citizens in the ward-room a year ago? *A.* I was, and spoke at the call of the citizens. I said: "If there is anything in this neighborhood that can be justly branded as a nuisance, there can be no division of sentiment as to the measures to be adopted." But it was an open question among people as to whether the nuisance proceeded from the slaughter-houses or the basin. I was taken to task later in the evening for the ambiguity of my remarks. I thought I could not be misunderstood.

Q. You were afterwards at the hearing before the City Board of Health? *A.* No, sir.

Q. (*by Dr. Derby.*) Would you favorably regard the idea of devoting this Miller's River basin to the business of slaughtering and packing swine, and would you advocate the establishment of new enterprises for that purpose, and the indefinite enlargement of that business in that locality? *A.* If I understand your question, sir, I should answer it in this way: I should say I know of no reason why that business, since it is legitimate, cannot be conducted in a manner entirely inoffensive to public health and comfort. I have been over that establishment, and although it has not been altogether satisfactory in the past, I should judge from the progress made in that business that it could be conducted free from reasonable objection from the people.

Q. I want to put the question to you just as I put it to the Mayor of Somerville the other day, as you have represented the people in the Legislature. I ask you whether you desire that business of slaughtering swine and packing pork indefinitely extended, or whether you think it should be limited to its present proportions, — whether you would favor the establishment of new places or not? *A.* Your question covers a great deal of ground; "indefinitely extended" might mean to cover every inch of territory there. In the rear of my place there is a planing-mill, from the tall chimney of which the cinders occasionally fall into my yard. Now I should not like to be surrounded by establishments of that kind. My remedy would be to get a little farther away from the chimney. If this business is to be conducted legitimately, — that is, upon sanitary principles, — I should n't object to its being extended. If it is an annoyance there, it must be an annoyance somewhere else. If the Board will bear with me for a moment, I should like to say a word in relation to the legislation of last year. The question was asked, why the area under Mr. Squire's building should be omitted in regard to the fillings. I think there were ten members present at the hearings. When the question came before the committee, it was their unanimous opinion — at least no one objected in committee that I heard — that the building should be excepted; that the place should be cleared out and used for a cellar, under such restrictions as the local Boards should advise; but if there should be an accumulation of foul water, then the filling should be done there. There was no objection on the part of any member of the committee, and, let me add, there was no bill more thoroughly and honestly analyzed and discussed than that. There was not a single objection urged against that feature of the bill. We thought that provision should remain, upon sanitary grounds.

Q. Do you recollect that it was in direct opposition to the recommendation of the Joint Commission? *A.* Do I understand that they especially recommended that the space under the building should be filled?

Dr. Derby. Yes, sir.

Witness. I should be glad to have my memory refreshed on the subject.

Dr. Derby. You will find it in the report. The words are "on and over the whole basin."

Witness. The Committee were convinced that there could be no objection to it, from the fact that the authorities of Cambridge and Somerville came into the hearing and stated that this provision appeared to be

entirely unobjectionable. It was in no sense a compromise, at least on the part of our Committee, as was intimated here some days ago.

Q. (*by Mr. McIntire*). The question that was put by Dr. Derby rather necessitates my asking one that I did n't intend to ask. The Doctor alluded to the fact that you represented the people in the Legislature, and perhaps represented public sentiment. I should like to ask whether you were not nominated this fall and were not re-elected? *A.* I was nominated and not elected, because there was not enough rum in my ticket. The same blow that struck me struck other men throughout the whole State. You know perfectly that that was the controlling issue.

Mr. McIntire. It was claimed that you represented the people, and I wish to show that you did not. I did not wish to ask the question.

Witness. I have no objection, sir, to your question.

Mr. Muzzey. I do not wish the Board to be misled. Did not Mr. Hastings, one of these petitioners, vote for Mr. McDaniel at the last election?

Mr. Hastings. He did, sir.

Mr. Muzzey. And Mr. Magoun also? *A.* Yes, sir.

Q. (*by Mr. McIntire*). Did n't all the employees at Mr. Squire's establishment indorse you and work for you? *A.* I do not know how every man voted, but I believe some of them did. I had the good taste, being a candidate, to leave the polls as soon as I had voted. You ought to know something more about that than I do.

The Chairman. Mr. McIntire, this must go no further; this Board will not permit personalities to be used.

Mr. Muzzey. This is our last witness.

Extracts from an Official Report to the British Parliament, on Obnoxious Businesses.

Mr. Derby. I have a few passages which I wish to refer to, and with your Honors' permission I will read a few extracts from the most essential parts, which I shall submit for your consideration.

Dr. Derby. Could n't you mark them?

Mr. Derby. I should like to read them; it will take but a short time. I will read from page 251, of the Report of the 8th of July, 1873, by a select committee of the English Parliament, which I referred to in the opening. I read from page 251 which is the essence of the Report: —

"So far as your Committee are enabled to judge, the question of providing public slaughter-houses, or abattoirs, for the whole of the metropolis, is beset with very considerable difficulty, and there is reason to fear that, were private slaughter-houses to be altogether suspended, the meas-

ure might be attended with almost greater evils than any which may arise from their existence. Your Committee are not at all satisfied that private slaughter-houses, when properly managed, are necessarily productive of nuisance, or unfavorable to sanitary influences; and if due consideration be given to the way in which this question affects the meat supply of the immense population of the metropolis, and especially of the poorer classes, and to the insuperable objections which exist to the adoption of any system which would tend to lessen the facilities now existing for the supply of meat to the people, it will be seen that there is in the present position of the question, some room for doubt whether the wants of the metropolis could be properly provided for, if none but public slaughter-houses were in future allowed to exist, more especially if these were situate at a distance fom the place of consumption."

Mr. Derby. That seems to be the essence of the Report, and the basis of their conclusion is that it is not politic to abridge the business of slaughter-houses, but rather to take away the language of the act which prevents them from being conducted within fifty feet of the street; that clause has since been repealed. I will now refer to a very little of the evidence on which this Report is based. I will now read from page 4:—

"Some of the medical authorities press upon the Committee the advantages that would accrue from the complete removal of all private slaughter-houses from the metropolis; and the establishment of fixed and properly regulated abattoirs in proper localities. The view taken by these authorities is that though no disease can be traced directly to private slaughter-houses, yet that they must, from the nature of the case, be such a nuisance as ought not to be tolerated in this metropolis. (See Dr. Letheby's Evidence, Question 2732.)

"On the other hand the general evidence is in favor of the cleanliness and wholesomeness of these private slaughter-houses, and this evidence is corroborated by the testimony of some of the members of the Committee, who have themselves personally inspected several of them, without having given any previous warning, and have reported well of them to the Committee, though they are at the same time of the opinion that some of them are faulty and indeed objectionable in their construction.

"It appears that from causes now in operation the number of these private slaughter-houses is diminishing. In the city of London, in the year 1851, there were one hundred and thirty-five, and there are now only thirty-one. The Committee are also informed that under an act of 1848, chap. 49, no additional slaughter-house can be established within the city. The change in this particular instance is chiefly due to the removal of the market from Smithfield to Islington; but there are other causes for the diminution in number of these places operating generally over the whole metropolis.

"With respect to the supply of dead meat, it is in evidence that the proportion of the supply of dead meat is increasing upon the supply derived from life animals sent up to be slaughtered within the metropolis.

"It appears that slaughter-houses have been brought under better regulation since the Act of 1844 was passed, and there have been several

acts passed since, both for sanitary purposes, water-supply, and the general management of the metropolis, which have tended to this improvement. The latest metropolitan act was passed in 1862, which provides for licenses and by-laws. The general Nuisance Removal Act of 1855 provides for all trades certified by a medical officer to a local authority to be a nuisance, or injurious to the health of the neighborhood, to be proceeded against.

"After a careful consideration of the whole subject, the Committee have come to the conclusion, in the first place, with respect to the trade of slaughterers of cattle and sheep, that the 55th section of the Act of 1844 should be repealed.

"They are, however, of opinion that it would be desirable, so far as possible, without interfering with the trade, or sujecting those who carry it on to expense or inconvenience, to diminish, or rather to accelerate the diminution of, the members of these private slaughter-houses.

"With this object the Committee recommended that additional private slaughter-houses, varying in size, should be constructed, and other conveniences given at the Copenhagen Fields Market, and other markets if established, so as to induce butchers to slaughter animals on the spot, and not drive them through the streets to their own premises.

"The Committee also recommend that no additional private slaughter-house should be established in the central part of the metropolis, except under special circumstances, and not then except with the consent of some such authority as the Metropolitan Board of Works, or the Court of Quarter Session; but that it would be desirable to meet the decrease that must be continually going on of private slaughter-houses attached to butchers' shops, to encourage the substitution of private slaughter-houses belonging to the individual butchers, in suitable localities in the vicinity of public markets; and the Committee in making this recommendation wish to draw a clear distinction between private slaughter-houses so attached to markets, and public slaughter-houses possessed by the market authority.

"It is clearly desirable that all private and public slaughter-houses should be constantly inspected, and made subject to precise, stringent, and uniform regulations. At present the inspection and regulation of the private slaughter-houses is done by the Sanitary Committees in different parts of the Metropolis, whose regulations appear to have the force of by-laws under the metropolis Local Management Act. Within the city the regulation and inspection of slaughter-houses is under the jurisdiction of the Corporation, and your committee would direct the attention of the Corporation of London to the observation of the members of the Committee with respect to the state of the public slaughter-houses within the Copenhagen Fields Market.

"Before the repeal of the sections of the Act of 1844, these by-laws should be carefully examined, and any defects found to exist in them should be removed. It is also desirable that the inspection and regulation of slaughter-houses should be made available for the detection of contagious diseases of animals.

"With respect to the other noxious businesses enumerated in the Act of 1844, it appears that the trade of fell-mongers has been carried on from time immemorial at Bermondsey, and the population of that neighborhood has been generally created by it, and is interested in the continu-

ance of it. The committee think that it would not be expedient to allow any old enactment to come into force which would cause the removal of this trade from its present site, and they recommend that this section of the Act should be repealed with respect to this trade, and that the process of inspection and regulation over the premises in which it is carried on should in like manner be considered, and, if necessary, strengthened.

"So also with respect to all businesses that may be called noxious, whether enumerated in the Act of 1844 or not mentioned in it, the Committee think that they should not be actually banished from the Metropolis, unless a case of nuisance can be established against them, but that they should all be subjected to stringent rules and frequent inspection, and the sections of the Act of 1844 concerning the enumerated trades should be repealed."

Mr. Derby. And on page 12 : —

"Have you any reason to believe that London depends at any period of the year, exclusively, upon the live meat in the private butcher's lairage? — I am told, and my inquiry has led me to believe it to be the fact, that there would be in London many days in the hot weather, when, if a butcher had not got his live animals, and his private slaughter-house, there would be practically no meat in London.

"If the first source of supply to which you have referred were abolished, do you believe that that would leave London under any difficulty? — Very great difficulty indeed.

"What particular day in the week would you say? — On Saturday, which would, of course be the worst day ; but the difficulty would arise in warm, muggy weather."

Mr. Derby. The view taken by these authorities is that no disease can be traced to the slaughter-houses. On the other hand, the general evidence is in favor of the general cleanliness ; and this is corroborated by the testimony of some of the Committee who have themselves inspected some of the places. I read now from page 11. This is from the testimony of Mr. Crouch : —

"*Mr. Brewer.* By what means is the demand of meat for London at present supplied? — By four means : in the first place by animals purchased alive by retail butchers, and slaughtered by them in their private slaughter-houses ; secondly, by animals purchased alive by wholesale or carcass butchers, and slaughtered by them, which meat is sold to retail butchers, principally at the Metropolitan Meat Market ; thirdly, by country-killed and foreign meat which is consigned to salesmen in the Metropolitan Meat Market ; and, fourthly, to a small extent, by meat preserved in tins, principally from the colonies. Those are the four means by which London is at present supplied with meat.

"Can you give the Committee any reason why those four means should remain ; could you cut out any of the four without injuring the supply of London? — I think, certainly not. I think that any one might be done away with rather than the first, namely, the supply by means of the retail butcher who slaughters his own animals."

Mr. Webster. Do they use oil in England?

Mr. Derby. It is rather an article of luxury, and is not used to a very great extent. It is an unusual thing in London to have the thermometer above 70°.

The Chairman. If you could mark the places you would like us to see, Mr. Derby.

Mr. Derby. I would prefer to make our record perfect. I will finish in less than ten minutes. I will now read from page 94 : —

"*Sir J. Ogilvy.* With regard to the destruction of Mr. Butler's meat, and I have just referred to the evidence before that Committee, and I find that there were 973 stone destroyed; was that occasioned by the weather? — In all probability; I do not know the very circumstance, but it is not by any means an uncommon thing for meat to be slaughtered in London at five o'clock in the morning, and to be green before it is got into the market."

Mr. Derby. And now on page 98 : —

"Do you think if we had public abattoirs for slaughtering, and if the dressing of what is called the esculent offal took place in other hands than those of private butchers, that is, in public hands, it would increase the expense of the offal? — Decidedly it would; it must do so.

"Would it be an inconvenience to a butcher to have to go two miles to a slaughter-house? — My opinion is that he would not do it.

"Would it be an inconvenience to him? — So much an inconvenience that he would not do it.

"Is every inconvenience to a butcher or a man in trade equivalent to a loss of money? — I cannot call it an equivalent. I might call it fifty times an equivalent.

"At any rate it is a loss of money to the tradesmen? — Yes; you could not estimate it in money.

"The fact of the case is, then, that if you establish a system for the supply of London meat which greatly increases the inconvenience of obtaining it, you really and practically increase the cost of it? — Yes, undoubtedly you must.

"And the meat, in fact, to the outside public must be dearer? — Decidedly it must; and, in my opinion, one great evil would be the doing away with the personal responsibility that at present exists between the butcher and his customer.

"*Mr. E. Turnor.* As to the meat killed in your own slaughter-houses, do you ever lose that meat from the weather? — I should say never; the course is so totally different. In my own slaughter-house, in warm weather, we do not commence killing till after the sun has gone down; and particularly on the Friday we kill a portion, and a portion is killed on the Saturday and consumed; but if we go to an abattoir or a market, our meat would be bought at five in the morning, and we should then be owners of the meat very frequently from thirty to thirty-six hours, and we have no other source of supply during the whole of that time. We cannot tell on a Saturday what our consumption may be; it is an impossibility for any man to tell."

Mr. Webster. Will you be kind enough to tell whether this is by the owners of private establishments?

Mr. Derby. Some of them are drovers who bring cattle from Scotland.

Mr. Webster. They are all interested parties.

Mr. Derby. Some of them are gentlemen of great respectability; some are members of Parliament, some are owners of private slaughter-houses. The Report is the result of the evidence brought before the Committee. I will now give you the occupation of each party. I have now the testimony of Mr. Leddell, who, instead of being a butcher, is a member of the Royal College of Surgeons (page 150). The question is put with regard to other obnoxious businesses, and he replies: —

"We have no blood-boiler in the district, and to my knowledge never had one; we have had one or two soap-boilers; one has removed, and another one carries on his business by the side of the National School, which is an occasion of complaint. I may say that the mere making of soap with fresh tallow, I believe, would not be such a nuisance as would be greatly complained of, but unfortunately those premises are used for other purposes, such as melting down fat in a state of decomposition, and the smell arising therefrom is sometimes most intolerable."

Mr. Derby. It is the very difficulty that we complain of in this case, — the melting of putrid grease. I come now to the testimony (pages 172 and 173) of Mr. Knight, who is a tallow-melter and soap-maker: —

"Will you just describe for a moment, to the Committee, what is the method by which you not only try to mitigate the nuisance, but to consume the fumes that are created? — Under the old system there used to be all open pans; now we have the pans all covered in closely with a shaft, that causes all the fumes to pass through the fire and up the shaft.

"With reference to this kitchen stuff, which is the most difficult of all things, — do you yourself collect it and melt it, or do you receive it collected and ready melted? — It is brought in to us by the different collectors, — men that go out from house to house early in the morning.

"Do you get the kitchen stuff from rag-shops, and so on? — Yes; they collect it from private houses also, and bring it to us.

"What is the condition, generally speaking, of the kitchen stuff when you receive it? — It is generally very good.

"What is the real crucial point in your business as to nuisance; what part of your business is a nuisance? — Merely when we are getting the refuse or the greave from the pan to the press, after it has been rendered, and we are putting it into an hydraulic press.

"Are the people who are employed in your trade a healthy or an unhealthy class? — Decidedly healthy.

"How long do you retain them in your service? — One man has been with us forty-five years.

"Are they liable to any special disease? — I never knew of any.

"Then you maintain that the trade itself, to those who are continually occupied in it, is not an unhealthy trade? — Certainly.

"It produces no disease? — No.

"It is never objected to on that score? — It is never objected to."

Mr. Derby. It is shown that grease is rendered in the city of London, and is the source of very considerable offence, and that is no doubt the reason which gave rise to the appointment of this Commission. I read now from the testimony of Mr. Cook, page 201 : —

"Then, the only part that we can find out to be offensive in smell is the fat, or rather a certain portion of the fat, which you receive in a slightly decomposed condition, and kitchen stuff? — As regards the soap-making itself, there is nothing offensive ; and as regards the tallow-melting, the principal source of complaint at all is when the fat comes in stale ; and as regards stuff-melting, there is a source of complaint if proper means are not employed for burning the vapor that arises from the melting-pan as the fat is being melted ; but it is quite practicable to arrange the pans so that the whole of that vapor shall be consumed and not pass into the outer atmosphere.

"Is that vapor consumed in a strong fire by you? — First, we pass the vapor that comes from the stuff-pans through a flue filled with coke, and water is allowed to drip upon this coke from a pipe which is pierced with very small holes. The wet coke forms a large condensing surface, and condenses any steam-vapor that may have contracted smell from the stuff ; after the vapor has passed through this chamber, it is driven by a fan into the ash-pits of our steam-boilers and passes up through the bars of the boilers into the fire and is completely burnt, so that I believe, if you were to stand at the top of the chimney-shaft, you would be unable to detect any smell whatever as the result of our stuff-melting."

Mr. Derby. Throughout the whole of this evidence I see no complaint of the rendering of fresh lard, and the only complaint seems to be in regard to the rendering of grease and tallow. I come now to the evidence of Mr. John Simons, on page 226 : —

"And that is of great consequence for the happiness and for the health of a community that fresh meat should be easily obtained, and as cheap as possible? — Undoubtedly."

Mr. Derby. This shows the pertinency of this inquiry.

The Chairman. I thought we should have something with more pertinency than this.

Mr. Derby. I believe I gave the number of private slaughter-houses in London at 1687.

Mr. Webster. At the present time?

Mr. Derby. Yes, sir. In consequence of the establishment of the Copenhagen Market the number has been greatly reduced.

Mr. Webster. Have n't they been as much reduced in the Metropolitan district?

Mr. Derby. I have n't the evidence. This refers to the city of Lon-

don proper, which is a very small part of London, somewhere about 150,000 or 200,000 inhabitants. It corresponds to State and Kilby Streets in Boston. The city of London is losing £ 8,000 a year by attempting to divert a portion of business to this Copenhagen Market.

Mr. Webster. I should like to ask you how many slaughter-houses there are in London proper?

Mr. Derby. I am unable to state.

Mr. Webster. Do you know that there are not more than forty, and that they have been reduced in a short time?

Mr. Derby. I think they have been reduced.

Mr. Webster. The business has been diverted to the Copenhagen Market.

Mr. Derby. Do you understand that they have been reduced to thirty or forty?

Mr. Webster. That is my impression.

Mr. Derby. The number for the whole city is 1,687. Some of the most populous districts are full of them. The reduction in those places is in consequence of the diversion of this Copenhagen Market.

Mr. Webster. Is that in consequence of their being diverted or being driven out by the authorities?

Mr. Derby. It is in consequence of their having gone where cattle are sold. It seems that the city of London has converted it into a market and has established it on a plan something like those at Brighton and Watertown, and near there the city has erected some large buildings which are poorly patronized and lose thirty or forty thousand pounds a year.

REBUTTING TESTIMONY FOR PETITIONERS.

Mr. McIntire. We have probably half a dozen witnesses that we shall have to put on in rebuttal. I do not think that we can finish to-day, but we will commence. In the first place, as the other side has put in evidence from this Report on Noxious and Offensive Businesses, I will put in, without reading, the testimony of Dr. Henry Lethby, commencing on page 157.

Testimony of Dr. B. Joy Jeffries.

Q. (*by Mr. McIntire*). You are a physician of Boston? *A.* Yes, sir.

Q. For how long time have you been one? *A.* Since 1857.

Q. Where do you reside? *A.* On Spruce Street. My office is on Chestnut Street. I live in what is called Benedict Chambers, at 3 Spruce Street.

Q. Either at your residence or office have you distinguished odors distinct from what have been testified to as drain and sewage odors? *A.* I don't know. I have, during the last summer, received odors very distinct and different from what are called drain, and perhaps, what are called sewer odors.

Mr. Muzzey. Now, if the Board please, we do not object to this testimony going in, but we call attention to the fact that it is cumulative upon the original case of the petitioners.

Mr. Newhall. Is it not so, Mr. McIntire?

Mr. McIntire. We were rather restricted in our direct examination, because the Board did n't wish to hear what might be termed cumulative testimony. Now, in defence, the defendants have brought in a number perhaps double our own, and perhaps they might count our number on the one side against their number on the other. I don't propose to call in much of this, but I propose to call in two or three witnesses that live in Boston and in Charlestown, to show that they have met with the general experience of other people in regard to these smells. I wish to put on two or three, perhaps, in addition to what I have already put on, to show that the rendering odor is experienced here, beside those of our own number, about whom so much has been said.

The Chairman. Can Dr. Jeffries trace that rendering odor to a certain place? If it is that he has smelt the rendering odor as different from the sewer odor, I think it is hardly worth while for you to go on.

Mr. McIntire. I wish to ask him first, if he recognizes the odor, and then if he recognizes from whence it came. We have sent away some thirty witnesses.

Mr. Muzzey. We have sent away forty or fifty, some of them physicians.

Mr. McIntire. We could have had a thousand, I suppose.

Mr. Muzzey. We could have gone on forever.

The Chairman. You may go on with him, Mr. McIntire.

Q. (*by Mr. McIntire*). You say you have distinguished the rendering odor? *A.* Yes, sir.

Q. When? *A.* During the past summer.

Q. At what time in the twenty-four hours of the day? *A.* More especially at night, sir.

Mr. Newhall. The Board is desirous that your questions should be confined, not to his own personal private experience, but whether he knows to what extent this odor has extended in Boston.

Mr. McIntire. I intend to do it.

Q. Have you heard complaints among your patients in Boston and vicinity in regard to that rendering odor that you speak of? *A.* Yes, sir.

Q. To what extent? *A.* That I could not answer. My practice is special practice; I being an oculist, the people whom I attend in that way are not, perhaps, affected seriously by it.

Q. Have you ever noticed from whence these odors come, — from what point of the compass? *A.* Yes, sir; always. I would state my experience in a very few words, and take but very little time, if you will allow me. I have experienced it three times. There was a time last summer I and my wife were aroused by a smell very distinct from the smell of sewers, or the smell that we have over Roxbury way, that is called the Back Bay District. This was a fatty smell, and has been termed the rendering smell. I was awakened and nauseated by it, as was also my wife, — to such an extent that at that time I applied to this Board for redress. The wind came from East Cambridge, or from that part of East Cambridge where these establishments are located.

Q. (*by Mr. Derby*). Give us the course of the wind, if you please? *A.* I am trying to remember just the locality. I think my front windows face Chestnut Street, and it also came in my bay-window, which faces Spruce Street.

Q. Is that west or north? *A.* The rooms are placed just about like this corner of the State House, I think.

Q. (*by Mr. McIntire*). Do you know that that direction is the direction of East Cambridge? *A.* Yes, sir; I do. And in my communication I spoke of it as the Miller's River nuisance.

Q. You know that it came from that direction? *A.* Yes, sir.

Q. Three times, you say? *A.* Yes, sir.

Q. Did it ever affect you before that? *A.* No, sir. I have n't been

awakened from sleep. I had to shut the windows on that account before I could go to sleep again.

Q. Have you heard any complaint from your neighbors in that vicinity experiencing the same odors? *A.* I don't remember, sir, that I have. Almost all my neighbors are out of town; I belong to the club that can't get away.

Cross-Examination.

Q. (*by Mr. Derby*) Did I understand you that the smell came up Chestnut Street, or across it? *A.* I cannot say, sir. It came into my windows. Two of my windows face toward Chestnut Street, and a bay-window toward Spruce Street.

Q. On what part of Spruce Street are you? *A.* On the upper side.

Q. Now, one of your windows faces on Spruce Street and the others toward Chestnut Street, on the side of the building? *A.* Yes, sir.

Q. Am I to understand you that the smell came up Chestnut Street? *A.* I cannot answer that. All I can say is, that the smell came in those windows especially. The front part of the bay-window on Spruce Street was shut and the side sashes were up, so that the odor came in from that side of the house.

Q. Can you tell which way the wind was that night? *A.* Yes, sir. It was in the direction —

Q. Give us the point of the compass, if you please? *A.* I could not tell from which point it blew.

Q. Can't you tell whether it was from the north, east, south, or west? *A.* Yes, sir. I think it was northwesterly.

Q. A northwest wind, you say? *A.* I cannot define the point of compass. I know to which windows I had to go to find where the smell came in, and which I had to close to keep it from coming in.

Q. I understand you, sir; but did the smell come down Spruce Street or up Chestnut Street? *A.* It would have to come down Spruce Street from Chestnut, because Spruce Street runs from Chestnut to Beacon.

Q. Then it came down Spruce Street? *A.* Yes, sir, if you call that down. That is, it came into the window that faces that way.

Q. It also came in at the window that faces on Chestnut Street, did n't it, sir? *A.* Yes, sir.

Q. Into which did it come the strongest? *A.* I could not say.

Q. You have two windows on Chestnut Street? *A.* Yes, sir.

Q. Did you have any weathercock that gave you the course of the wind?

The Chairman. What is the use of asking that question repeatedly when he cannot answer it.

Mr. Derby. I want to be sure that the wind was not in another direction.

Q. You cannot tell from the course of that wind, by a weathercock, whether it was one way or another? *A.* Yes, sir, I can. I can get the exact point of the compass.

Q. It came from Spruce and Chestnut Streets both? *A.* Yes, sir.

Q. The front of the bay-window being closed? *A.* Yes, sir.

Mr. McIntire. I have two persons from Louisburg Square who can testify to their own experience.

The Chairman. Can they testify except to the distinction of these two smells?

Mr. McIntire. I think not.

Mr. Newhall. I am afraid the defence will want to begin again, Mr. McIntire.

Mr. Derby. I want it either admitted or excluded from both.

Mr. McIntire. Then I will put on Alderman Brine.

TESTIMONY OF ALD. GEORGE R. BRINE.

Q. (*by Mr. McIntire*). Mr. Brine, you are an Alderman of Cambridge, are you? *A.* Yes, sir.

Q. And live in East Cambridge? *A.* Yes, sir.

Q. How long have you lived there? *A.* I have lived there about twenty-six or, perhaps, twenty-seven years.

The Chairman. I want to give notice to counsel that the Secretary is called away from here by the Supreme Court to give evidence. That is the reason of his absence. It leaves a quorum of the Board, however, and we shall go on.

Q. (*by Mr. McIntire*). You do business in Boston? *A.* Yes, sir.

Q. I will ask you whether you have recently examined the buildings which face upon Charles, Vine, Spring, Thorndike, and Otis Streets, facing the westerly or southerly side, and the buildings on the north side of the street, facing southerly toward Broad Canal? *A.* I cannot go into it as fully as that. I have examined them on Thorndike and Otis Streets, but I have n't been upon Charles, Vine, or Spring Streets.

Q. Well, on the streets which you examined did you find any discoloration on the houses which faced toward Broad Canal? *A.* Very slight.

Q. State where the most was. *A.* It was mostly on the other side of the street; on the north side of the buildings and on the south side of the streets.

Q. Have you been down toward Craigie's Bridge to notice whether there was any discoloration of the buildings along from the bridge, up Bridge Street in the direction of Mr. Squire's factory? *A.* Not particularly.

Q. Well, have you noticed those buildings at all, — whether there were any discolorations towards the bridge? *A.* I cannot say I have seen any discolorations on the buildings in that locality.

Q. Now, take it from where these boards were taken, right close by Craigie's Bridge, will you describe how the discoloration is there, and to what extent it exists? *A.* I have occasion to pass over that bridge every day, as I walk in almost every morning from my house, and I think I have noticed the effect of the sewer that empties there, for a long time. The effect, mainly, from the mouth of that sewer has been to discolor that fence and the body of the building, which is a continuation of the fence, the lumber-shed, and along the ends of the wharves.

Q. Where is the most intense discoloration? *A.* Immediately over the sewer.

Q. Where these boards come off? *A.* Yes, sir.

Q. There is a sewer which empties there? *A.* I think so. The flats are bare, whenever the tide is out, for quite a number of feet.

Q. There is a fence of about fifteen or twenty feet, and there is a long building, all painted the same color and facing on the river? *A.* I would not say painted the same color. I know that the effect of the sewer is to be seen on the fence, and also on the shed and the buildings, — on a small part of the building and almost the entire surface of the fence.

Q. Well, you were with the Board of Aldermen the night that they visited Mr. Squire's establishment, were you? *A.* Yes, sir.

Q. Well, first tell us what smells you distinguished, if any? *A.* I think that was my third visit to that establishment, that is, within a short time. I had not been there for a number of years before. I observed the same smells that I observed on two former occasions.

Q. What were they? *A.* I could distinctly say that on that evening I did n't go through the building as Alderman Sawin testified. I simply called in to see the effect of the destruction of the gases. To show what the effect was, when the experiment was about through, and when a majority of the people went away, I went too. I don't know that we got anything in particular. I noticed the live-hog smell, and on the other occasions I noticed the rendering, the live-hog, and the dock smell. On one occasion —

Q. (*by Mr. Derby*). When were the other occasions, sir? *A.* I cannot give you the exact date.

Q. Recently? In the month of July? *A.* In the month of June was my first visit. I offered an order in the Board of Aldermen, I think on the 28th day of May, asking the Special Committee on Health to go there and make inquiry what the intention was in having the basin under their buildings excluded from the filling. I offered that order to the Board, and it was in consequence of that that I first went there. I think in June, it may have been during the first week.

Q. (*by Mr. McIntire*). What opinion, if any, was expressed by the Board of Health that night in regard to the odors on the night of the visit, on the 31st of July, in regard to any odors which were perceptible in or about the room? *A.* Well, I cannot say that I had any direct conversation with any party that night, with the exception of one member, and that was Alderman Harding, whom I met outside the building, when I was going in and he was going away. That was at the time that the experiment had failed. I did n't go down there until perhaps a little late. They had been attempting to consume the gas, and for some reason or other they had stopped, and put the light out and were waiting, I understood, to accumulate gas enough to burn. They had burned out what had accumulated and were waiting for another accumulation. Alderman Harding was going out at the time.

Q. What I wanted to ask you was, whether there was anything said to Mr. Squire at the establishment at that time in regard to the smells from the tank. *A.* Well, I did n't go very near Mr. Squire at that time. I had good reason for keeping away from him.

Q. Did you visit that Reardon establishment at the time that the rest of the Board reviewed it? *A.* I did, sir.

Q. With the Mayor and others? *A.* I did.

Q. Well, now, how does the smell which was testified to as emanat-

ing from the tank that night compare with what you experienced at Mr. Squire's? *A.* Well, the smell that I got there —

The Chairman. At Reardon's? *A.* I went to Reardon's in company with the Committee on Health, and the Mayor, — a joint committee at the time.

Q. (*by Mr. McIntire*). You are a member of the Committee on Health? *A.* I am one of it, sir. I went to Reardon's in the evening —

Q. This is the Reardon's up on Madison Street? *A.* Yes, sir. I went there in the afternoon, and I think that the man in charge did n't let on the gas at that time. It strikes me that he had orders not to discharge any then, but later in the evening. We went to Mr. Squire's that evening, and afterward to Mr. Reardon's, and in the evening we had the gas discharged, as they were in the habit of doing after they had done their rendering. After that I met Mr. Squire and one or two of his men up in City Hall one evening, in the Mayor's room.

Mr. McIntire. You don't answer my question.

Mr. Brine. I am coming to it now, sir. I was going to say how I came to go to Mr. Squire's.

