

Handbook for inspectors of nuisances / by Edward Smith.

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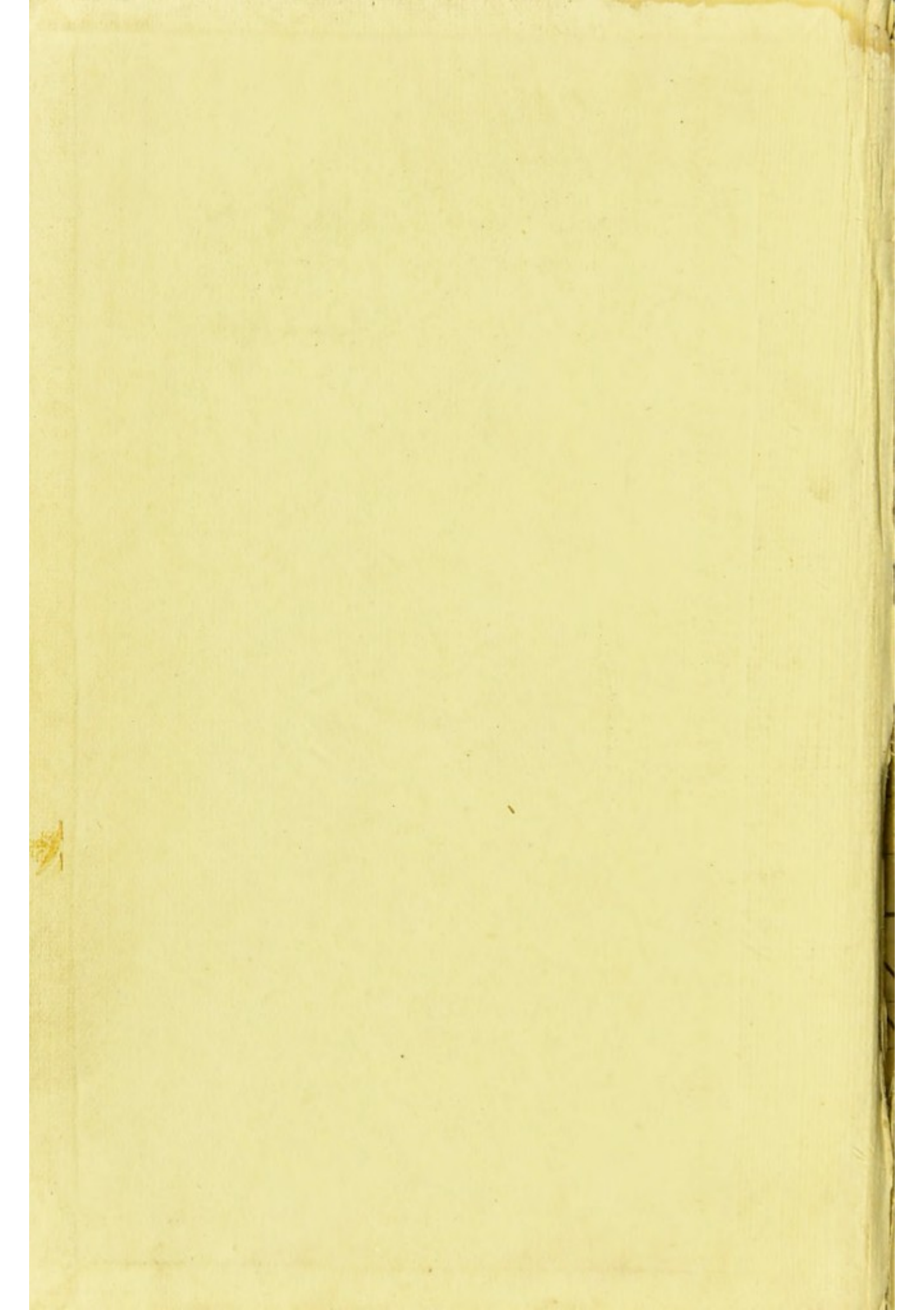
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~~Joe Smith~~
~~1900~~