Q. (*by Mr. McIntire*). I want to know the comparison between the odor at Mr. Reardon's and that at Mr. Squire's. *A.* I should say that the odors were very identical. The only odor I got at Mr. Squire's with the same apparatus was from the blowing off, and it was intensified.

Q. (*by Mr. Derby*). That is, when it was let off into the room? *A.* No, sir, I won't say when it was let off into the room, but when it was blown off under the building.

The Chairman. Which was more intense? *A.* Let me explain. The time that I got this terrible odor I was alone. I went in an unofficial capacity to Mr. Squire's, and also to Mr. Reardon's, and had them blow off, as they said they were in the habit of doing at 7 or 8 o'clock. They blew off exactly as I had seen them blow off at Reardon's, and I saw that the odor was then intensified.

Q. (*by Mr. McIntire*). But somewhat identical? *A.* Yes, sir.

Q. Were you present as a member of the Board of Health when the resolutions of this Committee were introduced before that Board? *A.* The resolutions of the committee appointed at the indignation meeting? I was there.

Q. Did you hear any remark made there by Mr. Squire, or in regard to his new apparatus, in comparison with the former apparatus that he had used? *A.* I heard a great many remarks that night. I think I did hear him make the remark, — yes, I am sure that I did, — in answer to Mr. Hastings or Mr. Magoun I think, that he thought that the place was sweet enough before, and he did n't believe that this had made any great improvement, and he would take it out if they said so, or words to that effect.

Q. Have you, as a member of the Board of Health, visited the Brighton Abattoir and Shaw's, as well as Mr. Squire's? *A.* I have, sir.

Q. There have been comparisons made between those places. I would like to have you make one.

The Chairman. I don't see the benefit of that.

Mr. McIntire. It has been testified that everything done in these establishments is the same as that at the Abattoir, and that it is not more

offensive. I would like to have another member of the Committee who visited them give his opinion. It is a question of opinion.

The Chairman. I don't understand it so. Ask the question and let us see if he can give as brief an answer as possible.

Witness. I visited the Abattoir, and went through it pretty thoroughly.

The Chairman. Your opinion, simply.

Witness. My opinion would be that Mr. Squire's establishment would be susceptible of great improvements before it was as good as the Abattoir. That is to say, it would at that time. I don't know what may have been done there since. I understand that he has made great improvements since then.

Q. (*by Mr. Derby*). When was that time? *A.* That was in June, the same day after I went to Mr. Reardon's in the evening.

Q. (*by Mr. McIntire*). Have you ever heard Mr. McSorley make any remark in regard to the nuisance or cause of this nuisance? *A.* I have in a general way. I have heard him, with a great many other people, be very indignant, and say that he thought it was very bad that the people should have these things.

Q. Which things? *A.* These smells; these unendurable smells from the slaughter-houses.

Q. Did he mention the slaughter-houses? *A.* I think he did.

Cross-Examination.

Q. (*by Mr. Derby*). Has there been some difference or estrangement between you and Mr. Squire at any time? *A.* There may have been on his part. I have never had any hard feelings against him.

Q. There has been to some extent? *A.* Yes, sir.

Q. You said you did n't like to go near him on some account? *A.* Yes, it was on account of some remark which he made to me which I never had made to me before.

Q. Do you remember what it was? *A.* Yes, sir. He called me a liar. It was the first time I ever was called a liar.

Mr. Newhall. It is of no use to go into the cause of this matter.

Mr. Derby. I merely asked the question.

Mr. Brine. I did n't intend to speak of it.

Mr. Derby. I simply asked the question if there had been any difference between them. I don't wish to pursue the inquiry.

Q. I would now ask you with regard to Mr. Reardon's establishment, whether you have been there more than once in consequence of their having offensive smells there. Whether you once went in company with certain men employed by Mr. Squire; if they took you there? *A.* I never went but once. I went twice the same day. I have never been there since.

Q. With whom did you go? *A.* The first time with Mr. Kendall and the Mayor.

Q. That was the visit described by the Mayor, I believe? *A.* Yes, sir. And in the evening of the same day we went to Mr. Squire's we went from Mr. Squire's to Mr. Reardon's again, at the invitation of one of his foremen.

Q. Was this after the pipe had been put in for burning the gases by Reardon, or the rendering in close kettles? *A.* No, sir. He was rendering in a tight tank, and discharging the gas into a cistern in the back part of the premises.

Q. He had introduced the principle of rendering in tight tanks, and was carrying the gas and liquid into a cistern at that time? *A.* Yes, sir.

Q. Was there any offensive smell at the time of your visit to Reardon's? *A.* There was.

Q. Was it very offensive? *A.* I would not like to stop there a great while.

Q. Was it a necessary smell, or was it only let off for your information? Was it so understood? *A.* It was let off for our information.

Q. You went there twice, and perceived it twice, did you? *A.* It strikes me that the first time I went there they gave us nothing of it. It seems to me that the man in charge said that he had no authority to let off the gas.

Q. At that time the Mayor and Aldermen were with you, and at the next time, when the gas was discharged, they did not accompany you. Have you on any other occasions been to Mr. Reardon's and perceived offensive smells? *A.* No, sir.

Q. Have you at any time been invited to go there, and declined to go? *A.* No, sir, I have never declined to go.

Q. You have been invited to go? *A.* Yes, sir; but I have never refused.

Q. Did you go on the other occasion? *A.* There was no other occasion. I have been asked to go up there and go around the place, and see if there was not a very bad smell.

Q. When were you told there was a bad smell, and asked if you would go up and notice? *A.* I don't remember. I think I have been told so. I did n't go into it. I have been around there; because men would not even go into it for the smell.

Q. Then you have smelt it for a considerable distance? *A.* Yes, sir. I claim that both places smell bad.

Q. I am confining myself to Reardon's. My inquiry is, whether you have been there and smelt it more than once? *A.* Yes, sir.

Q. Quite offensive? *A.* Yes, sir.

Q. It has been complained of as an offensive place? *A.* Yes, sir. One of Mr. Squire's men came to me and told me about it, — Mr. George, I think.

Q. You have n't been inside the building, only on these two occasions? *A.* No, sir.

Q. You then went there by some invitation? Or did you go there because somebody wished you to go? *A.* We went there in our official capacity in the daytime, and in consequence of an invitation of Mr. Goodrich, Mr. Squire's foreman.

Q. Allow me to inquire, sir, whether the watchman of Mr. Squire, or his foreman even, on several occasions notified you that there was a nuisance there, an offensive smell that demanded your attention? *A.* On the 4th of July I was at Cambridgeport. In the evening two of his men came to me, and asked me up to the Grand Junction Railroad. Alongside of the Grand Junction Railroad was quite a ditch, which was very offensive indeed. I called the attention of the Committee on Health to it, and it was filled up inside of three or four weeks afterward.

Q. On any other occasion did any of his men come to you? *A.* Yes. On one occasion Mr. Goodrich came, and stated that he would come after me that evening, and take me to one or two places that were offensive. I made an engagement with him, and stayed in the house on purpose to wait for him; but he did n't come for me.

Q. He came another morning?

Mr. Newhall. Did he ever go, Mr. Derby? I suppose that is your point? I wanted to ask whether he was notified, and whether he did or did not go? *A.* I have been invited to go, and was willing to go; but in consequence of their breaking their engagements, I have not gone.

Q. Did they break engagements more than once? *A.* Yes, sir.

Q. How far is it from your house to Reardon's? *A.* About a quarter, or perhaps three eighths, of a mile.

Q. On some occasions they have come to you and told you that there was a bad smell, and invited you to go there, and you did n't go, and on one occasion you did n't go because they did n't come with a carriage to take you? *A.* I have made special arrangements to go with them, as I have stated, on two occasions when they promised to come after me and did n't come. Not knowing where the places were, I did n't go.

Q. I speak of Reardon's. That is very near Main Street. You would not have to go very close to it. *A.* I have been repeatedly near that, and have found very offensive odors around that.

Q. Now let me ask you whether down to Mr. Squire's establishment you have found any smell but the simple smell of the tight tank opened for your benefit? *A.* The worst smells that I have got were from a pipe opened for my benefit.

Q. This was from this improved apparatus? *A.* Yes, sir; when the gases were discharged upon the flats.

Q. Before this method of burning the gas? *A.* Yes, sir.

Q. Not from the present apparatus, but from some previous arrangement, when it was let into the basin. It was from that pipe that you received the gas. *A.* Yes, sir. It was then that I received the gas I have referred to, and also that Mr. Squire talked to me in the manner I have spoken of.

Q. (*by Mr. Newhall*). I don't understand you that odor came from a pipe where they were continually blowing off, but from a pipe opened for your special benefit? *A.* No, sir; that was when they discharged the gas every morning from 7 to 8 o'clock from the tight tanks where rendering was done.

Mr. Derby. That was before the gas was burned.

Q. (*by Mr. Webster*). The smell you got when they were discharging from the tight tanks was not during the regular process, but rather a process for your particular benefit? *A.* It was an every-day occurrence.

The Chairman. This gas was let off into the river, and you found it quite offensive?

Q. (*by Mr. Derby*). But this was previous to the burning of the gas with gasoline. I believe that the Commission understands that it was prior to the introduction of the present apparatus for burning the gas.

The Chairman. Yes, sir, we do.

Q. (*by Mr. Derby*). That was like the smell at Reardon's, I understand you? *A.* Yes, sir.

Q. Was that smell more diffused, or not, sir? *A.* Perhaps it may have been more diffused, because it was blown off into the dock, where it had great chance to evaporate. At Reardon's it was blown into a cistern, and was covered over tightly and discharged into a sewer.

Q. But the smell at Reardon's got out around the place, did n't it? *A.* Well, I suppose that the effect of the smell may be that, as after one has stayed there a little while it is pretty hard work to tell whether it is outside or inside. That was the effect upon me. I got so much of it there that I could not tell whether I got it outside or not.

Q. I will ask you, sir, whether you were present when the conversation took place between Mr. McIntire and Mr. Chaffee, and heard the remark that there was no use in charging the effect of a certain odor to Mr. Squire's establishment? Do you recollect the conversation between Mr. Chaffee and Mr. McIntire? *A.* I think I have heard it said that Mr. McIntire said he would be honest and acquit Mr. Squire's factory of that charge, but I don't think I was present at that time.

Mr. McIntire. Mr. McIntire has not testified. I don't know how you can ask any question about that.

Mr. Derby. It is with reference, sir, to the other testimony.

Mr. Newhall. It is simply corroborating their own witness.

Q. (*by Mr. Derby*). You speak, sir, of certain improvements wanted to make Mr. Squire's establishment as good as the Abattoir. In what do you deem the establishment deficient? *A.* The day we were at the Abattoir we came to the conclusion — I think it was the general opinion of the Committee — that if Mr. Squire was to put in the same apparatus, or something of a similar kind, for the destruction of these gases, a great part of the evil would be done away with. Previous to that time I never had any feelings against this establishment. I went there simply as a matter of duty, and to all these places in the same spirit.

Q. You came, then, to the conclusion that if the same improvements were adopted there as at the Abattoir, it would be endurable? *A.* I thought it would be a very great improvement, and I signed the Report for that reason.

Q. Do you remember the improvement that was named? Was it the burning of the gas? *A.* That was the principal thing.

Q. Was it also the removal of the blood? The removal of the hair had at that time already been taken care of. The burning of the gas was the principal thing? *A.* Yes, sir.

Q. Do you think of anything else that was suggested? *A.* If I remember rightly, I think we suggested to him that it would be well to do something to do away with the live-hog smell. I am not quite sure. I know we mentioned, the Mayor and myself, — we stopped a little while after Aldermen Kendall and Woodbridge had gone, — and in a general way we stated to him that we thought such and such improvements would be of advantage to his establishment; that if he should burn the gases and get rid of the live-hog smell it would be a very great improvement. I think that if it had not been for that very unfortunate smell we had on the 31st of July, perhaps there would not have been so much feeling about it till another year.

Q. Do you think that if it had n't been for that there would not have been a great deal done about it for another year? *A.* It was that night, sir, which created the difficulty. It was that night which called forth the indignation meeting.

Q. You have given some little evidence with regard to Thorndike Street. Which is it nearest to, Broad Canal or the Squire Basin? *A.* It is very much nearer to Mr. Squire's.

Q. Then you would not expect, on the side toward Broad Canal, at that distance, so much discoloration as on the side toward the basin? *A.* Well, I have never seen any discoloration from what I should call the effects of Broad Canal on buildings. I have gone through this thing in a spirit of perfect justice. I feel as if I wanted to say that I have had no feelings whatever about it. I have never seen any effect on buildings of what, in my judgment, was the effect of the sewer.

Q. Have n't you seen any on Mr. Adams's house at the House of Correction? *A.* No, sir.

Q. Or on Craigie's Bridge? *A.* I have, on Craigie's Bridge, immediately over the sewer. I have seen it come from the sewer.

Q. On Thorndike Street the distance is two or three times as far from Broad Canal as from the Squire Basin? *A.* Perhaps twice.

Q. And Broad Canal is a much smaller collection of water than the other? *A.* Yes, sir.

Q. So that you would expect from the broader basin, much nearer, more effect than from the smaller basin at the greater distance? *A.* That would depend upon the amount of sewage put into it.

Q. You would not expect at a great distance the effect which you would have in the immediate vicinity? *A.* No, sir.

Q. You have alluded to some conversation with Mr. Squire. When was that, and where was it? in whose presence, and of what were you speaking? *A.* That was before the Board of Mayor and Aldermen, I think in the month of August. He made some general remarks that his establishment was well without a certain improvement, and he would take it out if they did n't like it. At the time, I did n't attach any great importance to it. Some question was passed between him and one member of the committee, and, in the course of the conversation, I heard him make that remark. Mr. Squire always contended that there was no smell there, and so, of course, he felt there was no improvement in any apparatus.

Q. Did n't he make a remark something like this, that if he discharged the water at high tide it was inoffensive? *A.* He may have made that. I know that the discharge was at low tide the morning that I was there.

Q. Yes, sir. There was a trough there especially used for blowing into when the tide was low. Was it not stated to you then that it was generally discharged at high tide, and that this was low water, but that if you desired it, to gratify you the discharge should be made then? *A.* Yes, sir, it was. When I went there it was with the definite understanding that it should be discharged between those hours.

Mr. Derby. Well, that perhaps is now abandoned, and the burning in the furnace is introduced. That is a question of the past, and is immaterial. I believe I will not ask any more questions.

TESTIMONY OF S. P. SHARPLES (*recalled*).

Q. (*by Mr. McIntire*). I will ask you whether you have made any tables or calculations from the analyses of mud from these different places with the table that has been put in by Professor Horsford? And if you have a table any different from his, I wish you would put it in. *A.* I have not analyzed any of the specimens of mud, but have simply made recalculations from some of his results.

Q. (*by Mr. Newhall*). Did you make recalculations from Professor Horsford's results? *A.* As you will find, these results are all calculated on wet mud. I thought it would show more nearly the difference between the analyses of the different muds to treat them dry rather than wet, the water being an entirely arbitrary matter. In calculating upon the wet muds, a great deal would depend upon the care with which it was dipped up, and the state of the water. I have, therefore, recalculated it on the basis of dry mud, and merely submit these recalculations to the Board. I have four columns here. I have reduced the total sulphuretted hydrogen to per cents. The ammonia was all in per cents. I have then divided the per cent of ammonia by the per cent of sulphuretted hydrogen, in order to determine the relation between these two substances. I have also made recalculations of the amount of free sulphuretted hydrogen in the dry mud. Thus the ratio between the sulphuretted hydrogen and ammonia runs from $\frac{9}{100}$ to $\frac{14.5}{100}$. Thus the ratio between the free sulphuretted hydrogen which would be furnished by albumen, and the ammonia in albumen is $\frac{11}{100}$ to $\frac{7}{100}$. In the other table I saw nothing showing that the sulphur must come from some other source than the albumen, and also from the condrine which is composed of gelatine. My tables go to show that the most of the sulphuretted hydrogen must come from the reduction of sulphates in sea-water. The exceptional case is that of Broad Canal, which I think may be accounted for by the fact that large amounts of castings are washed there in that canal, and very likely a great deal of the sulphate of iron goes into it, and coming in contact with the organic matter, reduces the free sulphide of iron to sulphuretted hydrogen.

Q. Whether that occurs to any large extent in Broad Canal or is only local? *A.* I should judge only local, because the other analyses show no such results.

Q. In other words, his analyses were taken, you should judge, from mud taken out near where this was turned in?

Professor Horsford. But you do not know.

Mr. Sharples. It is another way of looking at the results. I simply exclude the water in order to make my computations, in order to compare them with the other. I have reason to have great confidence in Mr. Munroe's calculation, and I also have the greatest confidence in Mr Merrick's work. I have had occasion to compare my work with his, and we have agreed thoroughly.

Q. You have never analyzed the mud from these different places? *A.* No, sir. I merely wished to correct the impression that I might have given, that much of that sulphur came from albumen. From the examination of Mr. Merrick's results, I see that it is impossible that it should come from that. It must have come from the reduction of sulphates.

The Chairman. Do you ascribe it to the sulphuric acid which is turned into the stream? *A.* Yes, sir; and to the sulphate of lime which comes from the bleachery. The springs of that basin are largely charged with the sulphate of lime, and so also is the drainage from Somerville hill.

Q. Well, is there any sulphate of lime from the action of the acid on the lime? *A.* Yes, sir. The action of decayed organic matter on lime is to reduce it to common sulphuretted hydrogen.

Q. Is there anything else? *A.* In some testimony that was put in, one witness said: "Had Mr. Squire's factory been absolutely new and clean, fresh from the carpenter's hand, but smeared with grease and lard, all absolutely pure and sweet, it would, situated as it was in the focus of the stench, have undergone enfleurage, and retained the scent next morning. The only surprising thing, to those who know the attraction of lard for an odor, is that the smell has gone away yet." Now I can testify from my own experience that the clothing of any one who goes in any place about these establishments retains the odor of the establishment; and that the clothing of a person who simply passes through them smells of it afterward. Persons working in that odor will not perceive it. There is one more correction I want to make, and that is with regard to the amount of soup. I shall alter my former estimates and agree very closely in the total amount of soup with Professor Horsford. I do this on account of some facts I have received from Chicago since my testimony. It is less at the Squire establishment than at Chicago, but still the Chicago results differ greatly from those we get here.

Q. Have you a letter from Dr. Chandler? *A.* Yes, sir, I have one which I alluded to in the other part of my testimony, and asked for by the Board. It was in answer to one I wrote him.

Dr. Derby. On what point? *A.* Concerning rendering in New York. I will first read my note to him, and then his reply.

OFFICE OF THE STATE ASSAYER,
No. 114 *State Street, Room* 9.
BOSTON, August 1, 1871.

TO PROFESSOR C. F. CHANDLER.

DEAR SIR, — If you will answer me a few questions in your official capacity as a member of the New York City Board of Health, I will be much obliged to you.

1st. Is the business of slaughtering animals for food permitted within the limits of the city of New York?

2d. Is melting and rendering carried on, as formerly, on the North River, and if not, when were the establishments closed?

3d. If rendering is still carried on, are the renderers allowed to run their soup, or liquor in which meat has been boiled, into the drain?

4th. Have the means adopted on the rendering-boats, for consuming the gases produced, been effectual?

We are suffering very much in Cambridge from the above nuisances, and are met by the assertion that the business is permitted by the Board of Health of the city of New York, and that if the New-Yorkers can stand it, we can. If not taxing your valuable time too much, I shall be glad of a speedy answer to the above.

Yours, S. P. SHARPLES,
On behalf of a Committee of the Citizens of Cambridge.

Witness. In reply to that I received the following letter.

Mr Newhall. If you will give us the results.

Mr. Sharples. It is only short, and I may as well read it. It is as follows : —

SCHOOL OF MINES, COLUMBIA COLLEGE,
Corner Forty-ninth Street and Fourth Avenue.
NEW YORK, August 15, 1873.

MY DEAR MR. SHARPLES, — In reply to your note of the 13th, I would say : —

First. That the business of slaughtering animals is permitted above Forty-second Street, in New York Island, and only near the river. That the Board of Health is now considering the question of removing them entirely from off the island, and the only alternative which is for a moment considered is the building of one or two abattoirs, in which not only the slaughtering, but the fat-melting, the gut-cleaning, the tripe-making, and the drying of offal shall be conducted in a manner entirely free from all cause of complaint.

Second. Melting and rendering establishments are not allowed anywhere in the city unless the operations are so conducted as not to give any cause of offence whatever. We are doing our best to break up this business, except where the most perfect machinery is employed for the avoiding of nuisance.

Third. By rendering, I suppose you mean the rendering of offal of dead horses, diseased meat, etc. This office was formerly executed by the New York Rendering Company, at the foot of West Thirty-eighth Street. It created such a nuisance, notwithstanding their improved machinery, that we were compelled to forbid their rendering. As an alternative, they then went down the harbor, and threw the fish and dead animals overboard ; but the tide brought them back, and this proved to be as great a nuisance as the other. As the Rendering Company declined to do anything else, we were compelled to declare their contract broken, and give the business to another party, who take the fish and dead animals daily, in covered boats, to Barren Island, on the south shore of Long Island, and there manufacture them into fertilizers. The statement, therefore, that the Health Department of New York permits these offensive trades to be carried on, is not true. We refuse permits, and close the establishments of the men who carry on these trades in an offensive manner. We do not recognize any particular apparatus as without offence, but we have given permits to a number of firms to melt lard, we having ascertained that their processes were not objectionable, and we have given a permit to only one party to melt tallow. We have broken up the business of drying blood and offal by the company using the Hogel machines, as we found that they could not conduct their business without creating a nuisance. They claim that they are working at Brighton, at Cambridge, and other places, without creating offence, and they used this as a strong argument in court to get an injunction against us, but failed. I should be greatly obliged if you would tell me what you know with regard to fat-melting, blood-drying, and other offensive businesses as conducted in Cambridge and Brighton, as these men claim that the Health Departments of these cities permit their operations there as inoffensive, and think us very unreasonable because we will not permit them here.

Very truly, &c.,
C. F. CHANDLER.

P. S. — Please tell me particularly about the Hogel machines.

Q. (*by Mr. Muzzey*). The practice complained of is the one used at the Brighton Abattoir ? *A.* Yes, sir.

Mr. Muzzey. We are very much obliged to Mr. Sharples for his creditable corrections ; he has added to the strength of our case.

Following is a tablular statement of the calculations submitted by Mr. Sharples.

Per Cents of Dry Mud.

No.	Locality.	Per Ct. H_2S.	Per Ct. ammonia.	Ammonia divided by H_2S.	Free H_2S in dry mud.
1.	Ditch in Charlestown	.19	.35	1.84	32.65
2.	Mouth of Drain, Canal Street	.46	1.16	2.74	121.60
3.	Same as No. 2, but 100 feet in River	.34	.75	2.20	.17
4.	North Branch Broad Canal, back of Mill	8.91	.81	.09	130.25
5.	Ditch east of Grand Junction R. R.	.62	1.47	2.37	55.00
6.	Ditch farther east	.04	.26	6.50	
7.	Edge of Sewer behind Rolling Mill	.25	1.02	4.08	65.22
8.	Open Sewer in front " "	.26	.42	2.61	55.53
9.	Open Drain near " "	.09	.06	.66	4.06
10.	Under the Wagon-Shed at Squire's	.57	2.55	4.47	134.14
11.	Under Hog-Pen	.58	2.00	3.45	127.33
12.	Basin near Hog-Pens	.61	1.67	2.73	117.00
13.	Near Medford-Street Sewer	2.40	2.32	.96	875.54
14.	Near Mouth Gore-Street Sewer	2.45	1.74	.71	882.80
15.	Near Outlet of Sewer, near House photographed	.24	.91	3.79	64.86
16.	Marsh near Allen & Endicott's	.02	.13	6.50	
17.	Same as No. 16, near Railroad	.02	.29	14.50	
18.	" " " 17, " "		.91		
19.	Cambridge Flats, near West Boston Bridge	.33	.46	1.39	.43
20.	" " " " " "	.52	.44	.84	
21.	" " " " " "	.22	.28	1.27	
22.	Back Bay, near Stony Brook	3.01	2.88	.96	984.80
23.	South Boston Flats	2.15	1.53	.71	441.66
24.	Broad Canal, near No. 8	.33	.52	1.57	62.30
25.	" " " " 7	.37	.83	2.24	33.30
26.	Between No. 2 and Tide Mill	.39	.84	2.15	77.00
27.	Beacon Street Sewer, Boston	.27	1.00	3.70	36.23
28.	Chestnut-Street Sewer, "	1.47	1.17	.79	228.57
	Albumen	1.70	18.81	11.07	
	Chordrin	.40	17.52	43.80	

Counsel for the respondents filed the following letter: —

LETTER FROM PROFESSOR WINLOCK.

HARVARD COLLEGE OBSERVATORY, CAMBRIDGE, December 8, 1873.

DEAR SIR, — The last daily observation of the direction of the wind is made here at 4 P. M. At that time, on June 9, the wind was S. E.; June 10, S. E.; June 11, W.; July 30, W.; July 31, S. E.

Yours respectfully, JOSEPH WINLOCK,
Director of Harvard College Observatory.

PROFESSOR E. N. HORSFORD, Cambridge, Mass.

THIRTEENTH DAY.

Tuesday, December 23, 1873.

TESTIMONY OF DR. SAMUEL H. DURGIN (*recalled*).

Q. (*by Mr. McIntire*). You are a member of the Boston Board of Health, and testified here the other day? *A.* Yes, sir.

Q. It has been testified here that the scrap and blood taken away from Mr. Squire's establishment is taken away in an entirely inoffensive manner. If you know anything with regard to the transportation of matter from the establishment, will you please relate it. *A.* At one time in the summer during the evening I was out riding —

The Chairman. At what time? *A.* On the 21st of July. I had passed out over the Milldam and was about at the junction of Beacon Street with Brookline Avenue and Brighton Avenue; I smelt something very offensive indeed, the wind being southwest. I drove off on Brookline Avenue rapidly, and overtook two teams, one a two-horse team and one a three-horse team. It was about half past eight and was beginning to be a little dark. I drove up to the teams and asked the drivers to tell me whose teams they were, and what they had. They seemed very indignant indeed at my questioning them, and did not stop, but turned their heads the other way. I spoke again to the driver of the rear team, and he told me that the driver forward would tell me. I drove forward and asked the driver of the forward team the same question, obtaining a similar reply. I then rose up in my carriage and demanded that he should stop, and he wanted to know what authority I had to ask him to stop. I told him I had the right to know, and if he did not stop I should give him trouble. He wanted me to prove it, and I told him I would; and he got down off of his team and came to examine my badge before he would answer the question. I then took my book out, a little memorandum-book I carry with me, and asked him whose teams they were, and he told me they were Mr. Bradley's. I asked what he had on board, and he said I could see if I wanted. I got up on the teams, and found upon one of them nine barrels of scrap; and in the other was blood in bulk. I asked him where it came from, and he said from Mr. Squire's establishment in East Cambridge. The scrap was extremely offensive.

Q. Do you know where it was being carted to? *A.* They told me they were going to Mr. Bradley's establishment on Pine Island.

Q. Did I understand you to say that you smelt the odor before you saw the teams? *A.* Yes, sir.

Q. And you followed the odor up in order to get at it? *A.* Yes, sir; I followed it directly on, and traced it all the way.

Cross-Examination.

Q. (*by Mr. Muzzey*). You say this was on the 21st of July. Where was the locality where you detected the odor? *A.* It was at the junction of Brookline Avenue with Beacon Street.

. Within the city limits? *A.* I think, sir, that is within the city limits.

Q. Who was the driver or conductor of this team? *A.* I did not ask his name.

Q. Are you aware, sir, that no scrap is carried in barrels from Mr. Squire's establishment? *A.* No, sir, I am not. This was in open barrels.

Q. Are you aware that from the Brighton Abattoir intestines and refuse matter are carried away in open carts? *A.* No, sir, I don't know anything about it. I have been told that it was all conducted directly into the tanks.

Q. You have not made any personal investigation to know how that has been done? *A.* I have been there two or three times.

Q. But have you ever seen the manner in which they transport refuse matter and intestines from that place? *A.* Well, sir, I have never traced it the whole distance. I have seen it come down into the slaughter-house, and I have seen it on its way to the rendering establishment, where it is taken up stairs and put into the tanks.

Q. You have not seen it loaded upon the wagons? *A.* No, sir.

Q. Well, now, you speak of the scrap. Did you find any barrels particularly offensive? Was the cart which transported it particularly offensive? *A.* That would be impossible for me to say. It was slightly dark.

Q. Well, but you could not smell anything offensive from the cart, behind it? *A.* Well, if a certain cart had nine open barrels of stinking scrap in it, and I got upon it, I don't think that I could tell whether the cart stunk or not.

Q. That is all about that. I now refer you to the blood. Was there anything offensive about that? *A.* No, sir, there was nothing offensive about the blood-wagon that I could detect.

Q. Did the driver or any one in charge of the team specify what part of the load that he was conducting came from Mr. Squire's, whether it was blood or scrap? *A.* I think they stated that it was all from Mr. Squire's.

Q. Do you feel positive of that? *A.* I noted it so on the spot; both the blood and the scrap.

Q. In point of fact, the scrap is never transported in barrels from Mr. Squire's establishment. It is pressed in round cakes, and transported in carts. Do you feel, with that as a fact, positive that you were told that it all came from Mr. Squire's works? *A.* Yes, sir. I feel positive that he told me it came from Mr. Squire's, and I noted it on the spot, in my memorandum-book.

Q. You do not know who the man was? *A.* No, sir. He said that they were in the employ of Mr. Bradley.

Q. In what form was the scrap. *A.* It was material such as you get from the bottom of the kettle, — some bone material and some meat.

Q. Then it was in reality what is found at the bottom of the soup-tanks? *A.* I should say that it was. I don't mean to say that it was simply the soup material, but it was bony and meat deposit at the bottom of the kettles.

Q. When did you first see these carts? *A.* I could not see them until I got quite near to them. I could not see them at first, but smelt

them. As I drove nearer I heard heavy teams, and when I got close to them I found the trouble.

Q. They were at the point you have indicated? *A.* Yes, sir.

Q. How long did you follow them. *A.* I don't know that I could indicate the exact point at which I overtook them.

Q. In which direction were they moving? *A.* They were going southerly.

Q. From what point? *A.* In driving from the junction of Brighton Avenue to Beacon Street, I should say it was perhaps a quarter of a mile on Brookline Avenue.

Q. Well, they were coming from the direction of Brighton or Brookline, were they, toward the south? *A.* Yes, sir.

Q. Did not it strike you that that would hardly be the right road to have taken from Mr. Squire's to Pine Island? *A.* No, sir.

The Chairman. Pardon me, but I want to know whether they were coming toward the city or going from it. *A.* They were going from Mr. Squire's to Mr. Bradley's, on Pine Island.

Q. As I understand it, there are three roads there: Beacon Street in the centre, and there is a road running to Brookline on one side, and another to Brighton on the other. On which road were they? *A.* They were on the Brookline avenue.

Q. And which way were they going? *A.* In a southerly direction.

Q. Away from Boston? *A.* Yes, sir.

The Chairman. The counsel have put it in your mouth that they were coming toward Boston.

Q. (*by Mr. Muzzey*). They were going toward Brookline and Brighton, — in that direction, were they? *A.* I should not say they were going toward Brighton, but they were going toward Dorchester.

Q. In point of fact, the road they were upon leads to Brookline or Brighton? *A.* Yes, sir.

Q. You say the men were reluctant to answer your question? *A.* Decidedly.

Q. Was there anything in the manner of these men that led you to suppose that they might try to deceive you? *A.* I did not suspect it after they began to give me answers to my questions.

Q. Were they frank in manner toward you? *A.* I should not say they were frank.

Q. Reluctant? *A.* Yes, sir.

Q. Did you suggest to them from what place the material had been taken, or did they tell you? *A.* I asked them the question, and they told me.

Q. Did you discover the smell before you reached the Brookline fork? Were they apparently ahead of you? *A.* I think it was about the time that we reached the fork of the road.

Q. When you reached the fork had they preceded you? *A.* They had got a long distance beyond on the Brookline road.

Q. They were on the Brookline road when you overtook them. The blood was in a close carriage, and you could not discover any smell from that, but you did from the scrap? *A.* Yes, sir.

Q. There was a two-horse team and a three-horse team. Can you say which had the scrap? *A.* I cannot say.

Q. The Brookline avenue runs from Beacon Street over toward the

"Punch-Bowl"? *A.* It leads from Beacon Street. I cannot say where it terminates.

Q. Was that on the road toward Mr. Bradley's? *A.* Yes, sir. They go over there in that direction. They made so much fuss about their carrying this blood through the street, it may be that they avoided the central part of the city.

Q. Did you ever go to Bradley's from the point where you saw them when they were moving in the contrary direction from South Boston? What road is there that they could take? *A.* I am not sufficiently acquainted with the streets, sir, to say.

Q. (*by a member of the Board*). You don't allow them to go through Boston with that kind of material? *A.* Not in the condition they were carrying it in. We prescribe that they shall carry it in covered carts or tight bottoms.

Q. Are Mr. Bradley's carts under the supervision of the local Board of Health of Boston? *A.* No, sir; we simply prescribe that they shall carry it in an inoffensive way in tight carts.

Q. Does Mr. Bradley hold any other permit than one with that condition in it? *A.* None that I know of.

Q. If you have seen the carts which were going to his place as you observed them on this occasion, violating the rules, have you made any remonstrance with him? *A.* A letter was written to him next day after this.

Q. Has there been any violation of your rules since that day? *A.* I don't recall any.

Q. So that now he is transporting in his carts in the proper and prescribed manner? *A.* I could not vouch for that. We have not had any complaint. Last evening I saw one of his blood-carts in Charles Street, leaking considerably. I had to have considerable words with the driver to make him stop. I did not smell any offensive odor particularly. I drove up alongside and asked him to stop. He would not at first, but finally did on persuasion. The cart was leaking considerably behind. I asked him whose cart it was, and he said it was Mr. Bradley's.

Q. (*by Dr. Derby*). Where did the blood come from? *A.* I did not ask him.

Q. (*by Mr. Muzzey*). Did you think enough of the circumstance to notify Mr. Bradley of it, or in any way to censure him? *A.* We have not had time.

Q. Do you intend to? *A.* Yes, sir.

Q. His business of transporting is under the direction of your Board, and you can prescribe and control the manner in which he shall conduct the business of transporting the scrap and blood? *A.* We have the right to complain if he does not carry it in a proper manner.

Q. (*by Dr. Derby*). I would like to know if you have any reason for knowing whence came the blood which you saw leaking on Charles Street last night? *A.* I took it for granted that it came from Mr. Squire's.

Q. But you did not ask? *A.* No, sir.

Q. What part of Charles Street was that? *A.* It was, I should say, between Cambridge Street and Pinckney, a little south of the Eye and Ear Infirmary.

Q. (*by Mr. Muzzey*). Why did you take it for granted that it came from Mr. Squire's? *A.* That is the general impression.

Q. There are some other places of the kind? *A.* I don't know.

Q. (*by Dr. Derby*). Is there any other establishment which carts away blood? *A.* I believe they try out there. I do not think they should be allowed to do it.

TESTIMONY OF ISAAC SWEETZER.

Q. (*by Mr. McIntire*). You live in Charlestown? *A.* Yes, sir.

Q. What is your occupation? *A.* Insurance.

Q. It has been stated here by a number of the residents of Charlestown, Mr. Sweetzer, that the smells which have pervaded that city came from the filling at the East Cambridge end of Prison Point Bridge, and from the filling on Canal Street and the sewers. I will ask you whether you are familiar with the smells of the garbage at Prison Point Bridge, Canal Street, and the sewers that have been testified to? *A.* Yes, sir.

Q. Have you been troubled by these smells? *A.* Not at my house.

Q. Where is your house? *A.* On Monument Square.

Q. What smells have you received at your house? *A.* The smells we have been troubled with have come only in the night. The offence has been at night, sometimes earlier, but generally from midnight till four in the morning. Sometimes it has been very offensive.

Q. Can you describe these smells? *A.* They are fearfully offensive, and have always come from the same direction. When the winds come from the southwest or west, from the direction of East Cambridge, we have been annoyed with them.

Q. What did they smell like? *A.* They are perfectly indescribable and horrid.

Q. Did you ever trace them? *A.* No, sir; no further than by the current of the air.

Q. Did you ever smell the smell of live hogs? *A.* I have.

Q. Where? *A.* In a good many places.

Q. At your house? *A.* No, sir.

Q. In Charlestown? *A.* Well, I don't know as I have, in connection with this offensive odor.

Q. Well, state where you have smelled the smell of live hogs, and under what circumstances. *A.* In going by hog-pens on the Milldam I have smelt it, but I cannot say in relation to whose hogs.

Dr. Derby. Can you give the Board any idea of the character of the smell which you got when the wind was from East Cambridge? *A.* Well, it is a fatty, greasy, nauseous smell.

Q. Is it distinguishable from the smell of sewers and dock-mud? *A.* I think it is, sir.

Q. Does it affect your family? *A.* Yes, sir.

Q. Did it cause nausea and sickness? Does it affect you personally? *A.* Yes, sir.

Q. How does it affect you? *A.* It is exceedingly offensive to me. I would not say it had made me sick.

Cross-Examination.

Q. (*by Mr. Muzzey*). These odors you get late at night, I understand? *A.* Sometimes earlier, but most frequently late at night, as I said, from eleven o'clock till four.

Q. Do you ever perceive them in the daytime? *A.* Never.

Q. Always in the night-time? *A.* Always.

Q. When the air is cold? *A.* Not so much. Within a short time, perhaps a month, I should think we had not been troubled much with them. The windows have not been open so much, and the wind has prevailed more from the north and west than from the west and southwest.

Q. How long have you occupied your present residence? *A.* Twelve years.

Q. In what direction does your house face? *A.* To the south and southwest.

Q. Are you aware that they keep 100 hogs in open pens at the State Prison? *A.* I am not.

Q. You did not know that fact? *A.* No, sir.

Q. Well, the disgusting odors from the filling at Prison Point and Canal Street you are familiar with, are you? *A.* Perfectly.

Q. They are offensive, are they not? *A.* On Craigie's Bridge they are, but I don't think they are experienced on the east side of Main Street.

Q. As you go out on the Boston and Lowell Railroad Bridge, and on the Prison Point Bridge, have you observed what kind of material was put in there last summer? *A.* Yes, sir.

Q. Have you seen the city of Boston carts dump the refuse of the streets, the swill, and all sorts of matter in that place? *A.* I have seen offensive stuff there.

Q. And your city authorities have complained against it? *A.* I don't know anything about that.

Q. Do you hold any public office in Charlestown? *A.* I do not.

Q. (*by a member of the Board*). Did you ever, day or night, smell these offensive odors from the Canal Street basin or from Prison Point at your house? *A.* No, sir.

Q. You ride frequently over the "Dump," as it is called, in Charlestown at Prison Point Bridge? *A.* Very frequently.

Q. You have to ride in the vicinity of these odors? *A.* Yes, sir.

Q. Can you describe, or give the character of, that odor? Have you experienced it yourself? *A.* Yes, sir. I have usually experienced it from about eleven o'clock at night until late in the morning, say four or five o'clock. I rarely experienced it before eleven o'clock at night, but occasionally. I should describe that odor to be a nauseous, greasy, fatty odor, grosser at some times than at others. It differs a little in its character for grossness. Combined at times with what I should describe as the odor of the filling, it takes the character more of a fatty or greasy odor.

Q. Have you ever, in your official capacity, endeavored to trace out these odors? *A.* Yes, sir.

Q. Will you state what you have done? *A.* Complaints were made to me so numerously, that the city took some action.

Q. (*by Mr. Derby*). What time did you speak of? *A.* Early in 1872. I took measures to trace the odor, and locate it, if possible; but I don't know that I ever arrived at any satisfactory conclusions. While the thing was going on, my term of office came to an end; and that was the end of it officially. That was the year 1872.

Q. I will ask you if, in your efforts to trace this odor, you went to

these different localities? *A.* We went to Canal Street, Prison Point, and the places all around us. I went myself, and went with others.

Q. Whether you found the same odor emitting from them as from others? *A.* I think the odor from the filling at Craigie's Bridge and from the Milldam, or Canal Basin, so called, in Charlestown, is entirely distinct in its character. At any rate, it is to my senses.

Q. Which way did the wind come from? *A.* Southerly, southwesterly, and westerly.

Q. Can you tell us how far these odors from the filling up and garbage extended? How far from the place itself? *A.* I should say apparently a short distance, sir.

TESTIMONY OF HON. W. H. KENT.

Q. (*by Mr. McIntire*). You have been Mayor of Charlestown? *A.* Yes, sir.

Q. For three years? *A.* In 1870, 1871, and 1872.

Q. I will ask you, Mr. Mayor, whether you are familiar with the odors of filling at Prison Point, Canal Street, and the general sewer. *A.* I think, sir, I may modestly say I am familiar with all the odors that have prevailed in Charlestown for the last two or three years.

Q. Do you distinguish a distinct odor from those which I have named, in Charlestown? *A.* Yes, sir.

Q. Will you describe that or those odors? *A.* The odor which has been experienced at night, which I have personally experienced, and which has been complained of to me officially, is entirely distinct in its character from the smell of sewers, or the smell of filling, or the smell of the Canal Street Basin. There was undoubtedly a great deal of odor from the stuff that was carted in at Craigie's Bridge. I stopped a great deal of this filling through the city of Charlestown. Some of it was quite offensive. But the odor from that was certainly not the odor which we complained of nights in our house, not to my sense, at any rate.

Q. I understand that you have never been able distinctly to trace these odors? *A.* I never got to that point, sir, because I went out of office before I succeeded in doing so. I took pretty vigorous measures to do so.

Dr. Derby. I should like to know, Mr. Kent, how far you proceeded in the way of tracing the source of these odors that you perceived at night? *A.* Well, sir, the City Marshal of Charlestown, or the Chief of Police (Mr. Swift), by my direction went over there with different men.

The Chairman. Where? *A.* To East Cambridge, and tried to look up this smell from which we had been suffering. But as the general result of his investigation at the time of my going out of office, I should say that from his reports to me, that, upon arriving at that territory this particular smell was lost in the general odor of the whole territory, and was, perhaps, unable to locate it. I think he visited Mr. Squire's place and others.

Q. Did you visit these localities? *A.* I never went into the establishment; I have visited the locality.

Q. Did you experience anything there similar to the smell you spoke of? *A.* No, sir, I think the smell we get in Charlestown was lost there. The smell, it seemed to me, was in that vicinity more of a mixture or a conglomeration of smells, but the distinctive smell which we got at Charlestown I lost there.

Cross-Examination.

Q. (*by Mr. Muzzey*). You say that at some times this smell partakes of the filling odor? *A.* I have noticed that at some times mixed with it.

Q. Have you found that your drains and sewers in Charlestown were out of order sometimes? *A.* Not more than ordinarily, sir.

Q. But as much as ordinarily, of course? *A.* Yes, sir.

Q. These odors, as I understand you, are perceptible every night? *A.* Not to me, sir. I have had them complained of some nights when I have not noticed them myself. It never had the effect upon me which it has had upon others.

Q. It is an intermittent odor. You get it sometimes, and sometimes you do not distinguish it. It is varied in its character? *A.* Yes, sir. It is more gross at some times than at others.

Q. Is it more gross at the time when it is attended by the filling smell? *A.* Yes, sir, that is what I mean by gross.

Q. Is there a kerosene establishment near the Navy Yard which emits bad odors? *A.* Yes, sir. It has been complained of.

Q. Do the odors you have perceived at your house at all resemble those in the vicinity of the kerosene works, and coming from that establishment? *A.* Not to my perception.

Q. What distinction would you make between them? *A.* I can hardly describe it, except by saying that it seems to me to be entirely different. The odor at the oil-works is not a fatty, nauseating smell.

The Chairman. Can you describe the difference between a rose and a pink? (No answer.)

Q. (*by Mr. Muzzey*). Is this the odor of tallow or putrid meat? *A.* Well, sir, to some little extent, I should say, perhaps, it is; but generally to my senses it has been more like a fatty essence mixed with this offensive smell.

Q. It has a greasy smell, has it not? *A.* Yes, sir.

Q. How often have you experienced that odor of which you speak, during the last year? *A.* Well, sir, occasionally; not very frequently.

Q. Well, take the season through, how many times? *A.* Perhaps I have noticed it a dozen times in the course of the summer of 1872.

Q. In the night? *A.* Yes; usually about the time of my retiring.

Q. Did you ever attempt to trace the smell yourself? *A.* No, sir.

Q. But the parties you sent to trace the smell reported that they lost the smell entirely when they got over to East Cambridge? *A.* It is my impression that they so reported.

Q. They said the smell of East Cambridge was not as strong as the smell in Charlestown? *A.* They did not express themselves in that way; they said they lost the smell in the general odor of the territory when they got over there. There were a great many smells, and the smell of which we complain they could hardly distinguish from others.

Q. Well, did not they say that there was less smell there than they had experienced in Charlestown, sir? *A.* O, no, sir.

Q. Did not they say that they had passed out of the smell when they reached East Cambridge, sir? *A.* I don't think the smell was lessened. It was different in character.

Q. Well, was it not lost in the basin odor when they got there? *A.* Yes; they said the basin was very offensive and rank, but they did

not say that the smell of Charlestown was lost in the general smell of the basin.

Q. In the general smell of the territory, more particularly the basin? *A.* No, sir; in the general smell of the territory.

Q. Are there piggeries connected with the city prison? *A.* I was not aware of the fact.

Q. (*by a member of the Board*). Do you ever get at your house that smell which you get on Canal Street, or near Prison Point Bridge? *A.* I think not, sir. I think I have got that smell, but it is the smell of flats. I have been over there repeatedly for the purpose of getting that odor. But I have said before that that smell was entirely different from anything which we get at Craigie's filling on Canal Street, as cabbage is different from cheese.

Q. (*by Mr. Muzzey*). Have you any soap-boiling places in Charlestown? *A.* We have one, sir.

Q. Have you ever smelled the putrid grease when they are rendering? *A.* I have never smelt it myself. It was complained of a few years ago.

Q. Do you know whether the smell was like that, sir? *A.* I am not conversant with that, sir.

Testimony of Thomas Dana.

Q. (*by Mr. McIntire*). What is your occupation? *A.* I am a wholesale grocer, on Commercial Street, Boston.

Q. You reside in Old Cambridge, at the top of the hill near Hovey's nursery? *A.* Yes, sir.

Q. It has been testified to by the defendants that the existence of the slaughtering-houses is of great property value to the city of Cambridge. Now, if you know anything about it, will you please testify, and tell us what your opinion is? You have lived in Cambridge how many years? *A.* thirty-nine.

Q. And you have lived in the Third Ward in former times? *A.* Yes, sir.

Q. How long have you lived there? *A.* I have lived there seventeen or eighteen years, and the balance of the time in the place where I now live.

The Chairman. You understand that this goes on only by special permission.

Mr. McIntire. It has been put in and it will be argued.

The Chairman. We have nothing to do with that point. We cannot go into details in regard to private property.

Mr. McIntire. It has been put in and insisted upon, and the argument will be insisted upon; and I simply wish to put in this one witness in regard to that point. I don't care to go into it.

The Chairman. He might state whether there has been an increase or a diminution in the price of property.

Mr. McIntire. I simply wish to know his opinion.

Q. Will you state what the influence of these establishments has

been, in your opinion? *A.* I should say that it would decrease the price of property every day.

Mr. Newhall. What has been the effect? *A.* I know that for myself I should sell my property for fifty cents on the dollar. If this smell was to continue, I should move out of the locality.

Mr. Newhall. That won't do.

Q. (*by Mr. McIntire*). Your business carries you into Boston every day? *A.* Yes, sir, I ride in an open buggy through East Cambridge most of the time. Sometimes I go the other way.

Q. Whether you ever ride over the West Boston Bridge from East Cambridge? *A.* Well, a portion of the time I go one way, and sometimes the other, when I have business at the bank in East Cambridge.

Q. Whether you distinguish these sewer smells from the flats and from Charles River? *A.* Yes, sir.

Q. Now whether at your house or in riding through East Cambridge or on West Boston Bridge, you distinguish any other odors than those of the sewers? *A.* I smell the rendering of lard, and then there is another smell that we get at night which we don't get in riding through.

Q. Where do you get the smell of the rendering of lard? *A.* When I get along about Seventh Street and opposite Mr. Squire's works. We get it on Cambridge Street; but when we get down to about Seventh Street the rendering of lard is more perceptible. That smell I have never smelt at my house. The smell that is most offensive to me I get in the night, — the warm summer nights when the windows are open. Frequently it has awakened us at night, and the house would be filled with an offensive odor which cannot be described.

Q. (*by a member of the Board*). Do you speak of where you now live? *A.* Yes, sir. I never smelt it when I was living at East Cambridge. The flats were not then contaminated with this putrid blood which has settled over these flats, and the odor of it we did not get.

Q. (*Mr. by McIntire*). None of these establishments were there when you lived there? *A.* No, sir; they came afterward, or about the time I moved away.

Q. Can you describe the offensive odor you get at your house? *A.* No, sir; it cannot be described; it is indescribable. It is the most horrible smell that I ever smelt. I undertake to say it cannot be described. It is different from any smell that you get anywhere else.

Q. Well, would it be a fatty or greasy odor? *A.* Something of that kind, perhaps. I cannot describe it. I know that it has made us all sick in the night; my wife and I both. We keep our windows closed all we can.

The Chairman. Did you vomit? *A.* No, sir; I did not get it but four times last summer.

Dr. Derby. Is this peculiar smell which you get distinguishable from the smell of sewers and docks? *A.* O, yes; it was nothing of that kind. I am familiar with the smells of docks; living, as I do, at Long Wharf, I have an opportunity to know considerable about the sewer and dock smells.

Q. (*by Mr. Derby*). Is this distinct from the smell of the basins? *A.* I have visited these flats; being connected with the Union Glass Company in Somerville I have been there quite often. We own some of those flats, and the putrid blood is very perceptible when it has gone

down with the tide and been spread over the flats. But this smell we get at my house is altogether a different smell from that. I don't know that it was the right conclusion, but I thought it might be created when these houses let off the water. I know it was a distinct smell from any we get in riding through the village or in visiting the flats.

Mr. Frothingham. Do you ever get these smells from the flats or from the sewers at your house? *A.* I should not say we did. No, sir, nor the rendering of lard. We are some ways off. It is a horrible smell that we get in the night.

Q. (*by Mr. McIntire*). Can you tell us how far away you are from the establishment? *A.* I should say three quarters of a mile or more. I am on the corner of Maple Avenue and Cambridge Street.

Mr. McIntire. That is 4,800 feet in a direct line.

Mr. Newhall. Nearly a mile, then.

Cross-Examination.

Q. (*by Mr. Muzzey*). Upon all public questions as to the value of property or the effect of business on the value of real estate in any locality in Cambridge, would not you trust, sir, the judgment of such men as ex-Mayors Merrill and Houghton of Cambridge, Mayor Brastow of Somerville, and Mr. Chaffee of East Cambridge? *A.* They are sound men.

Q. They would be recognized anywhere, sir, as capable men, with as good judgment as anybody in the city? *A.* I should say they would.

Q. Are you aware, sir, that on the south side of Cambridge Street and near the car-stables of the Union Railway Company, within two years land sold or valued for thirty cents per foot in that locality has this past season sold for two dollars per foot, — that is, within two hundred feet of Mr Squire's works? *A.* I was not aware of that. I have got some land near Mr. Squire's works I have offered to sell for seventy-five cents per foot.

Q. You have held that how long? *A.* About twenty years.

Q. What would you have sold it for two or three years ago? What would it have commanded in the market? *A.* I think I asked about fifty cents per foot.

Q. Now you ask seventy-five cents? *A.* Yes. All lands have gone up. The land in my neighborhood has gone up from four cents to seventy-five cents per foot.

Q. Well, now, in point of fact, East Cambridge has been rendered less desirable year by year, has it not, as a place of residence, in consequence of the increased growth of manufacturing establishments? *A.* That is my judgment.

Q. You were led to desert it as a place of residence ten years ago on account of the encroachment of business on the territory? *A.* Somewhat because of that.

Q. Your friend, Mr. Lewis Hall, has moved away for the same reason? *A.* He went before I did.

Q. You sought the higher ground farther on, where you are located? *A.* Well, there is high ground in East Cambridge.

Q. Do you perceive a smell which resembles that which you get at night when you approach the basins of Miller's River? *A.* No, sir, never.

Q. It varies from that? *A.* Yes, sir.

Q. Have you ever been within Mr. Squire's establishment? *A.* No, sir.

Q. Have you ever found that smell near his establishment when you have been in its vicinity? *A.* I have smelt this rendering-of-lard smell.

Q. That I understand never reaches your house? *A.* No, sir.

Q. I speak of the smell you especially complain of. Do you ever get that there? *A.* No, sir, never. I never get that except at night.

Q. There are a number of grease-boiling places, such as Barry's and O'Neil's, are there not? *A.* I suppose there are, but I don't know. I merely ride through the place.

Q. You don't know the location of these establishments between your house and the bridge? *A.* No, sir, I do not.

Q. Well now, Mr. Dana, I do not understand you to charge these odors upon the Squire establishment. You have never visited it or traced them to it at all. *A.* I don't know where it came from.

Q. Let me ask your opinion upon this state of facts: Suppose in Mr. Squire's establishment all the water in the scalding-tanks to be purified, and the solid matter precipitated and carted away with the offal and blood in tight tanks, and the water only to be run into the sewer; and suppose the rendering of fresh lard, like the rendering of any impure matter, to be done in close tanks, and the gases to be conducted over the furnace fire and entirely consumed, so that they cannot reach the air; suppose the hog-pens to be disinfected, and the hogs to arrive in the cars in an inodorous condition, — take all these things into consideration, sir, and is it your opinion, as a citizen of Cambridge, that the public health, comfort, and convenience of the community require the removal and suppression of this establishment and this business? *A.* Well, I am not able to judge. I do know that if this smell is not removed, in my opinion it will depopulate that part of Cambridge. Everybody that can get away will, if this smell is not got away with.

Q. To what part of Cambridge do you refer? *A.* I mean to say all through up to Harvard Square. If this smell increases as it has for the last two years, it will depopulate that part of Cambridge. Everybody that can get out of it will do so.

Q. This night smell? *A.* Yes, sir.

Q. How long has that been perceptible? *A.* My folks have smelt it before, but I have not smelt it until these two years past; not this foul, indescribable smell that I speak of.

Q. How early this past summer did you begin to perceive that, sir? *A.* Well, I think the first time I smelt it was some time in July. I know it was after some of my folks went up to the mountains, and there was nobody at home but my wife and I. I know it was after the 4th of July. My daughter was not at home.

Q. Would you put it in the early part of July, or in the latter part? *A.* I should think it was in the latter.

Q. Do you remember any odors on the night of the 31st of July? *A.* I could not say anything about dates, because I did not make any minute of them.

The Chairman. Was there any one night when there was some excitement about it? *A.* I could not say. I don't go around a great deal in Cambridge. My business is in Boston, and I drive right through East Cambridge and go to the bank once a week.

Q. Do you remember any public meeting over the odors one night in July? *A.* I don't recollect that. I was at Jackson, in the White Mountains, at that time.

Q. Has there not been a constant increase of population in East Cambridge? *A.* O, yes.

Q. They are gaining every year there, and so in Somerville? *A.* Yes, sir.

Q. Well now, sir, take the class which makes up the increase of population in East Cambridge, is it not the laboring class? *A.* Yes, sir.

Testimony of George L. Mitchell.

Q. (*by Mr. McIntire*). What is your occupation? *A.* I am a horseshoer, at South Eden Street, Charlestown.

Q. Is your place of business near the mouth of the sewer at Canal Street? *A.* Yes, sir.

Q. I will ask you whether you are familiar with the smell that comes from that sewer and the flats around it? *A.* I don't know that I ever smelt anything of the sewer. I don't think I ever did.

Q. How far are you from it? *A.* I should say about sixty yards.

Q. You are at your place of business every day? *A.* Yes, sir.

Q. How long have you been there? *A.* Three years the 11th of October.

Q. Have you at that point distinguished any odors of any kind that were offensive to you? *A.* Yes, sir.

Q. Will you please describe these odors? *A.* Well, they are very sickening; you can only smell them when the wind is from the right direction.

Q. Which way? *A.* A southwest, I should say.

Q. Can you give any other description of the odors beside saying that they are sickening odors? *A.* Well, I don't know as I could.

Q. Is there any fatty or greasy smell to it? *A.* There is a sort of sickish sweet smell about it.

Q. Do you ever get the hog odor? *A.* Well, I don't know that I have, sir.

Q. Where do you live? *A.* At Charlestown Neck, No. 1 Seaver Street, corner of Dana Street.

Q. Do you get any odors there? *A.* We did last summer for the first time since I lived here. When I lived in Somerville I think it was a great deal worse than now.

Q. Was this odor that you describe now an odor from these basins, or a similar odor, or was it a different odor? *A.* It seemed to be different.

Cross-Examination.

Q. (*by Mr. Muzzey*). Are you one of the petitioners? *A.* No, sir.

Q. You say that this smell is a sickish smell? *A.* Yes, sir.

Q. Does it resemble the smell from the sugar refinery? *A.* No, sir.

Q. Have you been in the neighborhood of Miller's River basin? *A.* Yes, sir.

Q. Did you get a smell like that? *A.* Yes, sir.

Q. About the same that you smell in Charlestown when the wind is in a certain way? *A.* Yes, sir.

Q. How near do you live to the basin? *A.* Half a mile.

Q. How near did you live to it in Somerville?

Dr. Derby. I don't understand him to say that the smell that he described was the smell from the basin.

Q. (*by Mr. Muzzey*). I asked you if this sweet, sickish smell was the smell you found when going near the basin, and I understood you that you got a similar smell there? *A.* Well, I calculate that there is a difference between the ordinary smell and that which we get in East Cambridge.

Q. But when you get the smell from the basins near the slaughtering establishments, do you find it worse than at your house in Charlestown? *A.* Well, I think it is. It seems to be stronger. There have been nights that we could not sleep.

Q. Was it the same smell that you get near the basins, only stronger? *A.* I think it was.

Q. (*by Mr. McIntire*). I understood you to say that you were familiar with the smell from the basin, when you lived in Somerville; and I understood you to say that this smell which you complain of was not the smell which you get from the basin, but was distinct? *A.* That is what I meant.

Q. The idea was that the odor from the flats and sewer was different from that at East Cambridge? *A.* That is the idea.

Q. Do you mean that the smell you get at your shop is the smell you get from the basin? No, sir.

Q. (*by Mr. Muzzey*). Miller's River basin? *A.* That is the idea exactly.

Q. Do you mean to say that the smell of Miller's River basin is not different from all ordinary flats?

Mr. McIntire. No, sir; he says just right the other way.

Q. (*by Mr. Muzzey*). Let us see that I get it correctly. You got at your house last spring the same smell which comes from Miller's River when you are near by? *A.* Yes, sir.

Q. And that smell of the basin of Miller's River is the same smell that you get at docks in general? *A.* Yes, sir.

Q. (*by Mr. Frothingham*). You live, I understand, at Charlestown Neck? *A.* Yes, sir; on Sullivan Square.

Q. That is just outside of the peninsula? *A.* Yes, sir.

Q. You state that during the last summer you have had these offensive smells, nights, very severely? *A.* Yes, sir.

Q. And that these smells affect you and your family? *A.* Yes, sir.

Q. Are these smells so distinct as to be different from the smell, whatever it may be, that you get from the Miller's River basins? *A.* Well, I don't know as it is any different. It is the same thing, as nearly as I can tell about it.

Q. (*by a member of the Board*). How do you account for not getting it in the daytime? *A.* I don't know. I generally get it most, mornings, and in the daytime I don't get it so much. It is only when the wind is in a certain direction.

Q. (*by Mr. McIntire*). How long did you live in Somerville? *A.* Nearly two years.

Q. In what part? *A.* On New Pinckney Street, off of Cambridge Street.

Q. You were not very near the basins, then? *A.* Within half a mile, I should say.

Q. When you went in to your place of business, you went in through Charlestown? *A.* Yes, sir. Right down Canal Street, Charlestown.

Q. What you mean to say is, that you get the same smell in Charlestown that you got in Somerville, coming from the direction of these basins? *A.* Yes, sir; and the same we would get by going to East Cambridge.

Q. I don't understand you to say that you went, while living in Somerville, very near the basins? *A.* I did n't go through there more than once in two months.

Mr. McIntire. I have only two more witnesses, and before I put them on I want to read to the Board some extracts from the "Boston Medical and Surgical Journal," of June 12, 1873.

Mr. Derby. There is a gentleman here who has to perform an operation within half an hour whom we would like to put on the stand.

The Chairman. What testimony does he intend to bring forward?

Mr. Derby. It is for the purpose of answering, as far as we can, the testimony that was put in by Dr. Jeffries.

The Chairman. You may put him on.

Testimony of Dr. Robert Willard.

Q. (*by. Dr. Derby*). You are connected with the same establishment with which Dr. Jeffries is connected; that is, the Eye and Ear Infirmary? *A.* Yes, sir.

Q. Do you reside on Charles Street? *A.* Yes, sir; at the corner of Pinckney.

Q. Whether you have experienced during the past summer unpleasant smells during the night? *A.* I have very often.

Q. You have had occasion to notice the direction of the wind when you have experienced them? *A.* Very often.

Q. Have you found that the wind was uniformly in one direction, or was it variable? *A.* It varied.

Q. Have you experienced these smells with a southerly wind? *A.* Yes, sir; with a southerly, a southwesterly, a westerly, a northerly, and a northwesterly wind. Never from the east at any time.

Q. But from the west and north you have experienced them? *A.* Yes, sir.

Q. Have you experienced them from the north as often as from any other direction? *A.* Yes, sir.

Q. How many times during the summer? *A.* I should think fully forty times, if not more, taking the three months of June, July, and August, at night.

Q. Did you reside in the city during these three months? *A.* I did.

Q. Was the smell equally strong by day as by night? *A.* I have never noticed it as much during the daytime; perhaps my attention was called to other things. I have noticed it in the afternoon as strongly as in the evening.

Q. Have you noticed as strong a smell when the wind was from the south as when it was from the north and northwest? *A.* Yes, sir; I won't say from the south, but from the southwest. It was stronger from the southwest than from almost any other direction.

Dr. Derby. What was the character of these odors? *A.* I am unable to distinguish them, except to know that they are unpleasant drain and dock smells.

The Chairman. Have you ever smelt this dock smell described by some, which has a greasy, fatty odor? *A.* I have never been able to distinguish anything of that kind. I don't know of the rendering odor as such. But the odors during this summer were at times quite peculiar; they were nothing that I should be able to distinguish.

Q. Do you remember the direction of the wind when you perceived that peculiar odor? *A.* No, sir; I don't recollect.

Q. You did n't notice it? *A.* No, sir.

Q. (*by Mr. Derby*). Was there any particularly fatty smell? *A.* No, sir.

Q. But a general very offensive smell? *A.* Very offensive.

Cross-Examination.

Q. (*by Mr. McIntire*). Then, if I understand you, you have received offensive odors from these different points of the compass that you have testified to, and on occasions you have smelt quite peculiar odors when you did n't notice which way the wind was, but it was from some one of these points? *A.* It was a smell different from the ordinary drain and dock smell, but I don't know that I should have noticed it particularly.

Q. Your attention was called to it? *A.* Yes, sir.

Q. (*by Mr. Derby*). The prevailing winds were from the south, were they not? *A.* I have noticed the odor more when the wind was southwest, and between southwest and west.

Q. Those are the prevailing winds in the summer? *A.* Yes, sir.

PAPERS AND RECORDS READ AND SUBMITTED.

Mr. McIntire. This is a communication to the "Boston Medical and Surgical Journal," of June 12, 1873, by Henry O. Marcy, a physician in Cambridge, and relates to the hygienic condition, and the mortality of the citizens of Cambridge. I will simply read some extracts from it.

The Chairman. I would inquire whether we may not have the gentleman as a witness.

Mr. McIntire. We have summoned no witnesses.

Mr. Newhall. We have a right to summon witnesses.

Mr. McIntire. We have the right to summon, but I don't know that we have the right to force them to testify. He has not refused to testify. He has said that he would come, but his business has not allowed him thus far.

Mr. Derby. If it is put in, it seems to me we should have the privilege of looking at it.

Mr. McIntire. The principal things we wish to put in are certain mortality tables; I think the gentleman's reputation is such that it should not be objected to.