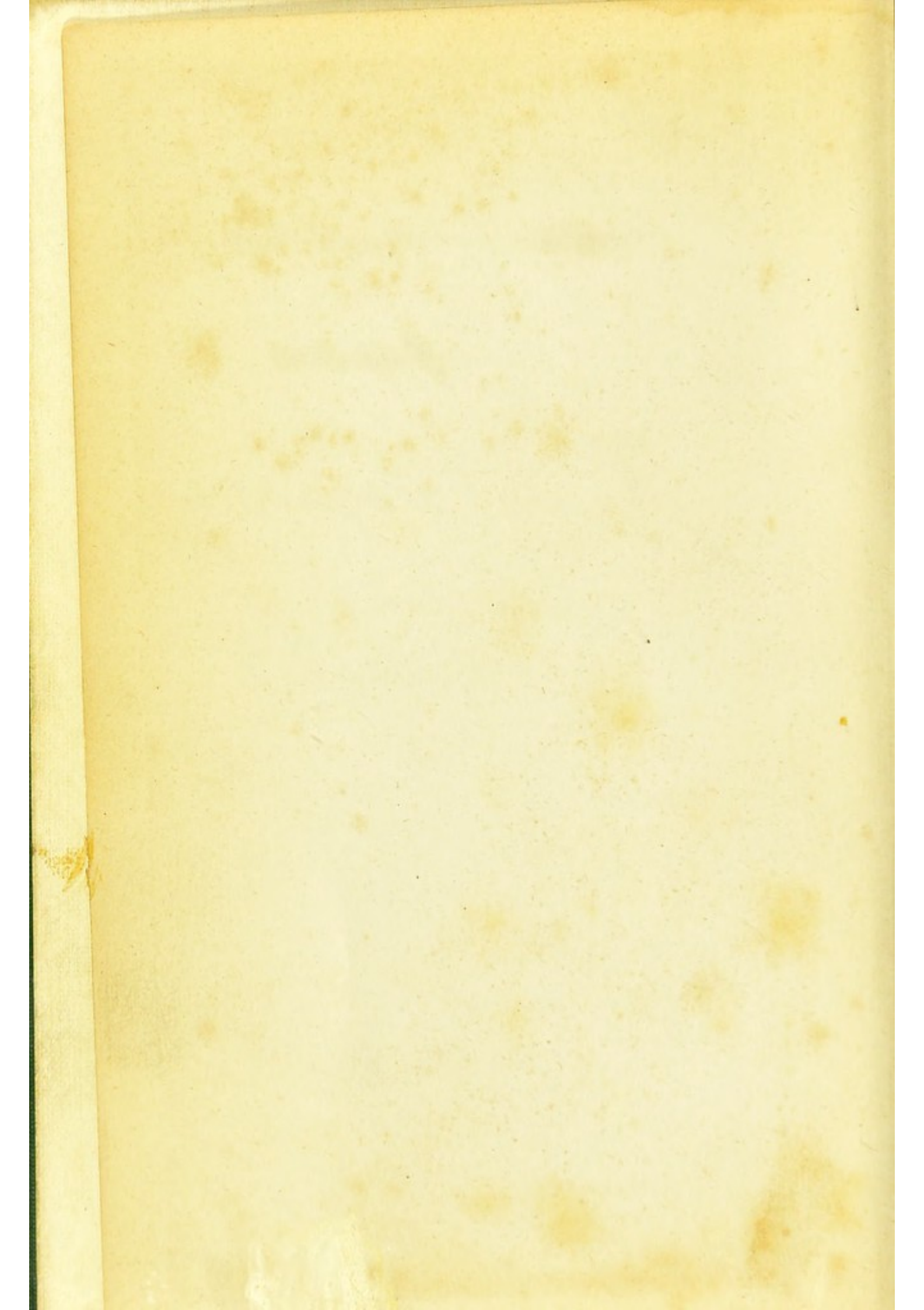
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HANDBOOK
FOR
INSPECTORS OF NUISANCES.

BY
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PREFACE.

THE Inspector of Nuisances, when acting under the provisions of various Acts of Parliament, and the Orders of the Local Government Board of 1872, has numerous functions to perform in reference to the public health, some of which devolve upon him as the agent of the sanitary authority or the medical officer of health, whilst as to others he is empowered to take independent action.

In preparing the *Manual for Medical Officers of Health*, and the *Handbook for Inspectors of Nuisances*, I have endeavoured to keep this distinction in mind; and whilst both officers are engaged on the same subjects, it seemed desirable that each should have the greatest information on those in which he has the greater responsibility. Moreover, as the medical officer of health is presumed to be a man of scientific attainments, whilst the inspector of nuisances may not have that advantage, scientific questions have been more fully discussed in the *Manual* than in the *Handbook*, and the inspector has been referred to the medical officer as his guide thereon.

Hence, whilst questions of disease, ventilation, sewage, and water supply have a prominent place in the *Manual*, those of food unfit for the use of man, and the apparatus required in sanitary works, are much more fully discussed in the *Handbook*.

It appears to me that the inspector is to be the eyes,

nose, and ears of the sanitary authority, whilst the medical officer is in a sense the head ; and the officers thus combined will together be a useful adviser ; but this implies that the area under the supervision of the former shall not be larger than he can inspect at very frequent intervals. This is very evident as to the knowledge and removal of nuisances, the supervision of water fittings and supply, and the examination of food. But when the inspector is required to have charge of sanitary works, an additional reason is offered for limitation of area, for, if it be too large, his supervision of workmen will be nominal and illusory, whilst his time will be so much engrossed by the discharge of this duty and in travelling that he will not be an efficient coadjutor of the medical officer.

The supervision of the supplies of food for man is a subject of the utmost importance as it affects health and in a pecuniary point of view. Diseased meat may have numerous victims since many eat of it, and to allow even one joint to be consumed may allow a great evil ; whilst to condemn food as unfit for the use of man which is not so injurious as to be hurtful is to inflict an injury on the possessor, and to unduly maintain the present high price of that food. Hence it involves a consideration of public policy as well as private gain or loss. The question is however in a most unsatisfactory state, and it may be well doubted whether the testimony of some so-called skilled witnesses is not causing justice to err and inspiring groundless fears. Dr. Letheby, who has had so large an experience on this matter, writes : " I feel that the question of the fitness of such meat for food is in such an unsettled state that my action in the matter is often very uncertain ; and I should

like to have the question experimentally determined, for, as it now stands, we are either condemning large quantities of meat which may be eaten with safety, and are therefore confiscating property and lessening the supply of food, or we are permitting unwholesome meat to pass almost unchallenged in the public markets."

With an important scientific subject so novel and unsettled, it is not desirable that witnesses should dogmatise, but rather that they should state the facts on which their opinion is founded ; and it is clear that whatever information is of a reliable nature should be placed before those justices with whom the adjudication rests.

For these reasons, and to inform the inspector of nuisances to the best of my ability, I have entered largely into this question, and have made use of the experience and knowledge of Dr. Letheby.

The question of sanitary works is also one which I have fully considered, and have placed before the inspector drawings of a great number of sanitary appliances, and the suggestions issued by the Local Government Act Office, from the pen of a very distinguished sanitary engineer and colleague, Mr. Rawlinson, C.B.

As this sheet is passing through the press, there are warnings of the approach of cholera in its Asiatic form, and it may be desirable to add a remark respecting it.

So far as our knowledge extends (and it has scarcely been increased since the last epidemic) the disease is propagated in this country chiefly, or perhaps only, by the excretions from the alimentary canal of cholera patients, and the poison thus presumed to exist must be taken into the body in a fluid or solid form ; as by drinking infected water, or

by handling linen or vessels on which the discharges have lodged, and then carrying the poison from the hand to the mouth, or by eating food from vessels which have been thus infected. There is not sufficient evidence to show that it passes with the urine, perspiration, or the exhalations of the lungs, or that the poison or germs of disease pass through the air and, being inhaled, cause cholera as certain fevers are caused from their own poison.

Hence it is almost or quite exclusively a water and not an air poison, and the inspector of nuisances should give his particular attention to the water cistern and supply, and inculcate the utmost cleanliness upon persons when using the water-closet or privy, and when removing the discharges of cholera patients.

Whether cholera can be propagated by dried cholera excretions, which in the form of dust may pass through the air (as when foul sheets having been allowed to dry are then rubbed), is not known, but such filth should be immediately removed and disinfected.

It must not however be assumed from these remarks that the causation of cholera is perfectly understood; and we may safely affirm that unsanitary and certain meteorological conditions prepare the body for the reception and action of the essential cause, whatever it may be.