Mr. Muzzey. I have not any objection to that. I had the opportunity of cross-examining Dr. Marcy when he testified before, and these are substantially the same facts which he stated then. In his cross-examination he put in some other supplementary facts which are not here, but ought to accompany the article.

Dr. Derby. I think the objections may all be removed when it is stated that the facts which Dr. Marcy gives us were published in the Fourth Annual Report of the State Board of Health.

Mr. McIntire. I suppose, if it is right to put this in, they have the right to put in the supplementary facts.

The Chairman. I think that the evidence of Dr. Marcy is very important. That would be my view of it.

Mr. Derby. I don't object to that, sir. It is only to have it in a proper manner.

The Chairman. You may proceed to read.

Mr. McIntire then read as follows: —

"Last autumn, when the periodical excitement over the slaughtering establishment of John P. Squire and the Miller's River nuisance was at high tide, believing that the surroundings complained of, and the entire absence of sanitary care and precaution in whole neighboring districts must increase the mortality rates (although, as may seem strange, it was a question over which medical gentlemen practising in these localities had different opinions), Dr. A. L. Norris of East Cambridge, and myself, were induced to carefully examine the records, and the following table of facts was presented, which I have felt are of sufficient interest to our profession to offer them here to your notice.

"The basis of population is taken from the census of 1870, which (gives a uniform increase in population for five years) would afford a nearly mean average in numbers. They are as follows: —

	Population, 1870.	Deaths during five years.	Number of inhabitants to one death per annum.
Ward 1,	6,909	552	62.66
" 2,	10,386	1,267	41.
" 3,	9,178	1,134	40.45
" 4,	8,865	728	60.90
" 5,	4,311	376	56.
	39,652	4,057	48.80

"This is an annual mortality of between twenty and twenty-one to the thousand of the inhabitants, and differs only a slight fraction from the mortality rates of the county of Middlesex. Ward lines unfortunately prove arbitrary divisions, not best arranged for our purpose, but give us the only data of population. Ward Three comprises East Cambridge, and Ward Two includes the territory lying south and west to Main Street. Perhaps one half of Ward Two may be considered as

healthily located as any part of the city, while the hill-top of Ward Three, or East Cambridge, is dry, well drained, and, except in its surroundings, is unexceptional as regards position.

"These two wards contain 19,556 inhabitants, and suffered a loss from death during five years of 2,401. The remaining portion of the city contains a population of 20,085, and suffered a loss from death during the same period of 1,656, showing an excess of deaths, with one fortieth less population, of 145 ; an excess of over twenty per cent.

"Comparing Ward One, known as Harvard Square or Old Cambridge, with Ward Three, East Cambridge, the contrast will be seen to be still greater : —

"Number of inhabitants to one death per annum, 62.66, Ward 1.
" " " " " " " " 45.45, " 3.

An excess of over twenty-two per cent.

"A further analysis of the diseases producing death show the diseases to be such *à priori*, as would have been supposed prevalent in undrained localities with such surroundings.

"Whole number of deaths from cholera infantum for five years in the city, 463. In East Cambridge, comprising about twenty-two per cent of the population, 133, or thirty-five per cent of the whole number.

"Whole number scarlet fever, 187. In East Cambridge, 59, or thirty-three per cent. Typhoid fever, 172. In East Cambridge, 44, or twenty-five per cent. Diseases of the lungs, 940. In East Cambridge, 282, or thirty per cent.

"The district under observation is included between Sixth Street on the east and Windsor on the west; Miller's River on the north and Charles River on the south. In the absence of definite knowledge as to the number of inhabitants in this limit, by a careful comparison of the opinions of those best able to judge, the population was supposed to be about 3,000, probably a large estimate. A glance at the map will show this entire district to be flat, chiefly marsh originally, and doubtfully, in some instances, improved by occupation, with very imperfect or no drainage ; and in this are situated several immense slaughtering establishments, flanked by rendering, bone-boiling, and soap-making establishments, to say nothing of other occupations detrimental to the public health. It is doubtful if a worse condition of surroundings could have been found in the vicinity of Boston than along the Somerville line.

"It will be remembered that July and August of last year were very sickly months, and the whole number of deaths for this period in Cambridge was 291. The number in the above-described district was 55, or more than one sixth of the whole number, while this district probably contains less than one fifteenth of the population of the city. This frightful rate of mortality, continued throughout the year, would reduce the average duration of life within these limits to about *ten years*, while the death-rate, continued throughout the year in the remaining portion of the city, would give nearly *forty years*, or almost four times greater in one section than in the remaining portion of the city.

"They are no more difficult to believe than similar statistics carefully drawn by unprejudiced observers, from different sections of other cities. I remember a report made by Dr. Edward H. Clarke of Boston, some years since, comparing the so-called Broad-Street district, then reeking

with filth and crowded to excess, with the Beacon-Hill district; here the mortality rates were in the first six times the greater, and revealed the astonishing mortality of one death annually in every ten of its inhabitants. To show the ease with which those unfamiliar with statistics may be misled, or mislead others, I would here refer to the closing argument by Mr. H. W. Muzzey, attorney for the defendant, before the Mayor and Board of Aldermen, which was printed and widely circulated, where by a single reference to the Registration Reports of Massachusetts for 1848 and 1852, he shows that the average *age at death* in the town of Brighton is one in twenty-three years, and in Cambridge one in twenty-one years, and seeing no difference between the average age at death and of life, states the average of life to have been in Cambridge twenty-one years, and hence from my table there has been a most marked increase in the longevity of life here during the last twenty years."

Mr. Muzzey. I would remark as to the criticism upon myself as read here, that I still adhere to my statement. I am still unable to see any error. The average age at death and the average age of life must mean the same thing. I turn the tables around and use them in an opposite direction, and they mean the same thing. I wish, Mr. McIntire, to ask you to agree with me, as I have no doubt you will, in fairness, that in making such calculations as these the quality of the population of these two districts has a great deal to do with the death-rate. For instance, in Old Cambridge there are wealthier and more well-to-do people, and in East Cambridge the majority of the people are poorer, and are not so well able to take care of themselves. Also that Dr. Marcy admitted that fever poisons have no known odor.

Mr. Derby. Will Dr. Derby have the kindness to refer us to the report which gives the comparative deaths in the wards of the city of Boston. There is a ratio, I think, of two to one in some of them.

Dr. Derby. The second report of the State Board of Health, Analysis of Mortality of 1870?

Mr. Muzzey. I am familiar with it. It is in the report of 1871. The difference is very marked.

Mr. McIntire. In answer to my brother Muzzey, he asks nothing that we are not willing to concede.

Mr. McIntire then read further as follows: —

The following is from the records of the Mayor and Aldermen of the city of Cambridge under date of July 16, 1873: —

"*Ordered*, That this Board, as a Board of Health, petition the State Board of Health to abate the nuisances in the Third Ward and its vicinity, and that the City Solicitor be directed to appear and represent the city.

"Adopted by the following vote: Yeas, — Aldermen Brine, Collins, Davis, Harding, Kendall, Morse, Snow, and Thurston (8). Nay, — Alderman Woodbridge (1)."

The following is from said records, under date of July 23, 1873 : —

"A communication was received from the City Solicitor, with forms for complaint to the State Board of Health.

"Laid on the table for one week."

The following is a copy of the communication of the City Solicitor : —

"To the Honorable the Board of Health.

"Gentlemen, — Your order providing for an application to the State Board of Health to abate the nuisances in the Third Ward and its vicinity has been communicated to me.

"Of course specific and definite charges must be made against any nuisance before the State Board can act. The charges must, among other things, describe the premises where the alleged nuisance exists, and the names of the persons carrying on the offensive business. I have caused such charges to be drawn up against such establishments, as, judging more from the newspaper reports of the debate preceding the passage of the order, than from any official information communicated to me in the order itself, I supposed your Board intended to proceed against.

"That there may be no doubt of your intentions in any particular case, I have transmitted the charges to you for your signatures, or for such other action as the Board may see fit to take.

"Should my conjectures prove correct as to the particular establishments the Board desire to proceed against, I shall be most happy to do all in my power to prosecute the charges to a successful issue.

"Should there be others I have omitted, I should be glad to have them designated. I remain, very respectfully,

"J. W. Hammond, *City Solicitor.*"

The complaints above mentioned were substantially alike. The following is a copy of that against John P. Squire & Co. : —

"*Commonwealth of Massachusetts.*

"To the State Board of Health.

"Respectfully represent the Board of Health of the city of Cambridge in the county of Middlesex, that said city contains more than four thousand inhabitants, to wit, forty-five thousand inhabitants; that the following described lot of land with the buildings thereon, situated partly in said Cambridge and partly in Somerville in said county, and bounded northeasterly by Miller's River, easterly by land now or late of Stickney & Davis, southwesterly by Gore and Medford Streets, and westerly by the location of the Grand Junction Railroad, so called, is used for carrying on the business of slaughtering hogs, and for melting and rendering the carcasses of hogs and other animals, by John P. Squire of Arlington in said county, and Hiland Lockwood and W. Washington Kimball, both of Boston in the county of Suffolk, copartners under the style of John P. Squire & Co.; that the public health and public comfort and convenience require that the said Squire, Lockwood, and Kimball should desist and cease from further carrying on said business of slaughtering hogs as aforesaid, and the business of melting and rendering as aforesaid, on said described premises or any part thereof.

"Wherefore your petitioners respectfully pray that your honorable Board, acting under the powers conferred on your Board by Chapter 167 of the Statutes of the year 1871, as well as all other powers thereunto you enabling, shall order the said Squire, Lockwood, and Kimball, by themselves and by their servants and agents, to wholly desist from further carrying on the business of slaughtering hogs as aforesaid, and also the business of melting and rendering as aforesaid, on the above-described premises or any part thereof.

"CAMBRIDGE, July 23, 1873.

"The foregoing are true copies,
"Attest, "JUSTIN A. JACOBS, *City Clerk.*"

The following is from said records, under date of August 6, 1873 : —

"The communication of the City Solicitor and the complaints prepared by him were taken from the table. An order offered by Alderman Snow as a substitute was rejected by the following vote : Yeas, — Aldermen Brine, Sawin, and Snow (3). Nays, — Aldermen Collins, Davis, Harding, Kendall, Thurston, and Woodbridge (6). Certain amendments offered by Alderman Harding were rejected.

"The Board refused to adopt the complaint against Charles H. North & Co. by the following vote : Yeas, — Aldermen Brine and Snow (2). Nays, — Aldermen Collins, Davis, Harding, Kendall, Sawin, Thurston, and Woodbridge (7).

"The Board refused to adopt the complaint against Joseph Boynton by the following vote : Yeas, — Aldermen Brine and Snow (2). Nays, — Aldermen Collins, Davis, Harding, Kendall, Sawin, Thurston, and Woodbridge (7).

"The Board refused to adopt the complaint against North, Spaulding, & Co. by the following vote : Yeas, — none. Nays, — Aldermen Brine, Collins, Davis, Harding, Kendall, Sawin, Snow, Thurston, and Woodbridge (9).

"*The Board refused to adopt the complaint against John P. Squire & Co. by the following vote : Yea, — Alderman Brine* (1). *Nays, — Aldermen Collins, Davis, Harding, Kendall, Sawin, Snow, Thurston, and Woodbridge* (8)."

Mr. McIntire. I will read from the records of the city of Somerville, under date of August 25, 1873 : —

"CITY OF SOMERVILLE,
"IN BOARD OF MAYOR AND ALDERMEN, August 25, 1873.

"*Report of Committee on Health.*

"The Committee on Health ask leave to report that during the summer, thus far, the nuisance in and about Miller's River and its basins has seemed to be more offensive than during any previous summer.

"Complaints have been made by citizens living in that vicinity who are highly respected, in whose word entire confidence may with safety be placed, that on several occasions during the night-time an intolerable stench has invaded their houses, causing immediate sickness in their families.

"In view of these statements, which your committee regard as truthful, they recommend that the Board of Health of the city of Somerville immediately petition the State Board of Health to visit the establishments of John P. Squire & Co., Charles H. North & Co., the Boynton Packing Company, the packing-houses of Lincoln & Chamberlin, and the rendering establishment of Charles O'Neil; and that said State Board of Health will take such action as in the judgment of that honorable body will result in abating the nuisance caused by these slaughtering, packing, and rendering establishments.

"In Board of Mayor and Aldermen. August 25, 1873.

"Report accepted, recommendation adopted, and sent down for concurrence.

"CHARLES E. JOHNSON, *Clerk.*

"In Common Council. August 27, 1873.

"Concurred in.

"SOLOMON DAVIS, *Clerk.*

"A true copy of records.

"(Attest) CHARLES E. JOHNSON, *City Clerk.*"

Mr. Muzzey. You have not the answer of the State Board of Health to that communication? Was there any answer made?

Dr. Derby. Yes, sir.

Mr. McIntire. I put it in to show simply what the opinion of the Board of Health of Somerville was.

Mr. Muzzey. Will you let me suggest that they have taken no action on that?

Mr. McIntire. I won't say so. I will say that they did. They prevented additions to other establishments which proposed to add to their works. They desired the State Board of Health to do it.

Dr. Derby. We told them we would do it as soon as the complaint was made. The complaint is now made, and this is the thirteenth day we have been hearing the story.

Mr. Muzzey. They have made no official complaint. They left it to individuals.

Mr. McIntire. I will read a letter from W. H. Farrand, of Cleveland, Ohio.

Mr. Muzzey. That is too far away for us.

The Chairman. What is its object?

Mr. McIntire. I wish to show what they are doing there with regard to these establishments.

Mr. Derby. We might go all through the United States.

Mr. McIntire. I have several letters from Boards of Health, from Baltimore, Chicago, and New York; another from Dr. Chandler.

Mr. Muzzey. We would like to hear from Chicago; and anything from Dr. Chandler we would be glad to hear. We do not know anything about Cleveland.

The Chairman. How long will it take to read them all?

Mr. McIntire. About ten minutes.

The Chairman. The Board is ready to hear them all.

Mr. McIntire then read the following: —

City of Cleveland.

OFFICE OF THE BOARD OF HEALTH,
CLEVELAND, O., September 16, 1873.

MESSRS. KEMBLE AND HEARTNESS.

GENTLEMEN, — Enclosed please find an ordinance and resolution on slaughtering establishments. We find by enforcing these the nuisance arising from these establishments abated. We also have an inspector, whose business it is to look after and report all parties who do not comply with the ordinance. The sanitary police also have the slaughtering establishments in their respective wards under their notice.

In your letter you refer to the slaughtering establishment of H. M. Chapin, Sholer, & Co. While this building was abandoned during the summer of 1870, it took fire from sparks from engine on the A. & G. W. Railway, and the railroad company purchased the lease from the firm; and in this manner the city were relieved from a great nuisance.

In addition to the ordinance and resolution, the Board of Health compel the rendering-vats to be connected with the smoke-stacks; and they must rend (when in operation) every day, and not allow the use of same water twice in same vat, or twice for same purpose.

This is all I can find on our books relating to this subject.

I have the honor to be

Your most obedient,

WM. H. FARRAND, *Clerk of B. A.*

THE ORDINANCE.

An Ordinance to regulate Slaughtering and Packing-Houses and Candle Manufactories in the City of Cleveland.

SECTION 1. Be it ordained by the City Council of the city of Cleveland, that no person shall slaughter, dress, or pack any cattle, calves, sheep, or swine, or establish a manufactory for candles or soap within the limit of the city, without a license from the City Council.

SECTION 2. Any person desirous of obtaining a license shall apply in writing to the Council, stating the business he is desirous to pursue, and specifying the premises whereon the same is to be conducted. He shall give one week's notice in two daily papers of the city of his intention to apply for a license, specifying the business and locality. If such application shall be granted, it shall thereupon be the duty of the applicant to enter into a bond with one or more sureties to be approved by the Council, in the penal sum of not less than one hundred dollars nor more than five thousand dollars, conditioned that the said applicant will faithfully comply with all the requisitions of this ordinance, and for the penalties which may be incurred by him for any violation thereof; and upon execution of said bond, it shall be the duty of the Mayor and Clerk to issue a permit to the applicant, upon the payment by said applicant of two dollars therefor, which permit shall continue in force for the period of one

year from and after the date thereof; and the Clerk shall keep a register of all permits which may be issued.

Section 3. No person obtaining a license shall suffer any bones, offal, blood, liquor from steam-tubes, or other offensive matter, to fall or run upon the ground or place, or suffer to remain on his premises as aforesaid any bones, filth, offal, blood, or other offensive matter, for a longer period than twenty-four hours from the first day of May to the first day of November, nor more than forty-eight hours during any other part of the year; but he shall collect the same and so bury them or otherwise dispose of them as not to become a nuisance.

Section 4. Every person shall at all times keep his premises in a clean, healthy, and inoffensive condition; and no person shall steam or boil any animal substance when such steaming or boiling shall taint the air so as to render it offensive to the inhabitants of the city.

Section 5. Any person violating any provision of this ordinance shall, on conviction thereof, be fined in any sum not exceeding five hundred dollars, and the further sum of twenty-five dollars for each day such violation is continued.

Section 6. That an ordinance, entitled "An Ordinance to regulate Slaughter and Packing Houses and Soap and Candle Manufactories," passed January 10, 1853, be and the same is hereby repealed.

Seceion 7. This ordinance shall take effect and be in force from and after its passage.

Passed February 18, 1873.

Amos Townsend,
President of the Council.

Theo. Voges, *City Clerk.*

Health Department, 28 N. Holliday Street,
Baltimore, November 20, 1873.

A. Winthrop Hastings, Esq.

Dear Sir, — Yours of 18th was received to-day. In reply to your inquiries, I am sorry to say our city is still suffering from the nuisance of slaughtering establishments within the city limits, and, notwithstanding the strictest watchfulness and order on the part of the police and Health Department, prove constantly a serious punishment and detriment to the neighborhoods in which they exist.

The complaints have been constant, and efforts are being made (and have been made for the past five years) to remove all slaughtering establishments beyond the city limits, and to concentrate them, as in Paris, France, and in Chicago, at one point. No patent machinery, or machinery of any kind, is in use in our city. I have had an account of the admirable means made use of by a company in Chicago, by which the blood and offal of the Abattoir are not only disposed of without offence, but utilized to a profit.

I regard the removal of all such establishments to a locality where the offence to the inhabitants can be reduced to the minimum of vital importance in a sanitary point of view, and think it the duty of all Health Boards everywhere to co-operate through the public press, and upon every fitting occasion to urge and insist upon this change.

Hoping this may be satisfactory, I remain yours truly,

James A. Stewart, M. D.,
Commissioner of Health.

This note explains the letter which follows : —

Chicago, December 9, 1873.

Mr. A. Winthrop Hastings, Boston.

Dear Sir, — Your letter of last month was duly received. Not hearing from the Board of Health in answer to your inquiries, I called on Dr. Reid. He said that press of business prevented their attention to your letter ; that the subject was intricate and required much explanation to cover the inquiries, but that he would state some facts in a letter, which letter I enclose. The stock-yard, slaughtering and rendering establishments, are about four and a half miles from the centre of the city, and are a source of complaint to citizens in the south part of the city, but the removal and sanitary measures taken have diminished the nuisance.

Yours truly, Gilbert Hubbard.

Board of Health Office, Chicago, Dec., 1873.

A. Winthnop Hastings, Esq.

Dear Sir,— Your letter of inquiry to Mr. Hubbard of the 18th ult., in reference to slaughtering-houses and the nuisances resulting therefrom, has been handed to me for reply. The subject is an extensive one on which much might be said ; but I will endeavor briefly to answer your principal points.

There are a number of such establishments in this city, and all have been occasionally a source of nuisance and offence. We have had great difficulty in making them conform to statutory laws. Now they give us comparatively little trouble, but we keep them under constant surveillance. Their offal was formerly deposited and buried in vacant fields and lots, which caused grievous offence ; but now this material is delivered to certain manufacturing establishments, which convert it into fertilizers. This process is mostly conducted outside the city, and in some instances is attended with but little offence, considering the nature of the material.

The rendering, as formerly conducted, was the source of much complaint, but, by the adoption of improved processes, has rendered it possible to carry on this business without tainting the air of the neighborhood. To do so, however, requires care, vigilance, and, on our part, constant surveillance.

The situation of the stock-yards renders them occasionally a source of nuisance, which is likely to be more severely felt as the city extends in that direction, more particularly from the defective drainage. This, perhaps, may be overcome, and various plans have been discussed to remedy this defect.

For all establishments of the kind mentioned a remote situation is desirable. There must be good drainage, prompt removal of offal, the most improved plan of rendering, and constant surveillance to prevent their becoming intolerable nuisances.

Respectfully yours,

John Reid, M. D., *Health Office.*

P. S. — The press of business prevented an earlier reply to your letter to ourselves, which we hope you will excuse.

J. R.

Copy of a Letter of Dr. Chandler to the Boston Daily Advertiser of September 1, 1873, *entitled* "MILLER'S RIVER. ONE WORD MORE."

TO THE EDITORS OF THE BOSTON DAILY ADVERTISER.

I notice an article with the above heading in your issue for Aug. 21st, the final paragraph of which speaks of the New York Rendering Company as being in successful operation, with certain apparatus described in the article, in rendering offal and dead animals, at the foot of Thirty-eighth Street, New York City. As the statement in this paragraph is entirely incorrect, I would say that the New York Rendering Company did not succeed in rendering their refuse matter without producing a nuisance. On the contrary, the nuisance was so unendurable that the Board of Health has declared their contract invalid, owing to their shortcomings, and has engaged another party to carry all the offal and dead animals to Barren Island, daily.

Very respectfully yours,

C. F. CHANDLER, PH. D.,
President of the Health Department of the city of New York.

HEALTH DEPARTMENT, NEW YORK, Aug. 28, 1873.

HEALTH DEPARTMENT,
No. 301 MOTT STREET, NEW YORK, Dec. 16, 1873.

A. WINTHROP HASTINGS, ESQ.

MY DEAR SIR, — The New York Rendering Company did not render any offal or dead animals last summer after their vessels were towed by the officers of the Health Department to the Jersey shore; nor did their vessels come to the city at all. The disposal of offal and dead animals was placed in the hands of another party, where it still remains, by whom all such matters are carried to Barren Island, about seventeen miles from the city, and there rendered. We have recently granted permission to this New York Rendering Company to render fresh fat, nothing further. We did not and should not permit them to render offal or dead animals anywhere in the waters of New York. Our jurisdiction extends to the Jersey shore, and when the New York Fertilizing Company persisted in drying blood and scrap on the hulk Algonquin, on the Jersey shore, opposite New York, we employed a steam-tug and towed the vessel beyond the city limits to Barren Island. I send you a marked copy of the *City Record*, the official journal of the city, which contains a report on this subject.

Very truly, etc.,

C. F. CHANDLER,
President of the Health Department.

TESTIMONY OF A. WINTHROP HASTINGS.

Q. (*by Mr. McIntire*). Your name? *A.* A. Winthrop Hastings.

Q. I will ask you if you reside in the Third Ward of Cambridge? *A.* I do sir, at the corner of Otis and Fourth Streets.

Q. How long have you lived there? *A.* For thirty-eight years.

Q. Were you born there? *A.* No, sir, I was born in East Cambridge, but not there.

The Chairman. How far are you from the Court House? *A.* About three hundred feet north.

Q. And how far from Mr. Squire's? *A.* From twelve hundred to sixteen hundred feet.

Q. (*by Mr. McIntire*). I will ask you whether since this hearing commenced you have examined the buildings in this locality to see whether there has been any discoloration on Charles, Vine, and Spring Streets, and the buildings near Craigie's Bridge, and the buildings on the Grand Junction Railroad from Cambridge Street and the Squire establishment? *A.* I have, sir, all around there.

Q. Between Broad Canal and Charlestown, whether there are any buildings? *A.* No, there are none. There are some on Vine Street.

Q. Whether along Charles Street there are any buildings painted with lead paint? *A.* With various colors; white and other colors.

Q. I will ask you whether on the front of the buildings, facing the south, or which face Broad Canal, there is any discoloration? *A.* No, sir, none.

The Chairman. How far away, sir? *A.* I don't know how many hundred feet away. Perhaps sixteen hundred.

Mr. McIntire. Twelve hundred.

Q. (*by Mr. McIntire*). You say there is no discoloration of the buildings on Charles Street? *A.* No, sir.

Q. Are there any discolorations of the buildings on Vine Street which is the next street above? *A.* No, sir.

Q. None on the sides facing Broad Canal? *A.* No, sir.

Q. On Spring Street? *A.* No, sir.

Q. On Thorndike Street? *A.* No, sir.

Q. I will ask you whether on Thorndike Street, on the buildings facing north towards the establishment of Mr. Squire, there are any discolorations? *A.* There are a few, but not so many as on the streets above.

Q. Well, on Thorndike Street are the buildings facing the south toward Broad Canal discolored? *A.* There is no discoloration there. One of the buildings on Thorndike Street faces the southeast, and you find little places where the current has drawn over them and discolored them a very little.

Q. Most of them are on the south side? *A.* Yes, sir.

Q. On Otis Street? *A.* The buildings facing the south are mostly discolored.

Q. On the southerly side of the street and on the northerly side of the buildings? *A.* There are some buildings on Otis Street that are discolored on the northerly side, but those are discolored by the current striking higher buildings opposite.

Q. I will ask you whether you examined any of those cross-streets, such as Fourth, Fifth, or Sixth? *A.* I did.

Q. Whether you found any discolorations there? *A.* Only on the sides towards the northwest.

Q. Now, you say you noticed some discolorations on Spring, Thorndike, and Otis Streets, and the principal discolorations were on the buildings which faced the north. I will ask you whether there is any increase of discoloration as you approach Mr. Squire's establishment? *A.* Yes, sir, there is a great increase.

Q. Where on Cambridge Street is the most intense discoloration? *A.* The building mostly discolored was on the corner of Cambridge and Sixth Street. There are some buildings farther up Cambridge Street, toward the Grand Junction Railroad, almost in a line opposite Mr.

Squire's, I mean between the Grand Junction and Sixth Street, that are very badly discolored. There is one house on the extension of Seventh Street, right near the gasometer, that is fearfully colored. They have lately taken down the fence so as to get at a new block of buildings erected by Mr. Ellis.

Q. Have you examined the buildings along on Gore Street? *A.* Yes, sir. They are very badly discolored as you go near Mr. Squire's factory.

Cross-Examination.

Q. (*by Mr. Derby*). Above or below, sir? *A.* Below Sixth Street, toward Boston. I call it below, running down toward the river.

Q. Whether you examined the buildings on Fifth Street from Cambridge to Gore? On Winter Street whether you noticed any discolorations? *A.* Yes, sir, there are discolorations all along there, more or less, as it happened to be favorably or unfavorably situated.

Q. Now, we will take Bridge Street from Craigie's Bridge. Whether you noticed the buildings up as far as its junction with Cambridge Street? *A.* There is no discoloration except on the fence, and a slight portion of the building that sits on the wayside right near the bridge, and that comes from the sewer that empties there. As the buildings extend, the discoloration ceases.

Q. Where is the most intense discoloration? *A.* Right where the boards were taken out. The sewer discharges under the bridge: the nearer you get to it the blacker it is.

Q. But you say that above that there is no discoloration? *A.* None very near on the top of the buildings facing the Boston side. The fence and buildings are painted alike. There are no discolorations on the tops of the buildings. Naturally there are some near the water's edge.

Q. Whether you went down the Grand Junction Railroad from Cambridge Street down to Gore, to notice that building which has been photographed? *A.* I did, sir.

Q. That building sits right over the mouth of the sewer which comes down Jefferson Street? *A.* Right at the foot of Jefferson Street, almost over the mouth of the sewer at the end of a little creek that used to come up in there from the Squire drain.

Q. Can you tell us where the mouth of that sewer is? *A.* It enters right at the corner of Mr. Squire's building, as I understand it.

Q. Do you know whether it is where that sewer of his enters the basin? *A.* I don't know whether he owns that drain or not. There is a sluiceway that comes out into what we call the North Basin.

Q. Well, sir, did you notice the sides of the buildings which are toward Mr. Squire's factory, and the rest of the buildings, from that one which we have had photographed down beyond the factory, whether there has been any discoloration? *A.* Yes, sir. There is discoloration on Warren Street, that runs through just above the Grand Junction. There are a great many houses discolored that face Mr. Squire's factory. There is one near the corner of Warren and Medford Streets, the porch of which is very much discolored.

Dr. Derby. But the main front is on Gore Street.

Q. (*by Mr. Muzzey*). They face the basin as well as Mr. Squire's? *A.* Certainly; and Mr. Squire's building intervenes between the houses and the basin.

Q. (*by Mr. McIntire*). I will ask you if the foulest basins are not up there? *A.* That is what has been termed the foulest basin.

Q. Well, on the side toward Mr. Squire's there are the most discolorations? *A.* Yes, sir.

Mr. Derby. That is above the junction of East Street? *A.* Yes, sir.

Q. With regard to these buildings through from Gore Street to where the establishment is on the railroad, to that building which we have photographed, whether there is any discoloration on the side toward Mr. Squire's? *A.* Well, sir, there are a few of them that are not painted. Of course you cannot discolor shingles.

Q. Have you visited this locality where this county sewer comes in, down at the foot of Thorndike Street or near there? Have you noticed any discolorations there? *A.* There is one house that has lately been put up there that has only been painted recently, that is nearest the sewer; it is Mr. Sculley's building, I think. There is a building pretty near there that has been there for several years that is not discolored at all. I went down to the mouth of the sewer and found it pretty nearly filled with dirt at the mouth where the sewage flowed out.

Q. Have you been to Charlestown and examined the houses on Canal Street near the mouth of the sewer? *A.* I have sir, a great many times.

Q. Did you notice any discolorations there? *A.* There are none along there except upon the window-sills and outside trimmings. Of course that shows what it is. But these are very few.

Q. Have you noticed the buildings near the Cambridge end of Prison Point Bridge? *A.* Yes, sir.

Q. Have you seen any discolorations there? *A.* None at all, sir. There are very few there, except the lumber-sheds.

Q. It has been testified here by Mr. Chaffee that he, with yourself and Mr. Sortwell, when going to the establishment of Mr. Squire, received a smell at the corner of Cambridge and Fourth Streets. Will you state when that was? *A.* It was, I think, along in September of this year. I won't pretend to say whether it was September or October. There had been a great deal of talk in regard to it, and when I met them in the street I said, "You smell the odor, why won't you go with me and trace it?" They told me they did n't smell anything but the doughnut smell, and I said, "Very well, let us go and trace the doughnut smell." We went up Cambridge Street, and turned down Sixth Street. They could not smell anything until they got to Sixth Street, and then they began to smell the doughnut smell, as they called it, and they finally traced it to Mr. Squire's factory. When we got right opposite the rendering kettles, they said that was quite a healthy smell; they liked doughnuts themselves. I remarked that it was a good hearth-smell in the proper place.

Q. Who was with you? *A.* Mr. Chaffee and Mr. Sortwell. They wanted to go out by Mr. North's, and we went to see the filling, and the cars coming down from Prospect Hill. It was a bright moonlight night. They were then bringing the dirt down and filling in just beyond Mr. North's cooper-shop. After that we came back to the Fitchburg Railroad and passed down the railroad to the Milk Street crossing, to the sluiceway where the gates are placed, and the odor from the basin right on the corner was very strong, the wind being northwest. Mr. Chaffee

exclaimed, with a great many expletives, that it was pretty bad. I admitted it myself. He said it was all dock smell, the same that you get down on Commercial Street. I said it was not. I considered it the rendering smell.

Q. That was sweet lard that you smelt then? *A.* I suppose there was good lard with it.

Q. Then you came to the dock smell which he said was very strong? *A.* Yes, sir.

Q. Did he say that it was stronger than the Boston dock smell? *A.* I did n't ask him that.

Q. I understood you to say that it was? *A.* I think it is, decidedly, sir. The smell of all these basins is entirely different from any dock smell you can find anywhere. I think there is as much difference between the smell of a rose and the smell of a pink, as between Miller's River basin and the smell of an ordinary dock.

Q. You distinguish it? *A.* Certainly. I think there is no man that cannot plainly distinguish them. Perhaps they cannot tell what they really are.

Q. There have been several witnesses who have testified that they have not perceived this rendering odor, except the fresh-lard odor, and that not outside of the establishment. Will you tell us whether you have distinguished any distinct odor, or whether there is any such odor? *A.* I have had a great deal of conversation with a great many people with regard to it. They have told me that it was very easy to distinguish it, and I have distinguished it myself. There are the lard smell, the tank smell, the dock smell, the live-hog smell, and the scalding-tank smell. I call them five distinct smells. They are entirely different.