EDWARD SMITH.

140 HARLEY STREET, W.:

June 1873.

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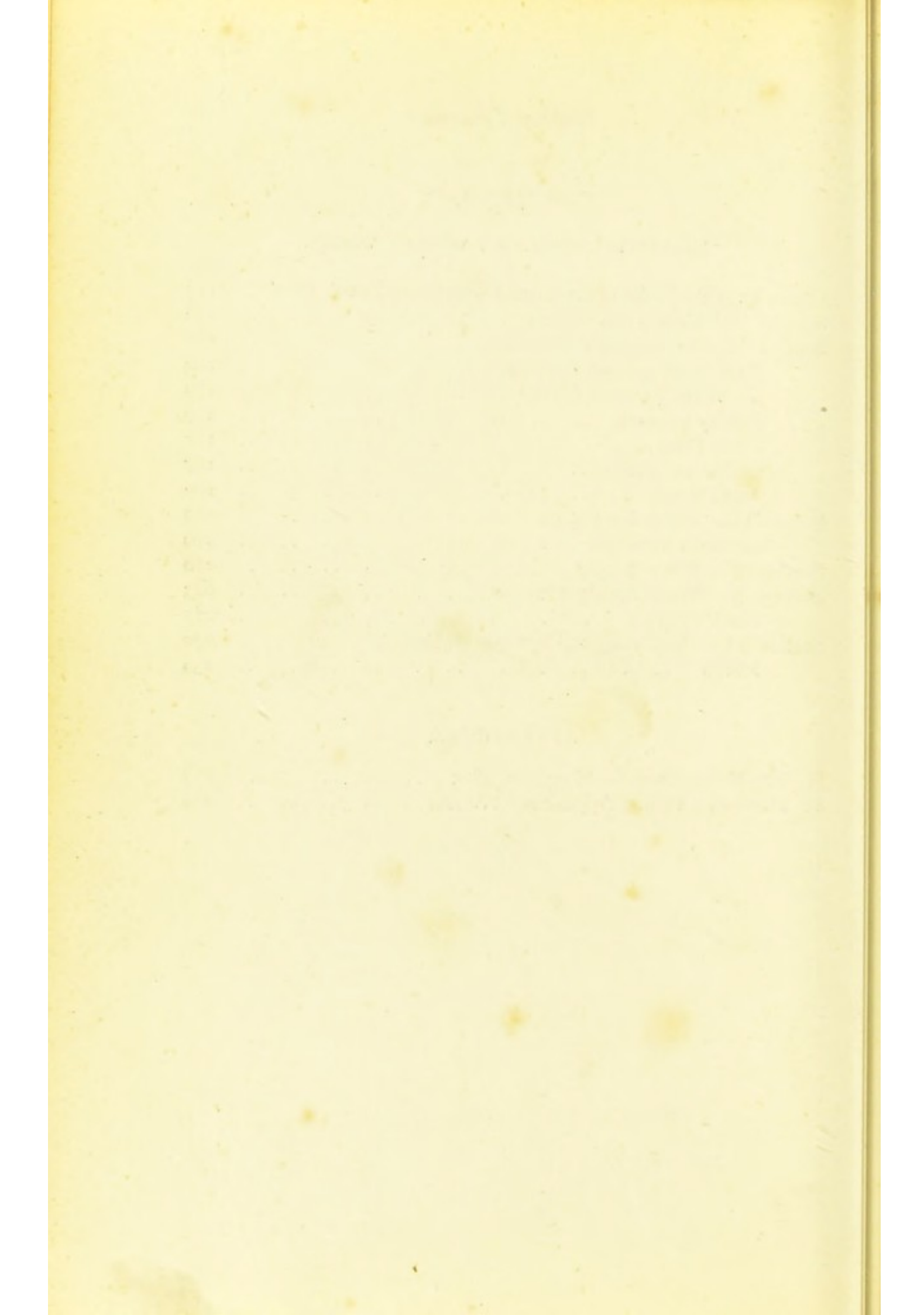
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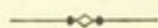
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- Artisans' and Labourers' Dwellings Act*, 1868 (31 & 32 Vict. c. 130)—ss. 3, 4, p. 19 ; ss. 5, 6, p. 116 ; s. 35, p. 23.
- Common Lodging-houses Act*, 1851 (14 & 15 Vict. c. 28)—s. 11, p. 94 ; s. 12, p. 21 ; s. 13, p. 104 ; s. 14, p. 94.
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- Diseases' Prevention Act*, 1855 (18 & 19 Vict. c. 116)—s. 4, p. 20 ; s. 14, p. 23.
- Enclosure Acts Amendment Act*, 1857 (20 & 21 Vict. c. 31)—s. 12, p. 36.
- Metropolis' Local Management Act*, 1855 (18 & 19 Vict. c. 120)—s. 73, p. 42 ; s. 81, p. 40 ; s. 82, p. 22.
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- Metropolitan Buildings Act*, 1855 (18 & 19 Vict. c. 122), p. 237.
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- Nuisances' Removal Act*, 1855 (18 & 19 Vict. c. 121)—s. 8, p. 34 ; s. 11, pp. 20, 38, and 127 ; s. 23, p. 86 ; s. 27, p. 72 ; s. 29, p. 114 ; s. 88, p. 34.
- Nuisances' Removal and Diseases' Prevention Act*, 1860 (23 & 24 Vict. c. 77)—s. 12, p. 96.
- Nuisances' Removal Act for England (Amendment) Act*, 1863 (26 & 27 Vict. c. 117)—s. 2, p. 127 ; s. 3, p. 24.
- Order of the Local Government Board as to Cholera*, July 17, 1873, p. 98.
- Public Health Act*, 1848 (11 & 12 Vict. c. 90)—s. 37, p. 18 ; s. 59, p. 103 ; s. 60, p. 39 ; s. 63, p. 126 ; s. 64, p. 71 ; s. 73, p. 88 ; s. 75, p. 75 ; ss. 76, 78, p. 76 ; s. 79, p. 77 ; s. 80, p. 87 ; s. 148, p. 23.

Sanitary Act, 1866 (29 & 30 Vict. c. 90)—s. 19, p. 32 ; s. 20, p. 39 ; s. 22, p. 91 ; ss. 23, 24, p. 95 ; ss. 25, 26, 27, p. 92 ; s. 28, p. 93 ; ss. 29, 30, 31, p. 97 ; s. 32, p. 98 ; s. 35, p. 114 ; s. 36, p. 115 ; s. 37, p. 96 ; s. 38, p. 93 ; s. 39, p. 94 ; s. 45, p. 78 ; s. 52, p. 98 ; s. 53, p. 103.

Sanitary Act (1866) Amendment Act, 1868 (31 & 32 Vict. c. 115)—s. 7, p. 46.

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Workshops' Regulation Act, 1867 (30 & 31 Vict. c. 146)—s. 9, p. 22.

HANDBOOK

FOR

INSPECTORS OF NUISANCES.

INTRODUCTORY.

THE office of Inspector of Nuisances has existed for many years under the provisions of numerous Acts of Parliament, among which may be enumerated the following :—

The Markets' and Fairs' Clauses Act, 1847, 10 & 11 Vict. c. 14, as to inspector of meat.

The Towns' Improvement Clauses Act, 1847, 10 & 11 Vict. c. 34 (when consolidated with other Acts).

The Public Health Act, 1848, 11 & 12 Vict. c. 63.

The Removal of Nuisances Act, 1855, 18 & 19 Vict. c. 121.

The Local Government Act, 1858, 21 & 22 Vict. c. 98.

The Bakehouses' Regulation Act, 1863, 26 & 27 Vict. c. 40.

An Act to Amend the Nuisances' Removal Act for England, 1863, 26 & 27 Vict. c. 117.

An Act to Amend the Law relating to Public Health, 1866, 29 & 30 Vict. c. 90.

The Artisans' and Labourers' Dwellings Act, 1868, 31 & 32 Vict. c. 130.

The Factory and Workshops' Regulation Act, 1867, 30 & 31 Vict. c. 103.

The Adulteration of Food and Drugs Act, 1872, 35 & 36 Vict. c. 74.

The Public Health Act of 1872 (35 & 36 Vict. c. 74) contains the powers under which the Order of the Local Government Board, dated November 11, 1872, was issued.

THE PUBLIC HEALTH ACT, 1872.

(35 & 36 Vict. c. 79.)