Q. Which of these is the worst? *A.* I think the grand combination is worst.

Q. Does that affect the people? *A.* It nauseates them, and gives them cholera-morbus.

Q. Which of these do you distinguish at your house? *A.* All of them.

Q. Well, has the hog smell and the rendering smell affected you at all? *A.* Yes, sir. The hog smell is only disagreeable, sir. I don't think that in itself is nauseating. The noise of the hogs in summer has very often awakened me when my windows have been open. I mean the noise of their squealing. Of course I don't mean to say that only Mr. Squire's hogs squeal, because I think his hogs are as peaceable as the hogs at the other establishments.

Q. On the night of the 31st of July, did you notice the direction of the wind? *A.* Well, sir, the direction of the wind on the 31st of July was at various points. There was very little of it.

Mr. Derby. Are you speaking of the night, sir? *A.* Of the day and night of the 30th and the 31st of July. They were both sultry nights with a kind of a muggy atmosphere. I remember particularly the night of the 30th, because I had a gentleman out to tea with me and he rode up around the celebrated perfume-manufactories and he was very much incensed at me because I took him there, and wanted me to drive out of it so that he could save his supper. So I drove him over Prospect Street, and then into Boston, where I left him. When I got home the wind was southwest, and about bedtime it was southwest.

Q. That was the 30th? *A.* Yes, sir. I remember that distinctly, because on the night of the 30th, — I wish to state this because I want to state more particularly with regard to the 31st, — on the night of the 30th my little girl was sick, and kept us both up all night, and I had to go all over the house and close the windows. When I went down stairs into the entry it had settled there and almost made me vomit. Being kept awake that night of the 30th, I went to bed the night of the 31st; I almost fell asleep at my office; I was so tired that I went home early, and went to bed at half past ten o'clock. I said to my wife we had better close the windows, and she urged me to leave them open; but I told her we should feel the effects of the odor. Unfortunately I did n't wake up that night to smell any of the odors that were flying around. It affected me and gave me cholera-morbus for ten days afterward. I was taken with vomiting on Saturday, and was sick Saturday, Sunday, and Monday. I got up then and went down to this indignation-meeting.

Q. (*by Mr. Derby*). Saturday was what day of the month? *A.* The first day of August, I think. No; Friday was the first day of August. I was taken sick, sir, on Friday morning, with vomiting, and then I had cholera-morbus. It poisoned my whole system. I did n't get over it for a month; in fact I don't know that I have got over it now.

Q. Whether you have resided in the city of Cleveland? *A.* I have, sir, and have been a manufacturer of flour there.

Q. Have you been there since? *A.* Yes, a number of times.

Q. How recently? *A.* I have forgotten: about a year ago. I did n't make any lengthy stop there at that time.

Q. Well, are you familiar with the slaughtering establishments in that city? *A.* I am, sir.

Q. And the effect upon the population? *A.* Yes, sir. That was why I wrote to Cleveland, to know if they had got rid of the hog odor. It was very offensive when I was there, — Mr. McNeil's and Mr. Chaffee's. Mr. Chaffee is a brother of the Mr. Chaffee who is a member of the Boynton Packing Company.

Q. Well, what has been the effect of the smells, if any, from these establishments? *A.* They have been very offensive to the people. Mr. Chaffee has been in a great many public offices there, and has been a public-spirited and very nice man, and has done a great deal for the advancement of the city, and I think that is the reason why they have not —

Q. Have you visited the establishments at Chicago? *A.* I never have been inside the establishments. I have been by them.

Q. Do you know whether they are troubled with them? *A.* I know a great many are troubled with them. There was a gentleman here the other day who said he had suffered from them for five years, every time that he went into his house.

Q. Have you visited the establishments at Baltimore? *A.* Never, sir.

Q. Do you know anything about them? *A.* I know what Baltimore gentlemen have said, and I have received a letter from them which you have heard read.

Q. Have you visited New York? *A.* In New York I have visited the establishments. The same train that carried Mr. Rapp took me. I saw him on the train. That was a week ago Friday.

Q. Will you state what you saw there? *A.* I visited Mr. Chandler there, and he very kindly accorded me an attendant, and we took a carriage and visited the various establishments on North River, the docks, the hog-slaughtering establishments, and the tallow-rendering establishments, and the boat which Mr. Rapp testified was run upon the Jersey shore.

Q. What is the nature of the buildings in the rear of these hog-slaughtering establishments? *A.* They are most of them low buildings, occupied for different purposes. There was one particular block of buildings that used to be abattoirs. These have been driven away, and the buildings are now occupied by carpenters' and coopers' shops.

Q. Are they inhabited dwellings? *A.* No, sir; most of them are of the lower class of people. As you go into the avenues, of course, where the buildings are better, there is a better class of people.

Dr. Derby. Which side of New York are you describing? *A.* The northerly side, along by Thirty-eighth, Thirty-ninth, and Fortieth Streets.

Q. (*by Mr. McIntire*). Did you get from any of the citizens or Board of Health any idea whether these hog-slaughtering establishments do now create any nuisance?

Mr. Muzzey. There must be some limit to this.

Mr. McIntire. I did not object to anything Mr. Rapp said. He told what he said, what he saw, and what was said to him. I suppose that as you allowed Mr. Rapp to go on, you will let this witness say what he experienced, and what he saw and heard.

Mr. Derby. If we have made a mistake, I don't know why you should.

Q. You may state what you found there. *A.* I perceived the same odors at the Thirty-eighth Street docks that we have in Cambridge. They call them the "offal docks." I called them the "awful docks." We went then into Mr. W. H. McNeil's place, which is a tallow-rendering establishment.

Q. Were you accompanied by this gentleman, of the Board of Health? *A.* Yes, sir; it was a private assistant of Professor Chandler.

Q. Will you go on and state what you saw? *A.* We examined at Mr. McNeil's the famous Turner machine, or one similar to it.

The Chairman. I don't know that it is worth while to go into that.

A. I was going to say that I noticed some odors there. I was not going to describe the machine. I noticed the same odors there, and Mr. Chandler told me they were very filthy there indeed, and that they had decided to put all the slaughtering establishments under one roof.

Q. You say you noticed similar odors to those that you noticed at Cambridge? *A.* Yes, sir.

Q. (*by Mr. Derby*). This was a tallow place? *A.* Yes, sir; tallow and hogs.

Q. (*by a member of the Board*). They kill hogs there? *A.* They were not killing any then, but I believe they had killed some. I did n't see any killed there; they were not working in any of the establishments.

Q. Mr. Rapp testified to that, sir. *A.* They were not working Saturday at all.

Q. So far as I understand you, Mr. McNeil's was a tallow-establishment?

Mr. McIntire. He says they render tallow and hogs. *Q.* What do you understand they render? *A.* I understand they render lard and tallow.

Q. You don't know whether they slaughter hogs or not? *A.* I was told that they did, but I don't know how true it is.

Q. (*by Mr. Derby*). Did you see whether the tallow in the front part of the building was offensive? *A.* It was putrid and very offensive.

Q. Did you see any lard? *A.* I did n't see any lard. I would like to state that Dr. Chandler told me they were endeavoring to do all they could to locate these slaughtering establishments in one great abattoir; to put all that slaughtering and rendering of cattle, sheep, and hogs under one roof, where they would be provided with all the modern improvements, water-tight floors, etc., and so that they can be accommodated with railroad and dock connections, so as not to drive the animals any long distance. They must all be provided with every convenience within the building for their offal and blood, so as not to carry anything away through the streets, and so that nothing but the inoffensive product should be taken away. With a view to this action, an association of butchers has purchased the land at the foot of Sixty-third Street, under the "Bluffs," on North River.

Q. What association, sir? *A.* I understood it was the Butchers' Association.

Q. They propose to build an abattoir, and all concentrate about that point? *A.* Yes, sir.

Q. (*by Mr. Muzzey*). That is for cattle and sheep? *A.* For cattle, sheep, and hogs.

Mr. Muzzey. I understand that that is not the fact.

Dr. Derby. I understand it to be the fact.

Mr. Hastings. I took that from Mr. Chandler's own lips.

Q. (*by Mr. McIntire*). There has been some testimony in regard to the smell of the basins and river, and the Thames River. Whether you have been upon the Thames, and whether you smelt it from its banks? *A.* I have never smelt it from its banks, and I have lived right beside it.

The Chairman. We all admit that it was a pretty badly smelling place at one time.

Mr. Hastings. Whenever we went up in the summer, there was a terrible stench. Every turn of the paddle-wheels stirred up the stench.

Q. Was it so that you could distinguish it far from the banks of the river? *A.* No, sir; only as we were sailing up and down the river. But that was in 1867, and my second visit was in 1871.

Q. That was before the improvements were made? *A.* No, sir; it was before they were finished.

The Chairman. You want merely to testify that you smelt it then, and now much lessened?

Mr. McIntire. No, sir; we wish to show that along on the river he smelt it, but that on the banks he did not smell it. They have brought

in evidence to show that the Thames River is foul, and that there is a great complaint about that. We undertake to say that the Thames River, which takes all the sewage of the city, gives forth bad odors to those who navigate it, but not to be distinguished a great way off. The mud is left bare, so that the boys play in it.

Mr. Newhall. To what extent? *A.* (*by Mr. Hastings*). Up and down the banks of the river.

Q. What width? *A.* It depends on the part of the river, whether up above the city or below it.

Q. What is the average? From what figure to what figure? *A.* I should say from several feet down to a foot, as you go up the river where the tide flows out. When you go down below there is not so much uncovered. I could not say the exact amount. I have never measured it, but I know that it was a matter of general remark that the boys could go down there and play in the filth, and not be affected by it.

Q. (*by Mr. Derby*). That is now covered, is it not, sir? *A.* I have n't been there since 1869 and 1870.

Q. How long were you there? *A.* For several months each year. I went there early in 1869, in May, I think, and came away late in 1870.

Mr. McIntire. Unless you have something that you want to add, I don't know as I wish to ask any more questions. You don't know which way the wind was on the night of the 31st? *A.* I have a copy of a letter from a gentleman who for the last few years has kept a record of the wind for his own amusement, Mr. Robert Treat Paine. I don't care to put in the whole letter. We took the direction of the wind from the Observatory, but I think they took no record after sundown. I went to the signal-station on Hanover Street, and they gave me a copy of all that they had taken. I also went to the Observatory at Harvard. Their self-registering machine there is entirely out of order, and they have no account of the wind after about twenty-five minutes past eleven.

Q. You say the self-registering machine at the Observatory was out of order at that time? *A.* I don't think it has been put in order since.

Q. (*by Mr. Muzzey*). At what time was it out of order? *A.* The 30th and 31st of July, and the early part of August.

Mr. Muzzey. But there is a stated record kept at the Observatory.

The Chairman. That record of the Observatory gave no account in regard to the time, and was therefore of no use whatever.

Mr. McIntire. We only wish to show that there was a shifting wind all that day. He makes it southeast, and not northerly, at about eight o'clock on the morning of the 31st.

Mr. Hastings. I was very much surprised at the incomplete accounts kept of the wind. They almost all terminate by night, or just after midnight, and the balance of the night nothing was kept, at the signal-station on Hanover Street, or anywhere else. I think the whole might go in. It is a fair record. I would like to state one fact which Mr. McDaniel stated in his visit to my house the other evening, which I did n't calculate to mention here; but so long as he named it, I think it is

nothing more than fair that I should speak in regard to these perfumes coming into various windows. I called his attention to the fact of his saying that the odors come in at his south window. I made the remark to him. "If you will stand here by this window you will notice the odor," — I then opened the top of the south window, that is, the window facing the south in my sitting-room, — "and you will perceive the odor of rendering now coming in at the window." He stood up there, and made the remark that he could not smell anything because he had the catarrh. After a few minutes, he said he smelt it on the piazza, at the end facing toward the north. He then smelt the rendering smell of lard. My mother occupies the room right over it, and on the night of the 31st, she thought she could keep the windows open; but the odors came in so strongly that she had to get up and shut them.

Q. That was the rendering smell? *A.* All of them. It made her almost sick. My sister had the cholera-morbus by means of it.

Dr. Derby. Let Mr. McIntire read the letter concerning the 31st of July.

Mr. McIntire. During the afternoon the winds prevailed from a northerly direction, and from two to three in the afternoon they were northeast, and in the evening he says they were east.

Dr. Derby. Some witnesses say they saw the weather-vane pointing toward the southwest. Others said there was hardly any wind at all.

Mr. Derby. The man at Mr. Squire's establishment testifies distinctly as to the course of the wind all that night. We are perfectly willing to have anything put in as to the course of the wind on that occasion. It only confirms our statement.

Mr. McIntire. We say that early in the morning of August 1, the wind went around to the south and the southwest.

Cross-Examination.

Q. (*by Mr. Derby*). I will ask you first with regard to Broad Canal, whether there are any houses near that canal? *A.* Yes, sir.

Q. How near? Are there any within 100 or 150 feet? *A.* Yes, sir.

Q. How many, and what houses are there? *A.* Some of them are drab, and some white. None of them are discolored. I went there yesterday afternoon.

Q. Do you know whether they are painted with zinc or lead? *A.* I did n't examine them at all.

Q. You found no discolorations near the canal? *A.* No, sir.

Q. How many houses did you examine, sir? *A.* I drove along up the street as far as it goes.

Q. Did you see the front facing Broad Canal? *A.* Yes, sir; and the rear of the buildings.

Q. How did you get in the rear? *A.* There is a street part of the way, sir.

Q. Did you go behind those houses, sir, between the street at the foot of the canal? *A.* I did n't go out behind those buildings,

because part of them were never painted. Part were painted and part not.

Q. Well, is there a road behind them, sir? *A.* No, sir; there is no road except on the East Cambridge side, and that, I believe, is called Potter Street.

Q. With regard to the discolorations upon the buildings near the basins of Miller's River, let me ask you whether there are not discolorations particularly perceptible at the openings of the streets, opposite the openings. Take, for instance, those on Gore Street opposite Third, Fourth, Fifth, and Sixth Streets? *A.* I don't notice any particular difference.

Q. Well, have not you noticed in approaching the basin more discoloration than before you went there? *A.* That is what I say, when you go near Mr. Squire's.

Q. I am not asking you about Mr. Squire. I will say that Mr. Squire's establishment being opposite Seventh and Eighth Streets, whether you have not noticed on the houses from Sixth to Fourth Streets, that the discolorations are particularly perceptible? *A.* No, sir. I have n't noticed any difference.

Q. Let me ask you this question, Whether you do not believe that the gases which come from these basins affect the paint upon the houses? *A.* I think, sir, that the gases which come from these basins affect the paint on the houses immediately over the basins. I don't think, sir, that the gases that come from the basins affect the houses that are away from the basins. I don't think the gases of the basins affect the houses on Cambridge Street, to any great extent.

Q. Well, those right along there, I would ask you whether any of those houses are injured by the basins? *A.* I could not say they were not.

Q. Do not you know they are? *A.* I should not be surprised.

Q. Do not you think so? *A.* I think those buildings nearest the basin would naturally be discolored a little by the gases of the basin.

Q. Do not you think they would be a great deal? *A.* No, sir, not so far off.

Q. I speak of those on Gore Street, — take the opposite side from the basin, between Sixth and Fourth Streets, — are there any houses that are discolored by the basin? *A.* I will say this, that the houses on the other side of the basin are situated so far from the factory that they receive the effects of the basin in full force, and I should say we might expect to get there the heaviest discolorations.

Q. I did not ask you that; I inquired whether the gases of the basin have affected the houses on the northerly side of the basin near Third, Fourth, and Fifth Streets. *A.* On what street?

Q. On the street nearest the water. *A.* I should think they had.

Mr. Derby. That answers my question.

Q. Is it a fact or not that those white painted buildings opposite Mr. Squire's establishment are not affected by the discolorations? *A.* No, sir, it is not a fact. There is one white house there that has been recently painted, that I should say had been colored by some discoloration. It was painted this summer.

Q. Take those that have not been painted. *A.* There is not one that has not been recently painted that is not somewhat discolored.

Q. Very slightly, are they not? *A.* Yes, sir.

Q. Much less so than other houses that are opposite the basin? *A.* Well, sir, they are mostly brick houses.

Q. I asked you the question whether the building opposite Mr. Squire's factory is not much less discolored than those farther away.

Mr. Hastings. Do you mean the white building?

Mr. Derby. Yes.

Mr. Hastings. I speak of that building that has recently been painted. The other is protected by a brick building.

Mr. Derby. I speak of the one directly opposite the factory, that is newly painted.

Mr. Hastings. I don't know how long it may have been painted; perhaps two or five months. It shows distinctly that it has been painted.

Mr. Derby. Well, you state that there is one white building.

Mr. Hastings. There is one white building beyond the brick block. Only a small portion of it is exposed.

Q. How much? *A.* The end of it. The end upon the street is slightly discolored.

Q. Much less than those that are colored? *A.* Yes, sir. The colored buildings of Mr. Squire, which are situated back of that white building recently painted, are discolored on the ends where they get the odors of rendering.

Q. Well, may it not be from the basin? *A.* I could not say. I would not say that the basin did n't do its share of the work. I simply noted the fact that these dark-colored houses were discolored.

Q. I am requested to ask you one question in regard to the indignation-meeting. Whether those who opposed this movement were not excluded from it?

The Chairman. I don't see what that has to do with this matter.

Mr. Derby. To show that it was an *ex parte* affair.

Mr. Hastings. I would like to say one thing if the Board will permit me: that is, that it makes no difference to me, sir, whether the meeting was *ex parte* or not. I think any number of citizens have the right to complain of any nuisance, whether appointed as a committee by a public meeting or otherwise.

Mr. Newhall. That is the reason that makes that entirely immaterial.

Q. (*by Mr. Derby*). The building at the corner of Sixth and Cambridge Streets is considerably discolored, is it not? Mr. Squire's buildings run along past Seventh and Eighth Street, and Sixth is opened from Mr. Squire's down to the river? *A.* There is no opening to the basin, excepting about five feet.

Q. Well, there is a five-feet opening there? *A.* Yes, the street is open to the basin; there is about five feet there, and the balance is blockaded by a house two stories in height, — a French house.

Q. Well, does not this street run down to the basin? *A.* It does not run down. It is blockaded by two buildings. There is an open place running down from the end of the street to the river, about five feet wide, — five, eight, or ten feet.

Q. Is it not nine feet? *A.* It may be from five to ten feet. I will call it twelve.

Q. Well, by that passage-way of five or ten feet there is an opening through to the basin? *A.* A passage-way is an opening, is it not, sir?

Q. I understand that it leads to the basin? *A.* Yes, sir.

Q. So that the air from the basin might come directly through? *A.* I should think it might get through any passage-way ten feet wide.

Q. There is nothing to prevent the passage of the air up to that house on the corner of Cambridge and Sixth Street? That has been very much discolored? *A.* Yes, sir, it was, but the frost and rains have washed considerable of it off.

Q. Is your sense of smell peculiarly keen? *A.* It is, sir.

Q. Unusually so? *A.* Well, I don't know as it is unusually so. I can smell a sweet odor or a vile odor as quickly as almost anybody.

Q. You have found unpleasant odors from the sugar-refinery, I suppose? *A.* I have smelt the odor from calcined bones or the charcoal used at the refinery.

The Chairman. Have you any more questions to ask?

Mr. McIntire. There is one question which I wish to ask, and I don't think it has been asked before. I want to ask whether the discoloration of the 31st of July, which was done in a single night, was like the discoloration of these boards? *A.* No, sir, it was entirely different.

Q. Describe the difference. *A.* Well, that came in blotches, more of a greasy discoloration. This is a kind of blue fume. I am not a chemist, and could not describe the difference, except in appearance.

Q. Was it evenly spread upon the surface? *A.* No, sir, it was all streaked over as if you had ladled it out of something and thrown it on.

Q. (*by Mr. Derby*). You were not out on the 31st of July. You noticed the discolorations the next day? *A.* I noticed the house on the corner of Sixth Street, because my attention was called to it.

Q. Generally with regard to East Cambridge, whether there was more discoloration on that night of the 31st of July than on any other night? *A.* Than on any other night I remember of. My own house was discolored partly on the northeast side on the night of the 31st of July.

TESTIMONY OF MR. JOSEPH MAGOUN (*recalled*).

Q. (*by Mr. McIntire*). I wish to ask you whether you noticed that vane on the church that was testified to by Mr. Adams, through the day and evening of the 31st of July? *A.* I did.

Q. Will you state how that vane was? *A.* It is within about one hundred and twenty-five feet of my dining-room, and I always look at it particularly, because the vane on the Court House never turns, while this one on the Unitarian church turns quite easily. That pointed southeast, and the next morning it was the same.

Q. Did you notice it turn that day? *A.* Yes, sir; it turned in the afternoon, when it was west.

Cross-Examination.

Q. (*by Mr. Muzzey*). The next day after the smell? *A.* I mean on that day.

The Chairman. Does he know anything about where it was on the night when this odor came? *A.* I could not see the vane at night. I would give my knowledge in regard to Mr. Squire's works, which I left a little past eleven o'clock with Mr. Sawin. We went out to look at the exhaust steam of the engine, which I thought would be a good indicator of the way the wind blew, and it was blowing every way.

Mr. Muzzey. It was in the hollow square formed by the buildings, and where protected from the winds? *A.* Yes, sir.

TESTIMONY OF CHARLES E. MUNROE (*recalled*).

Mr. McIntire. I don't know as the Board wishes to hear Mr. Munroe, but I will state, to call attention to what he has to say, that since his testimony he has distinguished some odors and traced them to the establishment. He was very careful about them, and very careful in tracing them.

The Chairman. I think the Board would like to hear that testimony.

Mr. Munroe. On the 6th of December it was a very pleasant day, bright sunlight, two weeks ago last Saturday. I was in East Cambridge, and that afternoon, as I came out of my house, at the corner of Cambridge and Fourth Streets, the hog smell was very distinct. I noticed the vane on the Universalist church, and it pointed northwest. In the evening, about eight o'clock, I was out again, and was going to take the eight-o'clock car to my room at Old Cambridge, and when I came out I noticed a slight odor of rendering. As I rode toward Sixth Street it became more and more intense, and after we passed the Grand Junction Railroad it disappeared to a great extent. I left my room again a little past nine o'clock, and thought I would walk down and see if I could perceive this odor I had recognized. I walked down past Reardon's, Boynton's, Lincoln & Chamberlin's, and Barry's, and there was no odor. I was on the south side of these buildings, but I got down to the Grand Junction Railroad without smelling anything. But when I got beyond that, to the southeasterly of Mr. Squire's building and also the basin, I commenced to smell the odor again.

Q. At what cross-street? *A.* On Cambridge Street, just below the Grand Junction Railroad, going toward Boston.

Q. Where were you when you began to smell the odor? *A.* I was between Lambert and Carson Streets, or between the Grand Junction and Carson Street. The odor there was rather slight, but as I went toward Sixth Street it increased again, and at Sixth Street it was quite bad. It was the odor of the rendering of the fresh material, and it was quite intense. There was also the odor of the hog. I then passed from Sixth Street to Gore. There I found that the nearer the buildings I came the stronger the odor was, until I got very near the buildings, and then, as before, all I smelt was a very little of the fresh rendering odor.

The Chairman. You smelt it? *A.* Yes, sir. It was the fresh rendering odor. As I was on the southeast of both Mr. Squire's and Mr. North's, it might have come from either. I passed along Sixth Street up to the Grand Junction Railroad, and then along the Grand Junction Railroad, between Mr. Squire's and Mr. North's, on Bridge Street. The tide was pretty low, and although it was pretty cold there was some odor from the basin. When I had passed by Mr. Squire's to the Grand Junction Railroad again there was this northwest wind, and I smelt no odor from Mr. North's or from the basin. I passed down Bridge Street to Fourth Street, up Fourth to Cambridge, and went entirely about the buildings; but nowhere did I perceive this odor till I got back to Cambridge Street again, in a southeasterly direction from Mr. Squire's, and then I began to perceive it again.

Q. (*by Mr. Derby*). Was this the doughnut smell? *A.* It was the doughnut smell and the hog smell.

Q. The hog smell, — was that there, sir? *A.* It was not strong at my house in the evening as in the afternoon. It may have been from the unloading of hogs. It was the hog smell, and was enough to be disagreeable to any one who has to have a window open.

Q. (*by Mr. McIntire*). I want to ask you in regard to the discolorations, whether the discoloration on the night of the 31st of July was like that on these boards? *A.* Well, it was irregular. It was not over the whole surface as regularly as that. It was in blotches.

Cross-Examination.

Q. (*by Mr. Derby*). Was not the discoloration of the night of the 31st of July as severe as on any night that you remember? *A.* My impression is that it was more severe than at any other time.

Q. (*by a member of the Board*). Have you noticed this odor at any time since December 6th? *A.* I could not state. I have not been in East Cambridge every day. I am there very irregularly.

Q. Were you out last evening? *A.* No, sir; I was at Old Cambridge last evening.

Q. You did n't notice anything there? *A.* No, sir.

Q. Was the wind blowing in that direction? *A.* No, sir.

Dr. Derby. Were you out on Saturday night last? *A.* No, sir.

Q. (*by a member of the Board*). In your former testimony, I think you stated that it was at a temperature of 239° or 240° Centigrade acrolein is produced. How much is that Fahrenheit? *A.* No, sir; that was the temperature at which the fat vesicles are broken. I had my note-book with me at that time, and I think I said 239° Fahrenheit.

Q. I would like to ask you if these vesicles were broken mechanically? *A.* The test that I made was this: I took some fine glass tubes, — perhaps they might have been one eighth of an inch interior diameter, — and I drew these out so as to make little test-tubes of them. Then I took a crow-bar and pierced a hole through them so that this would be obliberated. I then filled a cup partially with a strong alkali of sulphuric acid. Then I placed the bottom part of these tubes in the sulphuric-acid bath, and I placed in the tubes portions of this fat, and applied the lamp underneath. I had also a Centigrade mercury thermometer in the bath, and I watched it to see at what point the vesicles broke, and I think it was at 239°.

Q. Have you ever tried to see at what temperature you could disengage the fat if the vesicles were broken mechanically? *A.* No, sir. I should suppose at a much lower temperature.

Q. Are you familiar with, or do you know, the process by which they produce a substitute for butter from boiling lard? *A.* I have read about it, but I don't know particularly about it.

Q. You don't know at what temperature they render there? *A.* It has been reported that they render there at 110 by breaking up the vesicles mechanically.

Q. (*by Dr. Derby*). Did you give the temperature at which lard melts? *A.* I am not aware. I looked it up, but have forgotten it.

Q. It is below 239°, is it not, sir? *A.* O yes. I should imagine it would be.

The Chairman. Have you any other testimony?

Mr. McIntire. The only other testimony I desire to put in is the report of the Providence Board of Health, which I think is in the hands of my brother.

Mr. Muzzey. Do you wish to read it?

Mr. McIntire. I wish simply to put it in. That closes our testimony.

ADDITIONAL TESTIMONY FOR RESPONDENTS.

TESTIMONY OF JOHN P. SQUIRE (*recalled*).

Q. (*by Mr. Muzzey*). Describe, sir, the vehicles in which the scrap is taken from your establishment by Mr. Bradley? *A.* They are two tight two-horse wagons.

Q. Is it ever put in barrels or transported in barrels? *A.* Never. The stuff is taken away from there every day; the wagons are furnished, and we load them.

Cross-Examination.

Q. (*by Mr. McIntire*). You are not there every day? *A.* Yes, I am. I am not there every hour out of the twenty-four, but I know what is going on there. I know how this business is done.

Q. You don't mean to swear that Mr. Bradley — *A.* I know that that was some stuff that he picked up somewhere else. That story is just like all the rest you have been giving out here. There is no truth in it.

Q. I want to know of your own knowledge. *A.* I know of my own knowledge that no stuff is carried away in barrels.

Q. Will you please wait a moment? Whether you know of your own knowledge that, at no time since Mr. Bradley has carried away anything from your place, he has carried it away in the manner Dr. Durgin has described? *A.* The man has two wagons; he takes one away and leaves the other. The cover is put on and it is carried off fresh.

Q. Have you been present at every loading of every wagon that Mr. Bradley has taken away? *A.* I know how it is done. I have answered your question.

Mr. McIntire. No, you have not.

Mr. Squire. Yes, sir, I have. We don't have any stinking stuff around there. The scrap is put into tight covered wagons and carted off.

Q. Generally it is so. But will you answer specifically this question: Whether you have been present at every loading of every wagon that has been taken away? *A.* I know what is done there, and I know the wagon is left there and what is put in it.

Mr. Muzzey. Answer the question directly, Mr. Squire.

Mr. Squire. I have answered him.

Mr. Muzzey. He asks you whether you have been present at the loading of each wagon that has been driven away by Mr. Bradley?

Mr. Squire. I know the stuff is put into the wagon and covered up.

Mr. Muzzey. He wishes to know whether you have always been present on every occasion when a load of this material has been taken away.

Mr. Squire. Of course I have not.

Mr. Muzzey. Do you keep barrels that it could be put into and carried away?

Mr. Squire. No, sir. I say this stuff is fresh and is put into these tight carts and carried away.

The Chairman. The case is now closed, as I understand it, except the arguments of the counsel, and the Board desires me to say that the counsel will please confine their arguments to Monday, to which day we will adjourn, to meet at nine o'clock.

Mr. Muzzey. May I say before you adjourn that, for the purpose of the arguments, the adjournment would please us better if made until ten o'clock. Dr. Davis cannot be here at nine o'clock, and I desire to speak before a full Board.

The Chairman. That can be done, provided the arguments can be completed on Monday. It will be according to the time the counsel would like for their arguments.

Mr. Muzzey. I think we could get through on both sides in one of your ordinary sessions, very easily.

The Chairman. The Board will adjourn till Monday morning, December 29, at ten o'clock.

Adjourned.

FOURTEENTH DAY.

Letter from Mr. Bradley.

Mr. Derby read the following letter, which was filed with the other papers in the case: —

Office of the Bradley Fertilizer Company,
24 Broad Street, Boston,
December 24, 1873.

Dr. Bowditch, Chairman State Board of Health.

I have never received from the establishment of Messrs. John P. Squire & Co. in a single instance any tanking or scraps (so called) in barrels, but have always received it in tight carts and wagons. The load complained of, which was in barrels, came from another place. As regards my blood-wagons, I am very particular to have them clean and tight, and always take the blood when fresh. With one single exception, I have never heard a complaint in reference to the wagons leaking. I shall use all possible care to avoid the possibility of a cause for complaints, and feel sure I can do it. I make this statement in justice to whom it may concern. I would remark that my teamster misinformed the party, when he was asked where the load of tanking and scraps in barrels came from, when he answered, "John P. Squire & Co.'s."

Truly yours, Wm. L. Bradley.

CLOSING ARGUMENT

OF

HENRY W. MUZZEY, Esq.,

IN BEHALF OF THE RESPONDENTS.

May it please the State Board of Health : —

A wise and beneficent quality in the moral and mental nature of man asserts, as a governing principle in the administration of public justice, that where large powers are conferred upon a tribunal, they should be temperately, cautiously, and sparingly used. The Legislature has intrusted to the Board which I now have the honor to address, an authority, in some respects, unprecedented, and unapproached in magnitude by the powers bestowed upon any other tribunal in the Commonwealth. It is higher, even, than the sovereign power of *eminent domain;* for if the property of a citizen be taken for a public use, he must be compensated, and may have a jury to assess his damages. By a stroke of the pen, you may destroy that citizen's business, and forbid the use of his property, — thereby, practically, destroying the property itself, and the law provides for him no jury ; no redress, no compensation. The power to regulate, and prohibit the carrying on of, certain trades has long resided with the local boards of health in cities and towns ; but the right of appeal from their orders to a jury has always been secured to the citizen by the law. The omnipotency of this Board is well exhibited in its freedom from the restraints that surround a trial by jury. If the jury err, the judge may set aside their verdict. If the judge rule the law incorrectly, the full bench of the Supreme Judicial Court may rectify the error. Thus, in every other forum, familiar to our law, the safeguards of jury and court are thrown around property. If they are missing here and in this proceeding, it must be because the Legislature, in creating this tribunal, and in clothing

it with such novel and extraordinary functions, believed that the character of those selected to administer its duties would assure just and adequate protection to private interests, as well as due attention to the public welfare.

And so it is that, this day, you, gentlemen, stand between us and the petitioners, as a fair and impartial tribunal, to judge and determine, according to the law, and the evidence submitted to you, between the parties to this hearing.