Section 10.—It shall be the duty of every urban [rural] sanitary authority to appoint from time to time a medical officer of health, being a legally qualified medical practitioner.

It shall be the duty of every rural sanitary authority to appoint from time to time a medical officer or officers of health being qualified as aforesaid, an inspector or inspectors of nuisances, a clerk, and a treasurer, and such other officers and servants as it may deem necessary for the efficient execution of the purposes of the Sanitary Acts; and the appointments of medical officers of health and inspectors of nuisances first made after the passing of this Act shall be for a period not exceeding five years.

The Local Government Board shall have the same powers as they have in the case of a district medical officer of a union with regard to the qualification, appointment, duties, salary, and tenure of office of a medical officer of health, or other officer of a sanitary authority, any portion of whose salary is paid out of moneys voted by Parliament.

The same person may, with the sanction of the Local Government Board, be appointed the medical officer of health or the inspector of nuisances for two or more sanitary districts by the joint or several appointment of the sanitary authorities of such districts, and with the like sanction any district medical officer of a union may be appointed a medical officer of health.

A medical officer of health may exercise any of the powers with which an inspector of nuisances is invested by the sanitary Acts.

*ORDERS OF THE LOCAL GOVERNMENT
BOARD, 1872.*

The following are the Orders of the Local Government Board of November 11, 1872, addressed to the urban and rural sanitary authorities respectively, which recite some of the duties of the inspector of nuisances as defined by Acts of Parliament, and upon which the present Handbook is chiefly based :—

*To the several Urban Authorities in England and Wales,
constituted by the Public Health Act, 1872 :*

And to all others whom it may concern :

Whereas by Section 7 of the Public Health Act, 1872, it is enacted that, subject to the provisions of that Act, the duties imposed by previous sanitary Acts, including that of appointing inspectors of nuisances for the purposes of those Acts, shall be transferred to urban sanitary authorities constituted under the above-mentioned Act ;

And whereas it is enacted by Section 10 of the said Act that the Local Government Board shall have the same powers as they have in the case of a district medical officer of a union, with regard to the qualification, appointment, duties, salary, and tenure of office of officers of sanitary authorities, any portion of whose salary is paid out of moneys voted by Parliament ;

And whereas it is further enacted by the last-mentioned section that the same person may, with the sanction of the Local Government Board, be appointed the inspector of nuisances for two or more sanitary districts, by the joint or several appointment of the sanitary authorities of such districts :

Now we, the Local Government Board, deeming it expedient that regulations should be made with respect to

the appointment, duties, salary, and tenure of office of inspectors of nuisances appointed by urban sanitary authorities, in all those cases where any portion of the salary of any such officer is paid out of moneys voted by Parliament, do hereby order and direct as follows :—

SECTION I.—APPOINTMENT.

Article 1.—A statement shall be submitted to the Local Government Board, showing the population and extent of the district for which the sanitary authority propose to appoint the inspector of nuisances, and the salary or remuneration intended to be assigned to him ; and where the circumstances render desirable the appointment of one inspector of nuisances for two or more sanitary districts, statements shall, in like manner, be submitted to the Local Government Board, showing the names of the districts to be combined for that purpose, the population and extent of each district, the mode in which it is intended that the appointment shall be made, whether jointly or severally, by the sanitary authorities of those districts, and the amount of salary or remuneration proposed to be assigned to the officer appointed.

Article 2.—When the approval of the Local Government Board has been given to the proposals submitted to them, the sanitary authority or authorities shall proceed to the appointment of an inspector of nuisances accordingly.

Article 3.—No appointment of an inspector of nuisances shall be made under this Order unless an advertisement giving notice of the day when such appointment will be made shall have appeared in some public newspaper circulating in the district or districts, at least seven days before the day on which such appointment is made : Provided that no such advertisement shall be necessary for the appointment of a temporary substitute.

Article 4.—Every such appointment hereafter made shall, within seven days after it is made, be reported to the Local Government Board by the clerk to the sanitary authority, or, in the case of a joint appointment, by the clerk to one of the sanitary authorities by whom the appointment is made.