At the threshold of the case, lie two general inquiries, — Who are our assailants, and whom and what do they assail ?

The petition upon your table is signed by eight individuals, claiming to represent the people of East Cambridge. In point of fact, however, it appears that, in this respect, they make an erroneous claim. In midsummer a meeting was called, with the professed purpose of obtaining an expression of public opinion, in the neighborhood, concerning the establishments located upon the borders of Miller's River. The call originated with persons hostile to these establishments ; but when the meeting assembled, they found themselves in a minority of those who composed it ; whereupon, under the leadership of the gentleman who represents them as counsel at this hearing, they questioned the right to take part in the meeting, and demanded the expulsion, of all who disagreed with them. The weather was not warmer than the discussion that this unfair demand provoked. Finally, upon a direct appeal to the employees of the threatened establishments, they withdrew from the meeting, having been told that it was intended only for the opponents of their employers, and not as a general meeting open to all citizens and taxpayers of East Cambridge. Their retirement, followed by the withdrawal, also, of many disinterested citizens, disgusted with the unfair proceedings, left the meeting greatly shorn of its original proportions. Those who remained, consisting only of the promoters of the meeting, and persons in sympathy with their designs, then carried out the programme in peace and with alacrity. Among other things, they resolved : —

" That the Board of Mayor and Aldermen, who are designated and empowered as the protectors of the health of our citizens, be requested to petition the State Board of Health, without delay, to order, as a sanitary measure, the following : That the several basins comprising Miller's River

shall, within as short a time as the greatest appliances will permit, be filled, the sewers to be constructed as the filling goes on."

This resolution was passed either in ignorance, or disregard, of the facts, that the Legislature had already ordered both the filling and the sewer, that the work was in progress, and that the State Board of Health had no jurisdiction in the premises. After the airing of much inflammatory rhetoric, they also passed a resolution calling upon the Cambridge Board of Aldermen to petition the State Board of Health to proceed against the slaughter-houses. But the Aldermen refused the request, as applicable to any of these establishments, and declined to take action against that of Mr. Squire by the strong and significant vote of *eight to one,* — the single affirmative vote being cast by an Alderman who had had a personal difficulty with Mr. Squire.

Our assailants had already applied to the grand jury, to indict the Squire establishment as a nuisance; but the grand jury, at the late term of the court, ignored the bill. Defeated everywhere else, — the local authorities of Cambridge and Somerville, and the grand jury, refusing to listen to them, — our restless and persistent enemies have brought their complaint to this Board. We meet them here with three clear verdicts, already recorded in our favor by the local tribunals.

(1.) In the autumn of 1872 they petitioned the Board of Aldermen of Cambridge to suppress our business; but that Board, after a full and patient hearing, declined the invitation. (2.) On the renewal of their petition to the same Board last summer, it met with the same fate. (3.) They experienced a like failure before the grand jury, at its recent session.

No public body, charged with the duty of passing upon the question of the continuance of Mr. Squire's establishment, has ever condemned it.

I have the happiness to add to these results the further and dominating fact, that the Joint Commission, comprising this honorable Board and the Harbor Commissioners, appointed by the Legislature of 1872 to inquire into the cause of the nuisance existing in the valley of Miller's River, and to devise and recommend measures for its removal and cure, did not find it necessary to extinguish and drive therefrom the business which I am here to defend. That competent

body — in their union, as the guardians of the commercial and sanitary interests involved — made a careful exploration of the subject. Unusually qualified themselves for this duty, they, nevertheless, called other skilled and professional service to their aid. They granted a public hearing ; they listened to testimony and arguments, and visited the ground embraced in the inquiry. After full and careful study, they made their report, which founded itself upon a broad and comprehensive survey of the matters submitted to them. It reconciled conflicting views of engineering and sanitary science, and declared that the remedy for the nuisance lay in the making of the basins of Miller's River solid land, and in the building of a grand trunk sewer, finding its outlet away from this district, and in strong ocean currents. These were mere recommendations. To give effect to them, it was necessary that the Legislature should put them into law. This the General Court the present year did, and further on, it will become my pleasure, as well as my duty, to assign the merit of this legislation to the source from which it sprung. The work of constructing the sewer has been undertaken, and is being prosecuted, — vigorously by Somerville, tardily, and with halting steps, by Cambridge. But the filling of the basin has been pushed forward by Mr. Squire, almost without co-laborers, official or individual. So much for public fact and testimony, already accumulated.

Our antagonists, then, appear before you as mere partisans of one side of a local contest. They come clouded with the unfairness and cowardice which denied to the whole community, drawn together at their call, the plain right to participate in the meeting. They come with three, and the only, special findings of tribunals against them, and in favor of us, upon the matters involved in this hearing. They come, further, to ask you to paralyze the hand most vigorously engaged in carrying out the measures of relief recommended by the Joint Commission, and indorsed by the Legislature, for removing the nuisance in Miller's River valley. They come in the face of official and private local sentiment and opinion. They come to assail, not us alone, but the great future of Boston. They come, heedless and impatient, to obstruct and thwart the developments, now in progress, of your own advice, approved by the Legislature. They come — a small, limited, and prejudiced set of individuals — to ask of you a condemnation of the good sense and judgment of the local and

governing authorities of Cambridge and Somerville; who, trusting in your advice and that of your associates upon the Joint Commission, have entered upon the work you prescribed for them, and are confident of the results. They come in defiance of the voices of science and the appeal of commerce. I would do them no rudeness; but, in dismissing them now from consideration, I cannot withhold the remark, looking over the history of the controversy, and mindful of the intelligence and light which it has evoked, — so largely due to the Joint Commission, — that it is difficult to conceive how a pursuit which was begun in ignorance, can now, and under existing circumstances, be continued and inspired by creditable motives.

I pass gladly, and with pride, to the second inquiry, — Who and what are assailed? A brief review of the controversy is essential to the answer. You, Mr. Chairman, and a majority of the Board, have learned something of it, heretofore; but three of your associates have never had any official relations to it. I must, therefore, begin at the beginning, but shall not tax your patience long upon the subject. Two summers ago, the Squire, Boynton, and North establishments were summoned before this Board, on the petitions of the city authorities of Cambridge and Somerville. But a conference between the representatives of these cities and establishments, speedily revealed the truth (as Mr. Parker has told you), that the evil condition of the locality could not be relieved by the removal of the slaughter-houses, but demanded the application of broader remedies, covering the whole of the infected district. And so the complaints were, by the mutual consent of parties, withdrawn from your attention, upon the understanding that both should unite to secure legislative intervention and help. Upon petition, at the ensuing session of the Legislature, a hearing was had, at which conflicting engineering advice and theories gave rise to a reference, by the Legislature, of the whole subject to a Joint Commission, to consist of the State Board of Health and the Harbor Commissioners. The merit of suggesting this solution of the controversy belongs to Mr. Squire, by whose counsel it was presented to the committee, and who submitted a bill, which the committee recommended and the Legislature enacted. Mr. Squire, partly — as the two cities were in the main — responsible for the condition of the river basins, desired that scientific differences concerning the proper treatment of the water-areas should be submitted to a competent body for deter-

mination. He sought to lift a subject of large importance to its proper plane, for intelligent examination and sound determination.

The Joint Commission met in the summer of 1872. They gave public notice of the hearing to all concerned. They listened to every suggestion which any one interested in the subject desired to present to them; and no one went away from the hearing without feeling that he had enjoyed a just opportunity, patiently and cheerfully accorded, of presenting his views and his interest to their attention. The Joint Commission, after the public hearing was closed, employed an eminent civil engineer, of their own selection, the Hon. Phineas Ball of Worcester, to aid them with his professional skill and advice in arriving at conclusions. The authority of the Commission was, against the desire of Mr. Squire, limited to making recommendations. He wished them to be clothed with authority to execute such measures for the relief of Miller's River valley as they decided should be applied. He was ready to submit the question, whether his own establishment and the business of slaughtering swine should be sacrified, as well as the questions of filling and drainage, to their final determination. But, remonstrance being made by the cities, he reluctantly consented that the Commission should have only advisory powers.

The Commissioners made their report shortly before the meeting of the Legislature. Mr. Squire had contended before them, and presented high engineering authority to show, that the sanitary interests involved would be best satisfied by the bulkheading, dredging, and preservation from future defilement, of the water-basins, — together with the leading away to deep water of the sewage, then, and to some extent at present, discharged into Miller's River. The Commissioners and their engineer agreed with him upon the last proposition, but decided that filling the basin with earth was preferable to flooding it from the sea.

The methods of relief pointed out by the Joint Commission had, indeed, been substantially anticipated by the State Board of Health, who, on page 70 of their Report for 1872, remarked: —

"The great and pressing want in the case of these hog-slaughtering houses is *drainage*, and this they could have by the filling up the flats of Miller's River and the construction of a sewer through the whole length of the basin."

To fill his fifteen acres, involved Mr. Squire in an expenditure of

at least $75,000, and brought no advantages to the conducting of his business. It was money sunk and lost to that. Still further, it would sacrifice an existing benefit of his location, in that it would deprive him of the cooling influences of the sea around and beneath his works.

But he had asked for the Commission, and determined, in advance, to submit to its advice. Accordingly, when a hearing upon the question as to whether the plan of relief from the Miller's River nuisance, devised and recommended by the Joint Commission, came on before the legislative committee,—presided over by the able and intelligent representative from East Cambridge itself,— Mr. Squire appeared, and stoutly contended that the Legislature should accept and enforce the work of the Commission, *in all its parts.* He was the only party to the previous controversy that took this stand before the committee. The cities of Cambridge and Somerville — eager for a law to compel the filling, which they had advocated before the Commission — strenuously objected to being compelled by the Legislature to construct a sewer upon either of the lines recommended by the Commission, and indorsed by their engineer. They still plead to be allowed to follow the valley of Miller's River, and make the sewer outlet therein. The contest before the committee, however, resulted in a compromise between Mr. Squire and the cities, by which all were committed to the support of a bill providing for the filling of the basins, and leaving it optional with the cities to build a sewer to discharge either at Craigie Bridge, in Cambridge, or at Tufts's Dock, in Charlestown, but compelling them to construct one or the other, — both of these lines being highly commended by the Commissioners' engineer. A bill with these provisions was reported from the committee.

In the Legislature it was amended, by making it compulsory upon the cities to construct the sewer on the line to Craigie Bridge ; and in this form the bill passed, receiving the almost unanimous approval of both Houses. (Acts 1873, ch. 304.)

What has been done under this legislation? In Somerville, the construction of the required sewer has been reasonably prosecuted ; but Cambridge has done nothing within her territory. Cambridge sewers still empty into Miller's River. Mr. Squire's duty under the Act has been met and answered in a manner worthy of all praise. With that good faith and ready submission to results which has

characterized his every action, he, as soon as the Act passed, made his contracts to meet it, so far as any of its provisions were directed at him. When the season allowed, he began to move Prospect Hill into the river basin which he owned; and has since made that degree of progress with the filling which might be expected by any one acquainted with his determined and energetic character. He has expended in this work, already, nearly $30,000, and the total cost to him will reach, at least, the sum of $75,000. The early summer will find his part in the work, which you advised, well and thoroughly done. Had all related to the accomplishment of the remedy for the nuisance taken hold of their respective duties with the same fidelity, honesty, and energy, the ensuing summer would witness no trace of the famous and infamous "Miller's River nuisance." But my clients cannot control the movements of public bodies. What belongs to them is, and will be, promptly and faithfully accomplished. Mr. Squire is doing something more than what the law commands. He is spending very large sums in improving his premises, and in building a fine market and lodging-house, of substantial brick and tasteful construction, in East Cambridge. So much for the man and his characteristics. It is always pleasant for me to speak of him, for I feel that my feet rest upon solid ground. Sustaining toward him the relation of professional adviser and counsel from the beginning of the controversy, in which he has borne so manly, consistent, and useful a part, I think I may claim to know the man.

It was scarcely to be supposed that, after what I have already detailed to you, anybody could be found — however much disappointed and smarting under the defeats accompanying previous investigations — bold or impudent enough to resort to this Board, in the expectation or hope that you would interfere, at the present time, with the business of the establishment for which I speak. Did they suppose that you would pay no attention to the fact that it had been conducted with a view to trying the propriety of its existence under your own advice, sought for in your published reports and in the action of the Joint Commission, and followed regardless of what expense might be incurred thereby? There may be deaf ears in these matters, but I do not speak for them. We have something at stake. I doubt if its magnitude is entirely appreciated even here, and I know that the community at large were, before the developments at

this hearing, little aware of what the stopping of the business of this establishment would entail upon the community.

Let me give you briefly and comprehensively a few statements of fact in this connection. The premises owned and occupied for their business by John P. Squire & Co. comprise about twenty acres, or 880,000 square feet of land. Their buildings, alone, cover over five acres, or more than 200,000 feet. Besides the immense houses devoted to the various processes of the business, — assembled within the enclosure are an ice-house, holding 8,000 tons ; stables ; coopers' shop; harness shop ; wheelwrights' and blacksmiths' shops ; — in short, every facility for pursuing the business is gathered there. Persons familiar with establishments devoted to the same business, in this and foreign countries, inform me that there is nothing, at home or abroad, which in size, completeness, and cleanliness is superior to the establishment of my clients. Their works have cost a half-million of dollars, and the annual product of the establishment is constantly increasing, and has already reached $8,000,000. 400,000 swine are slaughtered annually. 700 men, whose annual wages reach $500,000, and 70 horses, are employed. The value of the product shipped yearly to Europe is $3,000,000, and of that sold in the domestic market, $5,000,000. But, as yet, I have spoken of what relates to the business within the walls of the establishment. Pass with me to the impulse given to business outside of it. It requires annually for its uses 10,000 tons of ice; 2,500 tons of coal ; 200 cords of wood ; 19,000 hogsheads, or 5,000 tons, of salt. These are a few of the items of consumption.

Let us reach to broader interests ; stretching east and west, and over the ocean. The pork-slaughtering and packing establishments have become of vast importance to the commerce of Boston, in sustaining lines of communication with the West and with Europe. A commercial centre depends for its prosperity and importance upon the avenues of communication that lead to it from tributary territory. The ship and the railroad have made Boston what she is as a mart of trade. Not the merchants only, but the whole community, are interested here. Cheap, quick, and convenient transportation, inland and ocean, are concerned, for all who have occasion to transport or travel. This one establishment pays to the Cunard Steamship Company about $300,000, and to the Boston and Albany Railroad $700,000, in freights, annually ; also, above $25,000 in freights to Antwerp.

The momentous question addressed to this Board, here and now, is, Shall this business be stricken down? It presents itself for consideration in three branches, or divisions: first, and paramount, in its sanitary aspects; second, in its commercial or business aspects; and third, in the weight justly to be accorded to public opinion, as applicable to both of the preceding.

The history of the case has already reached satisfactory scientific determinations of sanitary questions.

In the autumn of 1872, when the investigation before the Cambridge Board of Health (composed of the Mayor and Aldermen) arose, Dr. Charles T. Jackson was employed by Mr. Squire to make a thorough exploration of his establishment and its surroundings. This resulted in an entire vindication from the charges which had been brought before the Board. The errors into which Mr. Munroe had been led, some of which he has repeated at this hearing, and others which he has wisely and conscientiously abandoned, were plainly exposed and brushed aside. I regret that no report of Dr. Jackson's testimony, which exhausted the controversy, has been preserved. No one then looked for the misfortune which has, within a few months, sadly overtaken him. I am sure that I may speak, not only to, but for, the members of this Board, in expressing the hope that he may soon be restored to his accustomed labors in the paths of science.

When we were notified of the petition against us, the return of Professor Horsford, from conspicuous service in the National interest at Vienna, was understood to be near at hand, and was eagerly watched for in behalf of Mr. Squire. After his arrival, he had hardly enjoyed a half-day's welcome from his family before he was invited to investigate the charges against the Squire establishment, which had been laid before you. Conflicting engagements made it impossible for him to promise to undertake the work, unless sufficient time should be granted to him. He had never been known to have set foot within Mr. Squire's establishment, or to have expressed any opinion concerning it, or upon the vexed question of the neighboring nuisance; but Mr. Squire, always ready to submit to the results attendant upon skilled and competent investigation, instructed me to apply for a postponement of the hearing before this Board till such time as would enable Professor Horsford to enter upon and complete the work requested of him. We thank

you for granting the request, and believe that all concerned in this proceeding, and the cause of justice itself, have been benefited by the postponement. Professor Horsford has made and presented to you, in his masterly report, the result of a minute and searching investigation into every department and detail of our business. He is informed as to similar works in this country and in Europe. He has explored Miller's River and the surrounding territory, and, by an independent route, reached the same conclusions which Dr. Jackson presented at the investigation of last year.

There is no mystery. The cause of the trouble bares itself readily to the eye of science. Miller's River is only the companion of numerous other seats of pollution upon the shores of the Charles and the Mystic. And, after the filling of the basins shall have been accomplished, and the great sewer built and in use, there will still be complaints, as Professor Horsford reminds you, while Charlestown Mill Pond, Broad Canal, the marshes east of the House of Correction, Prison Point, the Cambridge shores of Charles River, on either side of West Boston Bridge, the water angle near the junction of Arlington and Beacon Streets, and, finally, the estuary of Miller's River itself, are allowed to continue as settling basins for the sewage of Boston, Cambridge, Somerville, and Charlestown. Analyses of mud taken from all these places, and from many others defiled in the same way, reveal the one common source of the insalubrity of the air breathed by our people.

Mr. Merrick's analyses show that sulphuretted hydrogen comes from all of these places. Bad as the basins of Miller's River are, and strong as is the demand for their obliteration, the air is tainted by the filth in other localities quite as much; and the deposit taken from a neighboring spot, lying between Portland Street and the Grand Junction Railroad, and near to Broad Canal, in East Cambridge, shows a greater amount of sulphuretted hydrogen than could be discovered in any part of the bed of these basins. Some parts of Broad Canal itself, *to whose foulness no slaughter-house has ever contributed*, taint the atmosphere, in close rivalry with Miller's River, and with like weapons. In fact, public attention in Cambridge has, since the passage of the law for the relief of the Miller's River district, been diverted therefrom to the condition of Broad Canal. Private suits have been instituted against Cambridge by individuals having proprietary rights in the canal, and the local newspapers are loud in the demand for the turning away of the sewers, and other steps for the purification of the canal.

I have alluded to the fact that improvements have already been made, and others are in progress, in the interior of the Squire establishment. In July last, the Cambridge Board of Health passed an order requiring the combustion of the gases in all establishments engaged in rendering by steam. The gases, being soluble in water, had hitherto been discharged into a vat of water, refreshed and changed by each tide, beneath the building; but upon the passage of this order, Mr. Squire immediately complied with it, and the gases are now being successfully destroyed by the furnace fires. That the gas from the rendering-tanks is thoroughly consumed by the boiler fires, is satisfactorily shown by the experiment of letting it escape from an aperture in the pipe into a room, when it has been found to burn freely and emit no odor. The patentee of the Turner process, which is in use at our works, claims an illuminating power as among the merits of his invention. His own establishment is lighted with this gas. Two years of improvement in inventions for the destruction of injurious gases generated in rendering establishments have elapsed since the making of the Report of the Superintendent of Health of Providence, in 1871. Science has been on the march ever since, until now undoubted success has been reached in the apparatus in use at the Brighton *abattoir* and in the Squire establishment.

I quote, from the Report of the State Board of Health for 1872, the following: —

"As regards *bone-boiling* and *fat-melting*, if the material to be used is fresh, and unchanged by any taint of decay, the vapors coming from it can be condensed in water, and there are several available plans for doing this without offence, if water is abundant and drainage complete.

"If, however, the material is tainted, as is certain to be the case in the waste animal matter collected in a large city, there is no process known to us by which the complex gases thus combined with watery vapor can be destroyed, except by fire.

"This mode of dealing with them is effectual, and apparently the only conditions for success are, the having a fire so hot that the watery vapor may not put it out, and delivering the gases at a high temperature."

Of his own motion, Mr. Squire has arranged to do all the trying and rendering of pure, as well as of impure, matter in steam-close tanks, — although in Paris the rendering is still done in open kettles, in the best appointed *abattoirs*. Other changes in the establishment have been made, by which, among other things, the

slaughtering and cleansing apartments have been removed to another part of the premises, which is provided with tight or seamless floors. All of the blood and offal is conveyed from the Squire establishment, in air-tight carts, each night. The solid contents of the scalding-tub are precipitated, and removed in the same way. The "soup" from the rendering-tanks is sweet when drawn off. It is soluble in water, and is easily borne away with the tide. But Mr. Squire, in view of the doubt raised at this hearing, whether the "soup" may safely be discharged into a sewer, has contracted with Mr. Upton for its daily removal from the works in air-tight vessels. You will observe with what enlightened steps this establishment advances in the path of improvement. It only awaits the new sewer to accomplish the best conditions in the conduct of such an establishment which science has offered. Mr. Chase, the engineer appointed to superintend the construction of the new sewer, and a very competent authority, tells you that the sewage from the Squire works may be received into it without difficulty of any kind, and will make no perceptible increase in its contents at times when its mouth is closed by the tide. The contributions to the sewer from these works will consist only of such matters as are recognized, in your Report for the present year, as proper to be carried away in a public sewer. I find these enumerated in the following paragragh, appearing on pages 28 and 29 of the Report: —

"There are other forms of refuse, of a fluid or semi-fluid kind, which may be carried away by force of gravity in sewers. The washings and scrapings of hides, both their outer and inner surfaces; the washings of hogs, after scalding their skins, as is practised at hog slaughter-houses; the wash of all slaughter-houses and of stables; chemicals used in the preparation of leather and morocco; chemicals used in woollen and cotton factories and print-works; the fluid waste of rendering establishments and of soap-factories, — these are among the most important of this class."

Experiments with disinfecting agents, to be applied to the swine in the cars, are being made, with every prospect that soon the animals will arrive in an inoffensive condition. They are taken directly from the railroad into the receiving-house, the floors of which are strewn with charcoal, wet with carbolic acid, for their reception.

You are aware that existing, under the sanction of the Board of Health of the City of New York, are two large hog-slaughtering establishments, upon the North River, known as the "Booth and

Tobey Works." In one of these, the gases are discharged under water; in the other, they are consumed by fire. Formerly, Mr. Squire used the first method; now, he employs the latter. Both of these establishments, whose methods were recently examined by Professor Horsford, have the sanction and approval of that Board of Health, of whose vigilance and courage it is sufficient to remark that they levelled to the ground, in a single night, buildings, styled markets, covering acres of ground, because of their unhealthy condition and distributions.

In passing, I have to remark, that I represent clients who are now employing the best established methods and welcoming fresh suggestions. If anything now existing about this establishment, or in any of its processes, is susceptible of substantial improvement, when the light is welcomed, the change will be made. Trust the record for this. *Do not forget that Mr. Squire has solemnly promised you, during this hearing, to be guided by your advice in these matters. If you recommend an improvement, he will adopt it.*

I infer from the statute which created this Board, that its design was to assemble a qualified body of gentlemen who should investigate questions of moment to the people, concerning health and life, with a view to disseminating throughout the Commonwealth sound and enlightened instruction and advice upon practical sanitary subjects, and to presenting suggestions to the Legislature, which, taking the form of law, might advance the general welfare in these directions. If I am right as to the original intention of your office, it is very apparent that subsequent legislation has cast upon you duties and functions not contemplated at the start. I am glad that the State has the happiness to find gentlemen who are willing to perform, gratuitously, such self-abnegative services as this one hearing has, for a whole month, imposed upon this Board. Remembering the earlier intention of your office, am I not right in suggesting that it is well to preserve my clients, if for no other reason than that they have the spirit, as well as the pecuniary ability, to put upon practical trial whatever you may, in the acquisitions of your wisdom, discover and recommend as likely to rid the community from all offence in conducting the pursuit in which they are engaged?

The statute gives to this Board the power to prohibit, but not to regulate, the carrying on of the business pursued by my clients. It

should have authority to do both. I am authorized by Mr. Squire to make public a proposition which has already been communicated to the petitioners and their counsel. It is this: That the present complaint be allowed to subside until the meeting of the Legislature, when Mr. Squire would unite with them in urging the passage of a law conferring upon this Board, in addition to its present authority, the power to regulate the business of slaughtering, and to prescribe the manner in which it shall be conducted. I regret to say that this proposition has not been accepted; but we are in the season when any offence to the community, real or fancied, is suspended by the cold weather. Nobody can be harmed by a little delay in the proceedings before you; and I understand, from the opening argument of their counsel, that the petitioners do not ask for the immediate suppression of our business.

I thought I perceived, during the presentation of the complainants' case, an attempt to convict my clients of a violation of the Lord's day; but the examination of Mr. Squire, who is a thorough and practical Christian, put an end to this suggestion. The works are never run on Sunday, except in times of necessity (which the law upholds), as when the comfort and convenience of the community demand, occurring chiefly during warm weather. The milkman must follow his route on Sunday as well as on week-days. So the early Monday market for fresh meat must be supplied.

Comprehensive remedies, not limited to one spot or a local trouble, but governing all related areas, must be applied. Too much, heretofore, of misleading has arisen from the accidental circumstance that upon the borders of Miller's River was located a particular industry. It was not unnatural that the unskilled observation of the neighborhood should trace the difficulty to this source. It belongs to this Board, — and, pardon me for saying, to opportunities like the present, — to draw attention to that overshadowing cause of attack, which every fresh investigation brings more clearly into the light, as threatening the health of Boston and its vicinity.

Allow me further to suggest that the broad office of this Board — the felt need which called it into being — presents wider reaches than any isolated case can furnish. I very much regret that what was known as the "Codman Bill," reported from the Committee on

Water Supply and Drainage last winter, failed to receive the sanction of the Legislature. It provided for the appointment of a commission, to consider and report to the Legislature a plan for the sewerage, water supply, and grade of highways, in Boston, and a territory of ten miles beyond the city. The bill was cordially supported by Mr. Squire, who employed counsel in its behalf. As the law now stands, each town and city must find the outlets of its sewers within its own territory. The suburbs of Boston have not become very populous, but public attention has been arrested by the fact that this limitation is not only absurd, but dangerous to the neighboring communities. This matter has already attracted the attention and censure of this Board. The towns of Woburn and Winchester drain into a pond, the source of the river which supplies Charlestown, Chelsea, Somerville, and East Boston, and will soon, probably, supply the city proper, with water. The positive present need of Boston, the limits of which have already crossed Charles River, is an adequate realization of the growing needs of a great community, — situated upon the sea, — for that system of sewers which, while meeting the conveniences and necessities of the shore, shall offer the least possible obstruction to the ocean paths that lead to the wharves and make the commercial importance of the city.

It is not difficult to anticipate the general direction, so far as sewerage is concerned, which an inquiry like that contemplated by Colonel Codman's bill would demand. For both shores of Charles River, meeting in their passage to the harbor Miller's River and the Mystic, there must be relief. A system of discharge, for the east and west shores alike, must be devised. It must intercept and gather all which now finds its way into the rivers, so as to convey it, and all of the sewage from both shores, far into the strong tidal currents, so that the flood will bear, substantially, nothing back. Otherwise, and under present circumstances, it is only a question of time when the city of Boston, and particularly its western shore, overlooking the Charles, shall become positively uninhabitable. Advance, I pray you, guardians of the public health, the thought of the community to what is within easy, and not remote, contemplation in these respects. Continue the investigation and thought upon the sewage problem, begun with such ability in the admirable paper contributed by Dr. Derby and Professor Nichols to your Report for this year.

Do us the justice to remember that the Squire establishment is on trial, singly and alone, and for its own faults only. An artful design of our opponents, in bringing before you nine separate complaints in a bunch, was, undoubtedly, to link the best and the worst together in the district within which all were located. At our earliest opportunity we objected to this congregation, and claimed the right to be tried separately, and to stand or fall on the individual merits of our particular establishment. We aim no blow at others, although we may have suffered by and from them ; but in the early summer Mr. Squire, defending from unjust aspersions, instituted an observation of what was going on, in general, upon the territory where his works are situated, — the results of which have been presented to you. Let me say that this observation was undertaken from no sentiment of ill-will toward any one, but to disarm a misdirected prejudice, and to enlighten a community as to the true sources of annoyance which exist independently of the basins of Miller's River. It is not for us to pass judgment, nor would we, in any degree, prejudice any man's defence; but we cannot suffer longer on account of the misdeeds of others. It is probable that among the nine complaints simultaneously filed before you, the innocent and the guilty have been mingled together.

The long and carefully pursued investigation of Professor Horsford, with its conscientious and clear declaration of results, aided by the determinations of Mr. Merrick, and the studies and testimony of Mr. Avery (to whom the inquiry is much indebted), relieve me (as they will all be preserved in print for your use) from the labor of a re-presentation of the conclusions reached by these eminently qualified chemists.

I have preferred, in shaping this argument, to deal with the broad, general questions which surround the case and must determine its results, rather than to employ myself in pointing out mere discrepancies, follies, and contradictions in the testimony of the petitioners' witnesses. If I were disposed to do this, I should not spend a moment over the attempts of local witnesses to distinguish one odor from another in the atmosphere of this variously afflicted district. It is sheer nonsense for the scent of the unscientific to essay that. I am, however, greatly tempted to recall to your attention the strong, consistent, and convincing evidence which has been brought forward by the respondents, — covering every salient point in the contro-

versy, by an overwhelming preponderance of the proofs. I must banish the temptation, however, since the proper limits to be assigned to an argument on this occasion forbid any attempt at an elaborate review or discussion of the voluminous testimony. I have the strength, and you have the patience, only for results.

Regarding the charge that unpleasant odors have, on various occasions, emanated from our establishment, to the annoyance of a wide community, it appears that in most, if not of all, of the special instances of discomfort, the wind has defended us from the accusation. Thus, on the night of the 31st of July it came to our aid; and I should suppose that, on a review of the whole body of testimony, there could be no lingering hope on the part of our opponents of maintaining aught against us in connection with that night of widespread and unparalleled suffering. Another potent fact, pointing to the source from which proceeds the gas that chiefly troubles the inhabitants, is associated with the events of the 31st of July. The wind was from the southeast. The white-painted buildings opposite the Squire establishment, on Gore Street, preserved untarnished surfaces where exposed to influences from the northwest, — showing, again, that nothing proceeding from that direction inflicted itself upon the neighborhood that night.

The lead papers exhibited here, to show slight traces of sulphuretted hydrogen obtained within the establishment, are insignificant guides to conclusions upon the question whether injurious gases are generated by our works. Deeper discolorations may be obtained within any kitchen, when the roasting, broiling, or even boiling of meat is going on.

A significant fact which challenges attention, because it demolishes the theory of the complainants, is that the bad odors pay intermittent visits to the inhabitants. Now, the processes carried on in our establishment have no pause. Day in and day out, night in and night out, there is like and unceasing occupation and movement. Why, then, do not the inhabitants get the odor every night or every day? Our opponents tell you that the direction of the wind makes no difference. Witnesses say that they have perceived the odors when approaching the establishment from the direction in which the wind was moving, and that the smell was stronger at a consider-

able distance from the works than under their very walls. They also claim that on occasions when there is no wind the odor is perceptible miles away from us, though not observable at all, or not as strong, near to the establishment, — which seems an absurd statement. (By the way, if it be true that the odors travel long distances, and are not perceived near by, it would be better to have the rendering establishments located in close neighborhoods, rather than on their outskirts.) They further pretend that when no unpleasant odor from the rendering vessels can be detected inside of the works, the outside atmosphere is tainted from them. Now, if these things be true, the like cause should produce the like result. The machinery of our business is never idle. That this establishment is not guilty of discharging foul odors into the air is proved by the fact that they are not always present in it. Whatever impurities, not wholly traceable to the foul marshes and basins, enter into the atmosphere and are perceived at times, it is reasonable to believe are chargeable to the grease-boiling-places, whose kettles are not constantly heated, and whose fires are lighted only at times when a sufficient quantity of material has accumulated to fill the kettles. Here is disclosed a sensible and trustworthy solution, from coincident facts. Our processes are constant; the odor is inconstant. The grease-boiling is intermittent; the odor is intermittent. Add to these facts the further circumstance, that the odor is perceived chiefly at night, and the grease-boiling is mainly done in the night. There is no "moving of gases against the wind," or other nonsense, about this explanation. Instead of leaning for support on shallow improbabilities, it plants itself upon common-sense.

No one should be condemned for a momentary misfortune, — an accident. Your inquiry is concerned with ordinary procedures and effects. Because during the evening of the 31st of July there was a slight escape of gas, all traces of which disappeared in ten or fifteen minutes, and which was caused by the water in the condenser becoming heated, it would be both ridiculous and unjust to condemn a piece of machinery, then on its first trial, and which has since performed its office with unvarying success. A similar accident might occur at the Brighton *abattoir;* but should the *abattoir*, therefore, be denounced as a failure and a nuisance? If a main sewer, built in the made land of the Back Bay, breaks away because of unequal settling of the soil, or if houses in the neighborhood are troubled

with bad air from the sewers by reason of imperfect traps, shall the sewer system itself be condemned?

Allow me to suggest that our particular business has increased, in this vicinity, faster than the attention of scientific men has been directed to methods for conducting it in a safe and unobjectionable manner. Mr. Squire is alert and submissive. He is receptive; and the record shows that he welcomes and adopts every sound suggestion of improvement. Unless it is proposed to sweep away wholly this business from Massachusetts, let him stand, as an example to all others, engaged in a business in the conduct of which there must be a compromise between individual profit and the public welfare.

Everything cannot be accomplished in a moment, and it is only fair and just to await the development of well-intended and vigorously pursued efforts, which are built upon the best attainable advice and instruction. I am happy to find this position indorsed by the State Board of Health, in their Report for 1872, from which I quote these considerate and sensible words: "Such changes" [referring to the concentration of the slaughtering of cattle and sheep at the new *abattoir* in Brighton] "cannot be made in a moment. They require deliberation; a regard for the rights of property, and a careful consideration of many details of construction."

The latest judgment of the Metropolitan Board of Public Works in London — the healthiest city in the world — condemns the *abattoir*, borrowed from France, and declares that the 1,687 slaughter-houses of that city had better, for sanitary reasons, be conducted separately.

The mention of the *abattoir* at Brighton reminds me that I should allude to the difficulties that met us upon the suggestion made by the State Board of Health at our preliminary appearance to answer the complainants' charges. The slaughtering of swine being a business not intended, like that of the slaughtering of cattle and sheep, to supply merely a local demand for fresh meat, but having a vast foreign and domestic market, its magnitude, alone, renders it impracticable to concentrate the business in a single establishment. Mr. Squire's works, of themselves, are twice as large as the *abattoir*. The other legitimate establishments (North's, the Boynton Packing Company's, and Lincoln and Chamberlain's), combined, equal the

Squire works; so that our union would make an establishment, at present, four times as large as the *abattoir* at Brighton. Now, we of this particular establishment have learned that public suspicion and condemnation bear an intimate relation to the size and magnitude of these establishments. Because of their extent, Mr. Squire's works have borne the brunt of the common battle of the business for existence. Because his establishment is larger than any other, the petitioners put it in the front. Hoping to taint it by association, they involve with it, in filing petitions, the humblest grease-boiler in the district. Knowing well that if they can obtain your judgment against it, they can easily sweep the whole district, they force us first to trial. Thus to-day, as in the previous history of this trouble, the contest falls primarily upon us. We welcome the situation, — with its just limitations. Full well they know that our establishment is ruled and conducted by men best equipped to try the question, — and here you have it in its length and breadth, — whether this business, adopting into its processes, regardless of cost, the best and freshest achievements of scientific direction, shall live anywhere in Massachusetts?

Let science do its best, there will always be complaints and complainants. It would be very easy to bring before this Board twice as many persons from Old Cambridge as the petitioners in this case have produced from East Cambridge, to testify to you that the Brighton *abattoir* — the child of your creation and care — brings intolerable odors and offence to their dwellings. The local newspapers of Cambridge were filled last summer with this accusation. The writers were positive as to the direction of the wind; and some of them claimed to have followed the odors to their source, — the *abattoir*. It is probable that these odors did not proceed from the *abattoir* at all, but came from the small slaughter-houses in its neighborhood. *Size* frightens the public. Thus to the Squire establishment, because of its magnitude, are falsely attributed the odors arising from the uncleanly grease-boiling places located around it.

It is my duty, in this connection, to attract your attention to another embarrassment, forbidding the removal of our business, which interests the purchasing community quite as much as ourselves. If, abandoning our present well-chosen location, we were to retire to a greater distance from the point of local distribution, we should not only sink a half-million dollars invested in our buildings, but the consumers of our products must be charged with an increase

in the price of meat sufficient to make good to us the additional cost of transportation, which would amount to $ 25,000 a year for each mile of the distance of our retirement from the metropolis.

Where, I pray you, shall this business be conducted, if it is to be kept for the commercial benefit of Boston, and in the interest of cheap meats in the neighborhood? Such an establishment cannot be located, afresh, in any place containing four thousand inhabitants, without leave of the local authorities. It cannot exist in any such new locality without liability to encounter a petition to this Board for its suppression, like that to which we now respond. It is, therefore, a simple question of abolishment from the Commonwealth.

Well, gentlemen, look at the spot and its surroundings where we now are located. Trace its history. You find it has been devoted to a similar business for a period stretching beyond the recollection of most men now living; you see that the lines of railroad communication necessary for its continuance, both for the reception of the live animals from the West, and the transmission of the product, alike for foreign shipment and domestic distribution, conveniently centre there. I need hardly allude to the ancient slaughter-house, soap-boiling, and tallow-chandler's shop of the Winchesters. I suppose that the fact of their having taken possession of this particular spot led the glass manufacture to resort there. One thing is absolutely certain, that for three generations trades, recognized as offensive in a measure, have planted themselves upon this spot. Low and marsh ground for the most part, it was not inconsiderately chosen. Intelligent citizens have deserted it as a place of residence, year by year. No ties of homestead can resist business developments and aggression, as the history of Boston changes shows. Unless Mr. Munroe's idea is to prevail, that no slaughter-house, however well furnished and conducted, is to exist, unless it is surrounded by a square mile of uninhabited land, it is difficult to conceive of a better present and prospective situation for the Squire establishment than that which it now occupies. If we were driven to a barren waste, a close neighborhood would rapidly spring up around us. The workmen must live near their work. Then the physician and apothecary, the grocer, butcher, baker, and tailor, would come. The school and the teacher, the church and the clergyman, and all the belongings of social life, would follow. We should make a very respectable village at the start. There are

fourteen hundred men employed in these establishments, representing a population of, say, seven thousand persons. Observe the proportion between this population, located where these establishments now are, and the total number of inhabitants in East Cambridge, — namely, nine thousand. We did not come to this population; it has come to us. Isolation for this business from populous neighborhoods is impracticable.

Now I have to submit to you that it has already become a substantial fact, that the belt of territory in Cambridgeport and East Cambridge, eastward of a line drawn three hundred or five hundred feet west of the Grand Junction Branch of the Boston and Albany Railroad, and between Charles and Miller's Rivers, must be surrendered to factories and business. Lines of intercommunication settle these questions. Lying between land and water transportation, this territory has been, and must continue to be, seized upon by business. Nature and art have combined to make it a site for business. The assessors' books show that the valuation of East Cambridge has nearly doubled within the last five years, having risen to $9,656,480, — of which about $4,500,000 is represented by manufactures and other branches of business, — while that part of Cambridgeport, lying within the belt described, is almost wholly devoted to similar occupation. Mark, also, the wonderful increase in population and valuation of Somerville. Its population in ten years, from 1860 to 1870, was doubled, while its valuation has risen from $12,590,900, in 1870, to $29,643,100, in 1873, — a gain in three years of over one hundred *per centum*.

Slaughter-houses exist in all large cities — in London, Paris, and New York — in densely populated neighborhoods. What, that is peculiar to Boston, should drive these industries hence? Why, especially, strike down the one establishment which I represent, located in this suitable suburban place, and confessedly the rival of any other in the world?

Your authority is a broad one. If the "*health, comfort, and convenience*" of the inhabitants require, you may exterminate the business in which we are engaged. But a power as ample existed in the local boards of health before your establishment. Do I read the law incorrectly, in inferring that the Legislature in creating this Board, with its greater and more comprehensive powers, contem-

plated a broader view and judgment upon the subject? If a local board, under the law, makes investigation, it can have in view only the "health, comfort, and convenience" of the limited community for which it acts, and whose interests only are its concern. It cannot legislate beyond town lines; but the *State* Board of Health surveys all Massachusetts. Its ample commission brings not only the health of a limited community, but the health, comfort, and convenience of the whole people, into its vision. Yes, and beyond this, it summons into view all that relates to the well-being and prosperity of the whole people, and the broad and general interest of all. It is in the light and elevation of this aspect of your duties that Boston — so largely contributing to produce the distinction of the State — calls upon you, in this investigation, not to be deaf to the appeal of commerce.

The "comfort and convenience" of all the inhabitants of Massachusetts do not require the total suppression and abolition of this business, — certainly not in an establishment conducted as ours is. If it makes a limited neighborhood a less agreeable place of residence, let those who suffer betake themselves away from it. This is no great hardship. Business is inexorable. It is pleasant to live upon an ancestral estate; but the "North End" is no longer the court end of Boston, as it was in the days of our grandfathers. The descended home-attachments of East Cambridge were long since doomed. Trade will have the water-front. Mr. Soule was right in removing his family outside of the line of encroachment. Hundreds of sagacious citizens had preceded him. The Rev. Mr. McDaniel was right when he said, if the advance of business made his home disagreeable, he must retire his home from its lines. But some people must remain there. They are fast being reduced to that class whose employments require them to sacrifice to their situation very many desired comforts. There are many useful and necessary callings, pursued for the benefit of the whole community, that diminish the pleasures of life to those who keep them in motion. But from this locality there comes not to you, from this class, a single voice against us. Nevertheless, you are to consider them as within your care.

There remains, therefore, this question: Does the "public health" demand the suppression of the Squire establishment? Our opponents have exhausted every available resource upon this inquiry.

The end of it all is, that they have failed to show, in the feeblest woman or child in East Cambridge, a case of suffering which produced anything more than nausea (vomiting in rare instances), or a slight irritation of the throat. In no single case was a physician's attendance ever summoned. They made a public appeal by resolution, printed and circulated, for testimony; and this is the result. In practical contradiction of the notion that the business pursued in our establishment is detrimental to health, the condition of Mr. Squire's men and their families is a living, present, overwhelming witness. I remember that at the Cambridge hearing, last year, these same complainants called several local physicians, in the hope of showing that the odors from the Squire establishment produced fevers in the neighborhood. The absence of these gentlemen and of this accusation, at the present trial, is very significant. It is barely possible that it may be traceable, in a degree, to the circumstance that before that former hearing closed some attention, in behalf of Mr. Squire, was drawn to the fact that *fever poisons are inodorous*. The origin of fever is still held, I believe, by the highest medical authorities, to be shrouded in mystery. Various theories upon this subject have had their day, and perished.

If credit is to be given to the Registration Reports of Massachusetts, the business of slaughtering animals does not tend to increase the death-rate in the communities where it is located. The butchers — like the cooks in our kitchens, living in the midst of odors similar to those prevailing, in a less degree, from lard-rendering in the Squire works — are noted for health and longevity. From the Eleventh Registration Report is compiled the following table, which presents the returns of four years, 1849 – 1852, inclusive: —

Deaths — Four Years — 1849 – 1852.

Towns.	Inhabitants.	Average age of death.
BRIGHTON	2,356	23.02 years.
Brookline	2,516	21.95 "
CAMBRIDGE	15,215	21.91 "
Charlestown	17,216	21.14 "
Lowell	33,383	19.72 "
Natick	2,744	21.12 "
Boston	136,181	20.36 "
Chelsea	6,701	17.87 "

This table represents a period anterior to the introduction of the swine-slaughtering and rendering business, at present conducted upon the shores of Miller's River. From it we find that Cambridge,

without slaughter-houses and with drainage, was less healthy than Brighton, with slaughter-houses and no drainage. It also appears that in the town of Brookline, exempt from slaughter-houses, the average duration of life was less than that in the contiguous town of Brighton. A further noticeable fact is, that in the town of Chelsea, also without slaughter-houses, but largely composed of marsh-land, the average age at death was 17.87 years, while in Brighton it was 23.02.

Further reference to the same Report may be useful. It affords these facts: —

	Population.	Deaths.	Death-rate.
Cambridge	15,215	1,541	1 in 39½
Brookline	2,516	185	1 in 54 4/10
Brighton	2,356	143	1 in 66

It thus appears that during these years Cambridge had an annual death-rate of more than one in forty, while Brighton had a death-rate of less than one in sixty-six. Of the land within the limits of East Cambridge, from 60 to 75 per cent is marsh.

The eminent *Parent-Duchatelet*, in a work on Public Hygiene, published in Paris in 1836, gives the results of personal observation, together with facts collected from public and other sources. From this work it appears that the men and women employed in the knackers' yards at Montfaucon, in skinning and cutting up dead horses, are healthy and long-lived, even where the animals have died of diseases that would have poisoned persons employed in the care of them while alive. The tanners who dress the skins of the horses are not affected by the diseases of which they died. During the cholera, in Petite-Villette, bordering on Montfaucon, the mortality was one in sixty-nine; while in Grand-Villette, which is distant from it, one in sixty died of the disease. Not one man in the knackers' yards died, and not one was sick.

It is believed that decaying vegetable, not animal, matter occasions disease.

I submit that a just and reasonable interpretation of the statute applicable to the present inquiry does not call for the suppression of the Squire establishment, unless its continuance is proved to be injurious to the health of the inhabitants. If only offensive to the sense of *smell*, it is not to be crushed. It stands upon the same basis with many other things not altogether agreeable, but whose

existence, instead of being against the "comfort and convenience" of the community, is essential to its sustenance. The slaughter-house is necessary, — for the people must have food. Gas-works are offensive, — but the people must have light. The gathering and carting of garbage and swill in the streets of Boston is an offence to all passers-by, infinitely greater than the transporting of any part of the refuse of slaughter-houses can occasion (indeed, the latter can give no offence at all when conducted in air-tight wagons), — but the refuse from dwellings and shops must be removed from the city. Horse-car stables are not agreeable, — yet they must be located among the people who make use of this mode of travel. Even school-houses are so objectionable that, in order to secure land in eligible locations for them, it has been found necessary to confer upon the local authorities the power of *eminent domain*.

The history of Miller's River is the history of the shores of Boston and its neighborhood. That river, like the Charles, was formerly pure. The discharges from the sewers, and the slaughter-house contributions in unenlightened days, aided by artificial changes of the natural shores and the increase of population, have turned Miller's River into a series of foul, precipitating catch-basins. Not very much attention was attracted to the change from wholesomeness to impurity until the summer of 1871, when an expedient was tried by the city government of Cambridge to relieve the situation. This effort, unhappily, only served to render matters worse than they had been before. It was the construction of a dam, four or five feet in height, at the Bridge Street crossing. Now water-filling and water-flooding are two very different things. Of course the effect of the filling, created by the dam, was to increase the settling character of all the basins above Bridge Street. The trial of this experiment, during three summer weeks, awakened the opposition of Somerville, and induced the removal of the dam by Cambridge. It never, however, was thoroughly removed, and the influence of the experiment yet lingers. It left permanent effects, in a largely increased deposit upon the bed of the basin. Of course, this must have been the result, for the influence of the ebb tide in bearing oceanward the more solid and heavier contributions to the water, to be retired with the last half of the ebb, was wholly lost. Hitherto, but slight attention to the gathering impurities in the river-beds had been excited. But presently, and as the immediate

fruit of this mistake, public apprehension was awakened, and it has been since engaged in an effort to trace and detect the source of the atmospheric affliction from which the community suffers.

As long as the question of the treatment to be applied for the cure of the evil in the river-beds was a matter of controversy, there was much excitement in the community and denunciation of all suspected causes of the grievance. But men, not inflamed by past relations to the contest, — such as former mayors of Cambridge; the present mayors of both Cambridge and Somerville; nearly every member of the present Board of Aldermen of Cambridge; representatives in both Houses of the Legislature; the late city solicitor, Mr. Parker, together with other prominent citizens, — have the good sense to bow to the advice of the Joint Commission, and the equity to wait for its results. There is no present commotion in Cambridge and Somerville over the vexed "Miller's River nuisance." There is a very hopeful attention directed toward the progress and results of the methods suggested by this Board, and enforced by the Legislature, for the extermination of the nuisance. Public expectation rests confidently in the belief that the filling of the basins, and the providing of the grand sewer, will cure past and lingering evils in the district. So much for a locality.

Continuing the contemplation of purely sanitary observations, you find us employed, with constant and liberal efforts, to relieve the reasonable objections of the community; having every wish for, and interest in, its prosperity and comfort. But attention directed toward our particular establishment — quieted by the fact that if any similar business can exist in any available situation in Massachusetts, we ought not to be, at present, disturbed — is led forward to the ever-pressing inquiry, how the reconciliation, through the efforts of scientific men, of these commercial interests and the public comfort can be solved and accomplished.

The contemplation of the removal from Boston to the West of the hog-slaughtering business leads us to consider what such a step would cost this community. The first effect which summons itself to attention, is the immediate promise of a hard winter, with low wages, and a curtailed employment of the laboring class. To them, as to all consumers, it would mean and be an increase, in our local markets, of at least four cents a pound in the price of pork, — the

staple meat consumed by them. It would advance the price of beef and mutton, also, in the same ratio, in this neighborhood. Pork, every practical dealer in provisions knows, regulates the price of all animal food. The farmer and stock-raiser in Maine and Vermont, or in the West, will tell you this. They, outside of your jurisdiction, watch, like the near neighborhood, what is in progress here.

I presume that the Board are in agreement with Dr. John Simon, — the first sanitarian in England, — who, in his testimony before the Parliamentary Commission, lately said: "It is of great importance for the happiness and for the health of a community, that fresh meat should be easily obtained, and as cheap as possible."

It may be said that these are exceptional times; but the leap is easy to permanent commercial effects upon Boston. Time was when Boston, under the enterprise and guidance of her early merchants, held up her head in bold and lofty contest for the commercial supremacy of the American shore of the Atlantic. To remind you of the disastrous results to the commercial prosperity of Boston, which may flow from ill-advised measures, let me call to your attention the tax upon sales by auction, which, on its adoption about thirty years ago, drove away to New York our trade with China, which had been the pride and support of the commerce of Boston. Then followed a period of decline and despondency, and New York advanced to what seemed to be a settled and permanent obscuration of Boston. We lost the English steamers. Imports took the lead of exports. All was in decline. Many were they who predicted that the acme of Boston prosperity had been reached and passed. But there came a fresh impulse from an unanticipated quarter. Mr. Squire started his business upon the banks of Miller's River, and others followed him. Finally the business attracted the attention of the Cunard line. Boston smarted under the withdrawal of steam communication with Europe. Investigation was had. The fresh impulse given by this business to the port of Boston won the steamships back. *They stay or go, according as it continues or perishes, under your order.*

I venture to say that no proposition to extinguish any one business house, or any collection of business establishments belonging to the same class, ever awakened, in this community, such serious attention or conspicuous remonstrance as this hearing has drawn forth.

Facilities for commercial intercourse determine the results of commercial rivalry. There are, perhaps, fifty or one hundred persons in East Cambridge (not a soul comes here from Somerville) who, moved by one motive or another, ask you to destroy our business and drive us from the Commonwealth. They fail to attract any support from the local authorities. Against their effort the Boston Board of Trade enters its solemn protest. Unwilling to say, on mere custom-house presentation, that the assailed business should be preserved, the merchants of Boston appoint a committee, conspicuous for intelligence and character, and headed by that distinguished and experienced gentleman, the Hon. Alexander H. Rice, — long in the front, as mayor of the city and its member in Congress, — as the representatives of Boston, to visit our establishment, and to test with a practical, common-sense, business judgment the validity of the objections raised against it. On a thorough examination, they unanimously agreed that these were unfounded. They made their report. It received the unanimous indorsement of the body that sent them forth on the service. They appeal to you not to strike down this business and drive away foreign connections with the city of Boston.

Beside the protest of the Cunard Steamship Company, in behalf of the ocean service of Boston, — one in three of whose ships is loaded by the single establishment that I represent, — the Boston and Albany Railroad Company, to whom we pay $ 700,000 in freights annually, presents its interest to your attention. And this involves the State, to which it is a debtor. Every other road leading from Boston, including the coming Tunnel line, in which the State is concerned to the extent of $ 12,000,000, is largely interested in the question whether this business shall continue or perish.

The product of my clients' establishment is distributed in every direction. You will remember that its annual value is $ 8,000,000, of which five millions find a market at home. By its life, every spring of Boston commerce is touched and invigorated. Why? — *Forty-five per cent of the exports of Boston are furnished by this business.* In the light of these facts, no one holding any official relation to this hearing can be surprised at the unparalleled rally of general business interests in support of a cause denominated private, but really the cause of the community.

Permit me to say that the community watches with solicitude the progress of this investigation. Practical, common-sense judg-

ment is being applied to its developments. What has been presented within this room has had a much wider hearing without and beyond it. In the marts of business every step is watched. A wide and interested audience of the whole public is addressed.

The existence of every power and the question of its continuance are dependent upon popular welcome and support. My clients, far from being fearful or timid under intelligent and practical investigation, desire its observation. It is inconceivable to them that an establishment, which the necessities of the community demand should exist in some convenient and appropriate location, can be condemned where it now is situated. Public opinion has testified, by the action of local tribunals; and we have presented to you an overwhelming exposition of resident feeling, judgment, and advice.

It occurs to any one indifferent to the controversy, — and therefore, of course, to the gentlemen of this Board, — that the local Boards of Health of Cambridge and Somerville, possessing ample powers, may be properly trusted; and, as the most intimate representatives of the people, should have confided to them the disposition and settlement of the controversy, presented by individuals, merely, to your attention. I ground myself upon a fair and equitable proposition in this suggestion.

I speak in behalf of a very great interest. If a survey of the whole Commonwealth be had, it can attract to your attention no office the equal in importance of that which now assembles you. You hold in your hands a very grave duty, and there is nothing but good sense and courage on the part of those who ask you, under all the attendant circumstances, to leave the solution of the controversy to the local authorities, chosen to office by, and representing, the home opinion and judgment. Trust these local authorities. They are vigilant, and upon the ground. It seems strange that an appeal should be made from their best informed judgment, with the dream, even, that it would be reversed elsewhere. It seems stranger yet that that appeal should be made to one branch of the Commission to whom the Legislature delegated the duty of discovering and recommending the proper remedies to be applied for the relief of this general district, and whose recommendations, in every respect, have entered into absolute requirements of law, by the unaided, and opposed, exertions of my clients. Nay, more; I look upon it as among the strangest of my personal and professional experiences,

that I should be summoned to utter a word of defence, here and now, in their behalf; when, by common acknowledgment, it is known and proved that the remedies which this Board itself advised are in progress of accomplishment, and that in the van of their carrying out stand the accused. I pray you, is anybody in earnest and honest in this matter? Search all Somerville and Cambridge to-day, and you will not find the hand, official or private, which has applied itself with such good faith and energy to the accomplishment of your advice and direction.

Do we ask too much of your equity and judgment, when we stand here to-day with one plain, righteous request, — which is, that you will permit us, as a party to a controversy which you have helped to solve, to do the work already assigned to us, willing to abide by its results, and conscious that they involve the settlement of the question of the continuance of our business? Why this premature renewal of opposition? Cannot our opponents wait to see what comes from the developments of your advice, already given in the premises? Rely upon it, the present application finds its spring in the animosity of individuals, and is not sustained by the good judgment and sense of justice of the community at large. At least, let us try one, and the first, of your prescribed remedies before we are sacrificed to those who have opposed us from the start. Remember that the local authorities are quiet, friendly, and expectant of good results from measures now in progress. One remedy at a time! The problem is a complicated one. Let it not become further involved and obscured by a confusion of official action. I think we are entitled, in view of liberal expenditures already made and to be faithfully continued by us, to claim that the filling and the sewer shall have a fair trial. If they fail to obliterate the nuisance, then, but not until then, in common fairness, ought my clients to be assailed, or molested, or put to the trouble and expense of an investigation like the present.

CLOSING ARGUMENT FOR THE PETITIONERS.

By CHARLES J. McINTIRE, Esq.

Mr. Chairman and Gentlemen of the Board: —

My brother has occupied nearly two hours of your time in delivering his long and carefully prepared argument for his clients. But I was surprised to find that less than fifteen minutes of this were dedicated to the question which actually is before you for your consideration and conclusion. Less than fifteen minutes were devoted to the nuisance of which we, the complainants and petitioners, here complain, and ask your action upon. In the absence of testimony, his argument, perhaps, might be conclusive; but his argument ignores the testimony. I cannot, therefore, follow in his footsteps; but I must reply to some things that he has said. I have the homely duty to refer to the testimony in this case, and upon it ask you to find your verdict.

In the first place, I will say that I did not interrupt my brother in many of the allegations which he made, because he suggested that I should wait and correct in my argument anything he might say which perhaps would not accord with my views of the testimony. In the beginning of his argument, he alluded to the action of the committee which I represent, and of the meeting which formed it. I deem it my duty to say here, in explanation, that that committee was appointed by a majority of the citizens of the ward who were opposed to the nuisance existing at that time and now, and was composed and appointed by the citizens, excepting only those present who were employed in this and like establishments. And I must say, further, this: that after that terrible stench of the 31st of July last, the citizens were aroused, and called an indignation-meeting, which took place, I think, two evenings following; that meeting was called in the Ward Room; it was taken possession of by the employees of this establishment and others of like kind; and nothing was done, or attempted to be done, in regard to this or any other existing nuisance; they simply took possession of the meeting and adjourned. Another meeting was called. The

same parties appeared. With them were Mr. Squire and a gentleman, — his nephew, the same who appeared here as witness. Every one in that second meeting, as in the other, excepting these employees, were for the suppression of the nuisance. Such was the general expression at that meeting, except by these employees, who had to be talked to and entreated by Mr. Squire, through his nephew, to leave the hall, after he saw the position he took in staying, and constructively indorsing their action. When they had gone, everything was peaceable enough. The committee was appointed. They were sent forth with power to investigate fully into the cause of things that existed; and were told to take such action as they deemed proper with regard to them. They had an arduous work to perform. They worked many days and nights; searched near and far for the source of the nuisance; and at last found, as they believe, and now insist, that the monster stench arose from near the basins of Miller's River. They found what might be likened to a hydra coiling around the basins, which have been so polluted by it. Making the basins its Lernæa; and having for its Argolis Boston, Cambridge, Somerville, and Charlestown. Exhaling its nauseating odors from each of nine different heads to all these localities. They presented these nine different heads or places to this Board, and were asked by it which of them they chose first to attack; and instead of presenting the weakly and poor, — that which had no power behind or money to sustain it, — they have chosen the chief head and front, the main one of these several establishments, — the one that can command the power, can command the influence, and can command the money, to make such a fight as you, gentlemen, have seen here before this Board.

As I have said, the homely duty belongs to me to review the evidence; for upon the evidence our case is based. I will not, however, go through explicitly with the testimony that has been given, because you are familiar with most of it; but I would draw attention to such particular points as are thought to be substantial in our prosecution, and leave it there. It seems to me that only two questions are to be determined by your Board. The first is, Does this establishment of John P. Squire & Co. give forth any odors, and, if so, are they offensive? Second, If it does give forth offensive odors, do they tend to the discomfort or the inconvenience of the people? I believe these to be the only questions which you should consider.

In deciding the first we must look to the nature of the business there carried on. It is a slaughtering establishment for swine; and within that establishment is carried on the business of rendering, of making sausages, of smoking hams, and of various other industries which such institutions carry on within their limits. The main stench which we find within its limits is that of the live hog. This is very offensive to some persons, and is unhealthy. I will here call the attention of the Board to the report on the keeping of swine in the city of Providence, which was made to the Board of Aldermen in 1865 by Edwin M. Snow, M. D., who is Superintendent of Health in that city. He says that the keeping of swine is unhealthy in the most favored localities, and is a source of disease at certain times. On the first page of this Report he says: —

"At the time of the prevalence of Asiatic cholera, in 1854, investigations were made by me in relation to the causes of the disease. I became satisfied, and I believe the city government and the people generally were satisfied, that the keeping of hogs was one of the principal causes of the disease in certain localities. The reports of cases of the disease by many physicians unanimously confirmed this opinion."

And on the fifth page he says: —

"There can be no doubt that the large number of hogs in the locality above named is dangerous to the public health at all times; and should we be visited by an epidemic of cholera, dysentery, or other kindred diseases, the hogs would be the direct cause of a large amount of sickness and mortality."

At a meeting of the Providence Medical Association on Monday, May 1, 1865, the following resolution was unanimously adopted after discussion: —

"*Resolved*, In the opinion of this Association, that the keeping of hogs in the compact portions of any city is a nuisance which is dangerous to the public health, and should never be permitted."

Now here in this establishment are daily kept from 1,200 to 1,500 hogs, brought a great distance upon the cars, and in the summer season, of course, heated and excited, and giving forth more noisome odors than the same number would if constantly kept. And these hogs, in and of themselves, do emit such vapors and odors, and are so much a source of nuisance, that for such reason alone we say the establishment should be situated in a locality different from that in which it now is.

There is the smell of the scalding-tank in that establishment testified to by many. There is the rendering smell. (The fresh rendering smell is admitted, I think, by almost all the witnesses on both sides; by some said to extend beyond the establishment, and by others said simply to be in and about it or very near it.) There are the soups, which have been gone into at some length, and the scalding-water in which the hogs are scalded to remove the bristles. But mainly and chiefly we have the stench that comes from the apparatus which is connected with the close tanks. Although Mr. Avery denies, in his testimony, that there is any stench from this, I think most, or many, of the other witnesses for the defence do not make that denial; while Mr. Crowe, superintendent in one of the departments of the establishment, testifies that there is a vile odor at the several faucets which are in the different portions of the apparatus. Mr. Sharples testifies to the same fact; also Professor Munroe and Mr. Magoun. In the tanks themselves is fat, or rather scraps. In some of them are dead hogs, and in others scraps of meat and fat together. The lard, we claim, takes up the odors only to be given off in those trying-kettles which are above the close tanks, — and of which Mr. Carson was so kind as to inform us, — which we did n't know of before. Now, I have enumerated what we have found in the several portions of the industry of the establishment, and we find in that establishment these different odors. They are certainly generated there. No one, I think, will deny the generation of these odors in this establishment.

We pass, then, to the next question. Whether, if these odors are generated in the establishment, they extend to the inconvenience and discomfort of the inhabitants who live about, outside of, and near to the establishment. We claim that the evidence proves they do. We show by Mr. Sharples and Professor Munroe that these odors are very intense; we show, by comparison with the basin, that the odors which arise from the kettles blacken test-papers more intensely than the vapors from the basins, and the gas from the close tanks blackens them instantaneosuly and quickly, — although I believe Professor Horsford failed to find such blackening, yet we have testimony from two other chemists who found it very distinctly It is only necessary for us to show that certain persons of undoubted veracity have found the odors outside, have traced them to this establishment as their source, in order to prove to you the nuisance of which we complain. We have presented to you many

witnesses of unimpeachable veracity; we might have presented many more. Perhaps it will be sufficient for me to read their names, in order to recall to your memory, those who have actually traced the odors to this establishment on several occasions. I read them in the order in which they were sworn: Samuel Slocumb, Charles O. Welch, Dr. Farnsworth, Jonas Woodard, Asa Tyler, Grove H. Loomis, Charles E. Munroe, S. P. Sharples, Dr. Abbot, Charles E. Meyer, Joseph Magoun, Lydia Rooney, Maria Spare, Drs. Durgin and Boardman of the Boston Board of Health, Dr. Taylor, A. W. Hastings, and George R. Brine. All of these witnesses distinguish between the several odors; most of them live near the establishment, and have lived there for several years, and all of them have, during the last summer, followed the odors to their source, and found them emanating from this establishment. Other witnesses we have introduced have distinguished between the odors, and been affected by them. There is no need of my reciting their names; they are in your mind.

Here, we think, we might well rest our case and ask you for a verdict. But what answer is made to this most conclusive testimony? Their answer seems not to be, "We do not make this stench that you complain of; we do not render lard which gives forth noxious vapor; we do not keep live hogs which incommode you." But the general answer has been, "The basins smell; the cesspools smell; Broad Canal smells; there are smells and stenches besides ours, and therefore ours should not be abated." The defendants have not produced testimony, if I understand it, from any witness who has distinguished between these smells on any one of the occasions where we have traced it to the establishment. They say that the basins of Miller's River contain large quantities of vegetable and animal matter; that from the vile flats of Broad Canal, Charles River, Canal Street, Charlestown, Prison Point, Stony Brook, and other localities come bad odors. We don't deny any part of that statement. We started at the outset, agreeing with them that these places were foul, and that the basins of Miller's River were rendered intolerable by reason of it; we claiming that they were rendered so most especially by the establishments upon its banks.

Professor Horsford is their main witness, and he goes very carefully, in his Report, into the foul sewage. He tells us of the sulphuretted hydrogen which he found at the mouth of the sewers in the several places which have been mentioned. He differs with

Professors Munroe and Thompson in regard to the animal matter which is in the bottom of Miller's River, and fails to find the extremely large quantity of ammonia which they find there and which must be there, if the great quantity of animal matter is in it, which the testimony says must be, from facts which are incontrovertible in regard to the throwing of filth for years and years into these basins. He finds that Broad Canal and Stony Brook are the most foul. In his tables he finds Broad Canal has 1,800 cubic centimetres and Stony Brook $496\frac{20}{100}$ centimetres of total free and combined sulphuretted hydrogen. But if we look for ammonia, or to take the amount of ammonia in Stony Brook or in Broad Canal, which Professor Horsford makes in his tables the most foul of all these places, and compare it with the ammonia of the Miller's River basin, — and the ammonia, I believe, is the most offensive part of any of these sulphur compounds, — we find that at Broad Canal there is only $\frac{25}{100}$ per cent of ammonia in the wet mud, while under the wagon-shed on the basin of Miller's River, which is the place where the defendants, I believe, used to slaughter and pour in their blood, there is $\frac{84}{100}$ per cent, or nearly four times that amount of ammonia. In other places — under the hog-pens and outside the bulkheads — there is $\frac{60}{100}$ per cent; so that there is a much larger amount of ammonia in these basins, and a much larger amount, I might say, of offensive matter in those basins, than in Stony Brook, Broad Canal, at the mouth of Charles River sewers, at Canal Street, Charlestown, or any of those other places mentioned by the defence. And he refers in his Report to the night of the 31st of July, and would have us believe that the blackening of that night was produced — because, as he says, the winds came from a different locality — from this same Broad Canal, from the Cambridge Street sewer, and from the sewer over at the House of Correction. He described how, in a moist and murky atmosphere, the air might have become saturated with foul sulphur gases, and the winds bring them along across Cambridgeport and over to East Cambridge, and effect that terrible blackening formed on the night in question. But facts, gentlemen, sometimes contradict the best efforts of scientific men. The facts show that on that night the blackening could not possibly have been produced by any vapors which arose from that locality. My brother, Mr. Derby, when he opened for the defence, brought in those (pointing to) boards, and stated that they were blackened in a single night. We found from

whence those boards were taken, and can satisfactorily explain how that blackening was produced. It was the blackening, not of a single night, — for they came from over the mouth of a sewer and have been blackening there the whole summer; and beyond, to the north and west of that sewer, and from this wharf where those boards were blackened, we find no discoloration of the houses. We also find it to be the case that there is no discoloration of those houses which face Broad Canal, and those noxious sewers which have been spoken of so much, and those facing the Charles River flats; there is little blackening to be found till we reach near the corner of Cambridge and Sixth Streets, thence it extends along to the foot and along the foot of Cambridge Street to Sixth; along on Gore Street to the corner of Sixth, where the intense blackening is found. Now, then, it came either from the basin of Miller's River or from the establishment situated on its borders. It might, gentlemen of the Board, have been caused by the mixture of both. On that night, the atmosphere being extremely moist, these sulphur compounds arose from the establishment mixed and saturated the air; the gases from the basins may have intensified these, but those from the basins alone did not cause the mischief; for in the other places, near to foul sewers and basins on that night, we find none of the blackening effect which is around and about that establishment.

Professor Horsford goes very carefully into the analysis of the waters of different sewers of this Miller's Basin, and tells us about the sulphuretted hydrogen, but does not give much space in his Report to the gases and vapors which emanate from the different employments carried on within the works. I am sorry that it is so. I wish that he might have gone over the same ground as Professor Munroe, so that we might know from him whether he would agree with him in his Report in regard to the different gases which he gets, especially the ammoniacal. It may be that, as the learned Professor is pecuniarily interested in works of like character, there is some little prejudice in the Professor's mind; for certainly a gentleman whose labors have chiefly been in finding ammonia, and in making ammoniacal sulphates, and utilizing ammonia as it can be utilized in making phosphates, — he certainly, it seems to me, unless there was some slight prejudice in his mind, would be able to find that substance from this large amount of animal matter at the bottom of the basin, and from the vapors which are evolved from the establishment; he would be able to find and to say something more about it than he has in his most careful Report.

In regard to the soups, which we say will foul the sewers, he makes conflicting statements, so that I cannot tell which he means to rely upon ; and I must rely upon our own chemist for the solution. On page 28 he tells us that the water in which meats are boiled (this is speaking of the waters that are poured into the sewers in Boston and Cambridge, and which he says came up through the sewers on the night in question and on similar nights) —

"The water in which meats are boiled, — that is, the meat extract, — ready to undergo rapid putrefactive fermentation, is poured into the drain. Meats are purchased at the shops to be sound, and found to be unsound. The boiling arrests the change ; but the putrid juices are poured into the sink, and reach the sewer."

On page 31, he tells us —

"The soup-liquor, or meat extract, has no offensive smell."

And he goes on to tell how well it could be poured into the sewers without offence to anybody. I think he is frank enough to admit that the fat itself does emit an odor such as is perceived from the frying of doughnuts.

Mr. Avery, in his — I was about to say argument — in his Report, labors hard in the same direction, — that is, not in the direction of what is evolved in the establishment ; but we do find from his Report some aid in determining the source of the odors. I will refer to one portion of it, which says that "fats greedily absorb odors. . . . . Lard is one of the most delicate means we can employ to collect odors." In two or three places, he makes mention of the fact that grease or fat rapidly absorbs odors, and gives them off to the atmosphere. If that be true, and the fat which is put into these close tanks, being mingled with more meat, which contains, as I understand, more sulphur and more ammonia, — certainly a greater amount of ammoniacal gases and sulphides are emitted than from the pure fat which is put into open kettles. These gases, of course, on the authority of Mr. Avery, must be taken up by this fat. That is the reason why lard which is tried out in close tanks must be dried, as it is called, and why these kettles for drying are put so high, and under the ventilators. The lard takes up the foul gases and odors, and is not fit to go upon the market ; and it is then in those kettles submitted to a hot atmosphere, and the gases go out immediately through the ventilators, which are close above. These kettles hold some 20,000 pounds

each, or in that vicinity; so there are 60,000 pounds of lard at several times a day, and perhaps at all times, which amount will be increased when they try all their lard in close tanks, and more kettles must then be used; and there, I think, you will find a source from which there will be an increase in offensive odors. Mr. Avery's allusion to the stenches which were distinguished at the House of Parliament has nothing to do with this question. We distinguish between these several odors. Our noses are educated. We have been there so long that we can tell the smell of the hog from the smell of the basin. We can tell the smell of the fresh-fat rendering odor from the vile and corrupt rendering odor. We can tell the opening of hogs from the scalding-tank. In London, they first mistook the stench to come from a graveyard, then from a bone-boiling establishment; and, finally, it was found to proceed from the river Thames. So it shows that their nostrils were not educated to the point that ours are, which can distinguish between these odors at any time, and trace them up to their source.

The defendants have brought in many excellent people, — most of whom live far away from the place, — in order to tell you that in their opinion this establishment should not be removed. They are not troubled with the odor; they don't have to live near it, but most of them have experienced the fresh-fat odor when arriving near to the establishment. They have no personal interest; but most of them would prefer not to be obliged to live near the works. Some were interested alone in the filling of the basins, looking upon it as a matter of expediency alone, that this establishment should be allowed to remain where it is till Mr. Squire goes forward and fills his basin, and then they care not how soon the establishment is wiped out; of this class are the respective Mayors summoned in here by the defence, — the Mayors of Somerville and Cambridge: Mr. Brastow does not hesitate to give that as his opinion. A very few of their witnesses — a most extraordinary few — come from the immediate locality of the nuisance. Most of these who have been brought here by the defence are in some way interested in the continuance of these works, or are not interested at all in the community in which they reside. Among them was Alderman Sawin, who confessed his brother is employed at the establishment; Mr. W. B. Hastings, who does a large amount of defendant's insurance; Mr. McDaniel, who has no personal interest in the ward, or in any property in it, has only lived there some four years, and his

knowledge of it is so limited that he could not tell toward what point of the compass his front door faces. Mr. Chaffee is the only one of the latter class of witnesses who testifies that it seems to him to be inoffensive. His sympathies, we can plainly see, are strongly in favor of the defendant. Mr. McSorley, now an Alderman, brought in here also by them, testified in regard to the strong odors received from the marsh and from the low districts where the filling is put in; but on his cross-examination he confesses that his family had been affected by the rendering odor and his son made sick from the odors of which we complain as coming from the Squire establishment. Mr. Adams, master of the House of Correction, who lives on the other side of the hill, has a sewer there which troubles him to a greater extent than even the rendering smell, although he has found these offensive rendering smells at times. Mr. Harvey George admits that he has smelt the live-hog odor at his house on Otis Street, and he also admits that he has smelt the rendering smell, but never traced it to its source. Not one of the witnesses that have been brought from the vicinity has traced the smells to their source; not one of those who do not live in that vicinity has traced any of the rendering odors to this establishment. General Chamberlain and Mr. Obadiah George have both smelt the fresh-lard odor on Cambridge Street, but none who are not employees have traced any of the vile rendering odors, except a few who live near Mr. Reardon's establishment, who complain of his horrid odor. This was admitted. We have to say to those witnesses who have testified in this case, of odors which emanate from those other establishments, that we have already presented those places as nuisances to this Board; that we have their names, and will soon ask them to come forward and help us abate them. Many of them had false theories; Mr. Merrill, for instance, had gotten up a theory of metallic vapors arising from the heights of the high chimney of New England Glass Company. None of them have experienced the foul odors that our witnesses have experienced from this establishment; and of course their testimony should only be given the weight that it deserves, which is, that they know nothing in regard to this establishment.

The defence say that if any stench is produced at their establishment it is all destroyed before it leaves the place. They say their tank-water is purified, and that this is done by the pouring in of blood, which is allowed to coagulate and gather up the organic matter, which is then shovelled out and converted into fertilizers. That

is no new experiment; for I have read in the Report of your Board of the present year, in speaking of the sewerage question, that in London, in 1868, I think, a Board of Commissioners was appointed to inquire into the best method of preventing the pollution of rivers. And among other methods they find what most nearly approaches this method of rendering the tank-water inodorous and innoxious, what is called the A B C process, the alum, blood, and coal, or Sillar's process; and I should like to read a few extracts from what your Honorable Board did state in regard to it, and also what conclusions were reached by that commission. And this is what your Honorable Board there say: —

"A B C Process. — Of all the plans at various times proposed for the purification of sewage, perhaps no one has awakened greater interest than Sillar's patent, commonly known as the A B C process. The patent is in the hands of a stock company, and the representations of those interested in the company are of the most favorable character. It has, moreover, been deemed by the Rivers' Pollution Commission of such importance that they have given an entire report as to the details of their investigation of it. The following is an extract from the specification filed by the patentees: —

"'We add to the sewage to be purified a mixture consisting of the following ingredients: Alum, blood, clay, magnesia, or one of its compounds, — by preference, the carbonate or the sulphate, manganate of potash, or other compound of manganese, — burnt clay, otherwise known as ballast, chloride of sodium, animal charcoal, vegetable charcoal, and magnesian limestone. Of these substances the manganese compound, the burnt clay, chloride of sodium, and magnesian limestone may be omitted, and it is not essential that both animal and vegetable charcoal should be used. If any of the ingredients named should from any cause be present in sufficient quantity in the sewage, it may, of course, be omitted from the mixture. The proportions in which the ingredients are to be used vary according to the nature of the sewage to be purified; as, for instance, if a large proportion of urine is present, we increase the proportion of clay; if the sewage is much diluted, we slightly increase the proportion of alum and blood; if it contains a large proportion of street refuse, we decrease the proportion of clay.'

"From the quantities employed it is evident that many of the substances mentioned in the above specification are non-essential; the essential ingredients of the A B C mixture are alum, blood, clay, and charcoal. These materials, in proper proportion, are mixed with water and run into the sewage in a continuous stream; the mixture is then sub-

jected to violent agitation, and allowed to subside in tanks. A heavy flocculent deposit soon settles to the bottom of the tanks, and the clarified liquid is discharged into the river, or into tide-water, as the case may be. When enough of the sediment has accumulated in the tanks it is removed, dried in a Needham's press or on drying floors, and then offered as a manure.

"The proprietors of the patent, the Native Guano Company, limited, claim for their process two advantages: first, that it purifies the sewage to such an extent that it may, without harm, be discharged into a river; secondly, that they produce a valuable manure, a manure costing about 25*s.* a ton to manufacture, and worth, at least, their selling price, £3 10*s.* ($17) a ton.

"As already stated, the process has been subjected to a searching investigation at the hands of the River's Commission. As there is no reason to suppose that the Commissioners were actuated by any motive other than a desire to ascertain the truth in the matter, full weight must be given to the result of their examination. It will not be necessary in this place to detail the results of their analyses, nor the methods they employed; it will suffice to give their conclusions. They say: —

"'Our investigations in Sillar's, or the A B C process of treating sewage as carried out at Leicester and Leamington, extending over nearly two years, have led us to the following conclusions: —

"'1. The process removes a large proportion of the *suspended* impurities from sewage, but on no occasion when we have seen it in operation has this removal been complete as to render the effluent sewage admissible into running water.

"'2. The A B C process removes a very small proportion of the soluble polluting matters from sewage. After treatment by this process the effluent sewage is very little better than that which is obtained by allowing raw sewage to settle in subsidence tanks. . . . .

"'4. The manipulations required for the extraction and drying of this manure are attended with a nauseous odor, especially in warm weather, and would occasion a serious nuisance in or near a town.'"

This, it would seem, is substantially the same method which the defendants come in here and say they are using to get rid of the foulness of their scalding-tank. It would seem that for two years the London Commission has looked into a subject of a like kind, and find that only a portion of the suspended impurities, and none of the soluble, are caught up and utilized.

We do not say that the smells of the 31st of July, as I have before mentioned, came merely from this one establishment, — they

came largely from it, — but to it were added the nauseous vapors from the basins. That was the night the new machine was put in which was to do so much good; and the Aldermen were invited to inspect it. That night no trap was in the machine, nothwithstanding the testimony of Mr. Carson and other employees of the establishment, for we have it from Mr. Kendall's lips, the machinist who put it in. There was nothing there but a common goose-neck, which I tried hard to make the employees testify. But they would not. There was nothing but that common goose-neck. We think that, the machine not being in perfect order, these noxious vapors escaped from the goose-neck all night, and, mingling with the other vapors of the territory, polluted the air near the establishment. But they say, why, if these vapors and gases blacken the paint, why is it that the houses which are directly opposite the works are untainted? The answer is very simple; I agree with brother Muzzey that there are buildings which shield the houses from the vapors of the Squire Basin. But the basins are not wholly on the north; they extend around to the west. And if the foulest basins are west of this establishment, as the defence claims, and vapors from the basins were the sole cause of the discoloration, why, then, the odors coming down Medford Street would color those houses on their westerly sides and would also deflect from the Squire buildings and color opposite as well as on Sixth and Cambridge Streets. It seems very plain to me. We claim that these vapors are heated when they arise from the establishment, and they have not fallen. It is too near for them too fall. The vapors from the Squire Basin certainly cannot reach them; and the vapors from the establishment have not been sufficiently cooled in the upper atmosphere to descend so near and cause that intense discoloration.

They tell us that since our movement against the establishment they have placed deodorizers in their pens; they have covered them with charcoal. Mr. Munroe says that charcoal in hog-pens theoretically is successful in deodorizing, but practically it is not. And he knows from experience the practical working of their deodorizers.

In order to show how much ammonia might be produced in the close tanks, since the beginning of the hearing we have asked the defendants almost daily to produce the actual number from their books of dead hogs which arrive at the establishment and are used up there. They have daily promised; but we have not yet received the statement.

Mr. Muzzey. You shall have it this moment. It has escaped our attention.

Mr. McIntire. It makes no material difference. You can put it in before I get through. But we have been unable to ascertain. It has been estimated about one per day. I think it is much more than that.

Mr. Muzzey. It is about ten a week.

Mr. McIntire. They say also, when this sewer is finished and the soup and the waste are carried into it, there will be no smell.

The statement of the number of dead hogs received at the establishment being handed him, Mr. McIntire read it and said : —

From April to November, — in nine months, — their account says 350. There are 350 dead hogs boiled up in the tanks during this period.

They say that, when their sewer is completed and the basin filled, there will be no more trouble. The soup and waste will then go into the sewer, and there will be no noxious vapors, their apparatus consuming the vapors generated in the close tanks, and the hogs being deodorized and the buildings improved, we will no longer have cause for complaint. But will that be true? Shall we not have another Miller's River at the end of the sewer itself, in Charles River under Craigie's Bridge, the bed of which, it is testified, is lower than anywhere else, when the solid matter of sewage, as Professor Horsford told us, will flow up stream, perhaps, rather than down, and lodge upon the Cambridge flats, which now are so foul from the sewage which is emptied upon them. I think that the people of Cambridge, Charlestown, and Somerville may not be troubled so much, but the people of Boston will be troubled more, by the nuisance than they have heretofore been, provided these establishments are allowed to empty their sewage into this contemplated sewer and have it discharge where it is proposed.

They urge in their defence, that there is no ill health at the establishment; that the men are all strong and their families well. Of this I will speak anon. The statement that no more odor is to be perceived than that which arises from the frying of doughnuts, forcibly reminded me of what I found in the Report of the Superintendent of Health of the city of Providence upon the subject of fat and lard. This Report was presented to the Board of Aldermen in September, 1871. It is almost identical with the defence in this case. I will read what he says on page 5. In speaking of the dif-

ferent processes, some being rendered in open kettles and others in close tight tanks, he says : —

" The question to be considered is this : Does this process, conducted in this manner, constitute a nuisance which demands the action of your Board for its abatement ? The answers to this question will be of the most contradictory character. If you visit these establishments, no special nuisance will be found. They are conducted in as cleanly a manner as the business will allow, and we are bound to believe, from the character of the owners, in most cases, that they are desirous of doing nothing that will be an injury to their neighbors, or will make a public nuisance.

" The greater portion of the odor of the boiling fat is carried upwards by the chimneys and ventilating draughts, so there is no odor perceived in the establishment which would be specially offensive except to Hebrews, and to those Christians who believe that the Lord had good and sufficient reasons for declaring some to be unclean animals, and forbidding the use of their flesh by his chosen people.

" If we inquire on the spot of the owners or employees of the establishment, they scout the idea of there being any possible nuisance in the business they carry on. They would have you believe that their business is the healthiest in the world ; that no person engaged in it is ever known to be sick : and they will tell you that you might as well complain of frying crullers or doughnuts as being a nuisance.

" This is nearly the language I heard at one of the establishments reported, in my investigations upon the subject. But on the very same day I was informed by parties of the highest respectability and character, living twenty, thirty, and more rods from the same establishment, that the odor from it is extremely offensive, that it is perceived almost every day in the year, except when the wind is strong in the opposite direction ; that they are often compelled to close their windows to avoid it, that women and children are made sick by it, and that some persons have been obliged to leave their rooms entirely on account of it. These parties are ready to make their statements before your Board, or elsewhere.

" There are a great number of other persons who have not been troubled to the same extent, but who have often perceived, and have been annoyed by, disagreeable and offensive odors from these establishments. I have no doubt that some if not all the members of your Board can testify to this.

" It is a well-known fact, and easily explained, that persons who are constantly employed in any offensive business will become accustomed to the disagreeable odors, so that they will be no longer offensive to them. Such persons are inclined to scout the idea that these odors can be

offensive to others, or can make others sick. This will explain, to some extent, the positive language of denial upon this subject, generally used by those employed in such establishments.

"Another fact will also aid in explaining the contradictory testimony we find in relation to this matter. It is the fact that the greater portion of the offensive odors in these establishments are carried upwards by the ventilating flues, and are not perceived by those in them. But with favorable winds and atmospheres, these same offensive odors, with all their concentrated nauseousness, will be carried directly into the family-rooms and bedchambers of persons living at considerable distance from the source of the nuisance.

"Even the worst nuisance in the city, the establishment for boiling dead animals and slaughter-house offal at Field's Point, is comparatively inoffensive on the spot; but the most horrible stenches are wafted from it by the winds to the hills beyond, to vessels and steamboats in the harbor, and sometimes even pervade large portions of the city.

"It is certainly possible that the fat-boiling establishments in the city may be comparatively inoffensive inside, and yet may be serious and annoying nuisances to great numbers of people at considerable distances from them."

On page 8 he says:—

"Having stated these facts in relation to the business of fat and lard melting in this city and in other places, and having shown the opinions of others upon the subject, we are now ready to give an answer to the question, already stated, which is to be decided by your Board, namely: Does this process of fat and lard melting, conducted as it is in this city, constitute a nuisance, which demands the action of your Board for its abatement? I am compelled, after the most careful consideration, to answer this question in the affirmative."

And on page 10, he says:—

"It seems to me to be established that the fat and lard melting establishments, as conducted in this city, do make a nuisance which requires to be abated."

"It is certain that all fat and lard melting should be done in immediate connection with the place where the animals are slaughtered, and that neither fat and lard melting establishments nor slaughter-houses should be permitted in the compact portion of cities."

To which we all agree, and my brother Derby also agrees in that fact, in his argument before the Joint Commission.

Mr. Derby. Would you do me the favor, sir, to read the resolutions with which Dr. Snow's Report closes, which is that fresh-lard

matter may be rendered in a city within twenty-four hours after the animals are killed?

Mr. McIntire. Yes, sir; I will read the whole of his recommendations, beginning at the first: —

"I would recommend the following: —

"First, That the rendering of fat or lard within the limits of the city be entirely prohibited, except it be from animals slaughtered for food, and unless it be done within twenty-four hours after the animal is killed from which the fat or lard is taken.

"The reason of this order is obvious, from the preceding report. The effect of it would be to stop the rendering of the fat and lard of animals killed at the West. It would also stop the boiling of offensive fat from animals that have died from natural causes.

"Second, That the rendering of fat and lard in open kettles be prohibited, and it be allowed to be done only in such tanks or kettles as shall effectually consume all odors from the heated fat.

"The effect of this, if enforced, would be to close all the fat and lard melting establishments in the city. At present, where any attempt is made to consume the offensive odors, the combustion is so imperfect that the animal matter contained in the steam is only scorched, and passes out of the chimney in a far more offensive condition than it was originally. There are, however, several processes by which the odors from the heated fat may be effectually destroyed, and it is no more than right that parties engaged in the business should be compelled to use these processes."

Mr. McIntire. As I have said before, I was pleased to find that my brother Derby agrees entirely with this conclusion in his argument against the filling of the lower basin, before the Joint Commission, when he said: —

"Is it desirable that small houses shall creep into that area, — creep up around the packing-house? Is it not better to keep them at a distance, where they can have the healthful influence of air and water? Is it not better for Mr. Squire to have his establishment over the water tolerably pure, than to have these houses abutting upon it, cutting off all the avenues for the admission of pure air to the slaughter-house? I respectfully suggest to this Commission that you promote health by keeping them at a distance, — by keeping this basin open, if it can be made reasonably pure."

Mr. Derby. I indorse it, sir, again.

Mr. McIntire. I only wished to show the Board that you indorsed it then; it pleases me to have you indorse it now. That is also

our position. We say that the farther the establishments are from the dwellings, the healthier the locality will be.

Now, in regard to sickness, they have said that they have known of no sickness in the establishment. But very curiously, from their own testimony, we have elicited the fact, that the superintendent has been off a portion of two summers on account of sickness; that the head slaughterer has had two attacks of typhoid fever; that the gentleman who took care of the tanks on the 31st of July has often himself become sick, and has applied for another position, which has been given him.

Mr. Derby. He was not strong enough to do that duty. He was not sick.

Mr. McIntire. So, though when we have been requested to show any particular instance where there has been sickness beyond temporary nausea and irritation of the throat caused by the smells which emanate from this establishment, we have been unable to do so, yet they themselves, by their own witnesses, have shown us these of the parties in their own establishment who have become sick and have been affected by the vapors.

Mr. Muzzey. You claim three cases of illness, in two years, among seven hundred men. Nothing very alarming in that!

Mr. Derby. And one of those cases not of sickness, but lack of strength.

Mr. McIntire. That simply proves, not that three alone of your people have been sick, but that we have discovered that three at least have been sick, while you have said that not one had been sick, but, on the contrary, the employees were the healthiest in the community.

In regard to the report in the Boston Medical and Surgical Journal on the health of the people living in the localities about this establishment, we do not claim that mortality shown in these statistics is entirely due to this establishment. Of course, the low land, the vile basins, and these establishments combined, go together to make up the extreme mortality which is found in that district. We should not ask to have one alone of these causes abated; we ask to have all these causes abated, for they all have an influence in the extreme amount of sickness in that locality.

Now, I pass to what is said by my brother in his argument in regard to the action of different boards of health in regard to this establishment. I disagree with him entirely in what he has given

you as the result of different presentations and as to the action of those different boards. I say to you, and you have the papers before you, see whether I or my brother be right, — I say that this and other establishments have, by both the Boards of Health of Cambridge and Somerville, several times been pronounced and adjudged nuisances to the inhabitants and population surrounding them. On November 26, 1872, after a long hearing which we had before the Cambridge Aldermen, which took up a period of some two weeks, they unanimously adjudged the place a nuisance. The records of it I have here shown you. But they did nothing upon their report, immediately retiring from office. Before that, in 1871, the authorities of the cities of Cambridge and Somerville together appeared before your Honorable Board, and presented this establishment, among others, as a nuisance, and asked for your action upon it. In 1873, on July 16, the city of Cambridge again, by its vote, adjudged this, among other places, to be a nuisance, and left the matter to the City Solicitor to proceed against the several establishments. But when the City Solicitor prepared and presented the different indictments for their signatures, they were fearful of their great power, great influence, political and social, and money, and dared not raise their voice against these establishments. In 1873 (also this year), August 25, the Board of Health of Somerville, as I have shown you, by discriminating testimony, adjudged this, among other places, to be a nuisance, and has said plainly, in its official report, that this place was a nuisance. There, I say, are four different adjudications: one from both cities in 1871; another from the city of Cambridge, after a long and patient hearing in 1872; and two during the present summer from local boards of health, who only dared to go so far as to say (what the people knew before the complaint was presented to them) that the places were nuisances, but dared not raise their hand to prevent or abate the nuisances. That I submit, may it please your Honors, is the reason why the Legislature constituted such a Board as this Board of Health. It is aloof from all influences and powers which can be brought to bear on a purely political board such as these local boards always are. That is the reason why our committee has finally applied to this Board for relief, and asked you to do what should be done, and which they are so fearful to take hold of.

Another judgment against this establishment is the judgment of the Boston Board of Health. Dr. Durgin, and Mr. Boardman, its

Chairman, after experiencing these smells on the other side of the water, in Boston, and tracing up the source of these offensive odors, unqualifiedly say that they experienced similar odors in the establishment that Mr. Boardman smelt at his house, and similar to the odors complained of; and we think that that Board has adjudged this place to be a nuisance. I was about to refer to his language, but I think I need not. He says it in unqualified terms. When asked by my brother how he would compare the business as conducted at this establishment with that conducted at the Brighton Abattoir, Mr. Boardman says it is not to be compared. His language was that one of them was conducted in a neat and unobjectionable manner, and the other was an intolerable nuisance. I believe those were the words that he used.

Mr. Derby. No such language, Mr. McIntire.

Mr. McIntire. I can refer to it, but I don't think I will take up the time of the Board for that purpose. I can find it.

These complaints against this establishment have covered a period of between three and four years. The proprietors have promised they would so improve their premises by putting in new apparatus and improvements, that the stench would no longer remain. But continually we have the same complaint; the odors, instead of decreasing, are increasing with the size of the establishment, and we find them to-day worse than when we first complained, four years ago.

Pardon me, it was Dr. Durgin who testified. Since I said it was Mr. Boardman, I have asked for Dr. Durgin's testimony, and find he says this, in his cross-examination, of the establishment and the Abattoir: "One was a great nuisance, and the other was not." That is the way he compares it. "The Abattoir was free from odors; the other I should not wish to stay a great while in or around. I have no doubt that the odors complained of in Boston come from the establishment, and make people sick."

Mr. Boardman did say something in comparison in his cross-examination. He says that "there was no sort of comparison between Mr. Squire's and the Abattoir."

Mr. Derby. And the Superintendent of the Abattoir thought Mr. Squire's establishment perfect.

Mr. McIntire. But two of the Board of Health, whose business is to ferret out and look up nuisances, who are paid by the city of Boston to distinguish between one such place and another, say, by

unanimous judgment, that this is not to be compared with the Abattoir.

Mr. Derby. I would not, sir, have interrupted you, but I understood you to speak of an adjudication.

Mr. McIntire. I suppose they have no power to make any adjudication in the matter.

Now it may be possible to render an establishment of this kind so perfect, or so near to perfection, that it would cease to be a nuisance to the population and the people. But certainly, in the history of Massachusetts, hog-slaughtering has as yet not reached that state of perfection. It may at some future time. Nor in the various cities of the Union, or in the cities abroad, do we find that absolute perfection has been reached; on the contrary, from all the advices we are able to procure, that they are constantly troubled from like sources of nuisance, which is only kept down to a tolerable state by the use of the most extreme cautionary measures, by corps of Sanitary Police, and by such regulations as will allow Boards of Health, at any moment, to enter into the works and control them, subject to the desires of the people, rather than to the ideas of the owners of the establishment. This establishment might, by such force, be brought to a tolerable state of perfection. But we claim it is not, and that the Board cannot act upon what the place may be made to be, but what it now is.

Much has been said in regard to the territory where these establishments are located, or where, perhaps I should say, this establishment is located; about its being of such a nature that it should be devoted entirely to trade. That may be. In the future it is possible that all that low territory there will be devoted entirely to trade. It is, I suppose, the nearest suburban place to the business centre of Boston. There is no town outside that is so near, or with any portion of it so near and so convenient. But it is surrounded by Charlestown, — which is now part of Boston, — by Somerville, by the higher and better portions of Cambridge; and I submit that this territory, if it is to be devoted to manufactures, should not be devoted to such manufactures as will taint the atmosphere of these healthy, high, and well-located places that surround it, where people intend to live and must live, where the finest residences are. Nor should such be permitted to pollute the atmosphere of the territory where they are located, to the discomfort of persons not employed in those establishments, and whose avocations compel them to reside in the locality near to these establishments.

The committee saw, when they began their action against this establishment, what a fight would have to be made to abate it. They saw what efforts would be used to bar their work and clog their wheels in every direction. But they believed, when they came to this Board, these would be unavailing. They felt that you would take a broader view than local boards, and would look to the evidence, instead of political influence, in solving this great question. It took a Napoleon in 1810 to compel the butchers to assemble in abattoirs. It will take no less power than that of a State Board of Health, with the extraordinary powers given it by the Legislature of Massachusetts in 1873, to compel this and other like establishments to go into abattoirs, under proper supervision and control, where people shall not be injured by their foul and noisome exhalations.

In behalf of the committee whom I represent, I thank you, gentlemen of the Board, for your great kindness throughout this whole hearing, and for the attention which you have given me. We are content to leave the determination of this matter in your hands, for we know that here we will get justice. We have been rebuffed and defeated — personally rebuffed, defeated by non-action — when we have applied to other boards. Here we feel safe to rest our case, satisfied that whatever result may be reached, the verdict will not be affected by fear of the defendants, Boards of Trade, or political bodies.

Mr. Derby. The gentleman has put in something from my argument before the Joint Commission. I do not propose to read, but I have marked a few parallel passages, to which I wish the Board would refer. Some allusions are made to a statement in my opening with regard to the blackened boards that have been presented here. Now, to the best of my recollection, I did n't allude to them in the argument. They were spoken of by Professor Horsford in his testimony ; and I had n't heard of them until they were presented.

Mr. McIntire. My recollection is that Mr. Derby alluded to these boards as being blackened in a single night.

Mr. Derby. I had not seen them at the time I made my argument.

This concluded the hearing, and the Board took the case under advisement.