Article 5.—Upon the occurrence of a vacancy in such office, the sanitary authority or authorities shall proceed to make a fresh appointment, which shall be reported to the Local Government Board as required by Section I. Article 4, of this Order; but if the sanitary authority or authorities desire to make any fresh arrangement with respect to the district or the terms of the appointment, they shall, before filling up the vacancy, supply the particulars of the arrangement to the Local Government Board in the manner prescribed by Section I. Article 1, in regard to the first appointment, and if the approval of the Local Government Board be given, absolutely or with modifications, the sanitary authority or authorities shall then proceed to fill up the vacancy according to the terms of the approval so given.

Article 6.—If any officer appointed under this order be at any time prevented by sickness or accident, or other sufficient reason, from performing his duties, the sanitary authority or authorities, as the case may be, may appoint a fit person to act as his temporary substitute, and may pay him a reasonable compensation for his services; and every such appointment shall be reported to the Local Government Board as soon as the same shall have been made.

SECTION II.—TENURE OF OFFICE.

Article 1.—Every officer appointed under this order shall continue to hold office for such period as the sanitary authority or authorities appointing him may, with the approval of the Local Government Board, determine, or until he die, or resign, or be removed, by such authority or authorities with the assent of the Local Government Board, or by the Local Government Board: Provided that the appointments first made under this Order shall not be for a period exceeding five years.

Article 2.—Where any such officer shall have been appointed after the passing of the Public Health Act, 1872, for one or more sanitary districts, and any change in the extent of the district or districts, or in the duties, salary, or remuneration, may be deemed necessary, and he shall decline to acquiesce therein, the sanitary authority or authorities by whom he was so appointed may, with the consent of the

Local Government Board, but not otherwise, and after six months' notice in writing, signed by their clerk or clerks, given to such officer, determine his office.

Article 3.—No person shall be appointed who does not agree to give one month's notice previous to resigning the office, or to forfeit such sum as may be agreed upon as liquidated damages.

SECTION III.—DUTIES.

The following shall be the duties of the inspector of nuisances in respect of the district for which he is appointed; or if he shall be appointed for more than one district, then in respect of each of such districts:—

(1) He shall perform, either under the special directions of the sanitary authority or (so far as authorised by the sanitary authority) under the directions of the medical officer of health, or in cases where no such directions are required, without such directions, all the duties specially imposed upon an inspector of nuisances by the sanitary Acts, or by the orders of the Local Government Board.

(2) He shall attend all meetings of the sanitary authority when so required.

(3) He shall by inspection of the district, both systematically at certain periods and at intervals as occasion may require, keep himself informed in respect of the nuisances existing therein that require abatement under the sanitary Acts.

(4) On receiving notice of the existence of any nuisance within the district, or of the breach of any by-laws or regulations made by the sanitary authority for the suppression of nuisances, he shall, as early as practicable, visit the spot, and enquire into such alleged nuisance or breach of by-laws or regulations.

(5) He shall report to the sanitary authority any noxious or offensive businesses, trades, or manufactories established within the district, and the breach or non-observance of any by-laws or regulations made in respect of the same.

(6) He shall report to the sanitary authority any damage done to any works of water supply, or other works belonging to them, and also any case of wilful or negligent waste of

water supplied by them, or any fouling by gas, filth, or otherwise, of water used for domestic purposes.

(7) He shall from time to time, and forthwith upon complaint, visit and inspect the shops and places kept or used for the sale of butchers' meat, poultry, fish, fruit, vegetables, corn, bread, or flour, or as a slaughterhouse, and examine any animal, carcass, meat, poultry, game, flesh, fish, fruit, vegetables, corn, bread, or flour which may be therein ; and in case any such article appear to him to be intended for the food of man, and to be unfit for such food, he shall cause the same to be seized, and take such other proceedings as may be necessary in order to have the same dealt with by a justice : Provided that, in any case of doubt arising under this clause, he shall report the matter to the medical officer of health, with the view of obtaining his advice thereon.

(8) He shall, when and as directed by the sanitary authority, procure and submit samples of food or drink and drugs suspected to be adulterated to be analysed by the analyst appointed under the Adulteration of Food Act, 1872, and upon receiving a certificate stating that the articles of food or drink or drugs are adulterated cause a complaint to be made, and take the other proceedings prescribed by that Act.

(9) He shall give immediate notice to the medical officer of health of the occurrence within his district of any contagious, infectious, or epidemic disease of a dangerous character ; and whenever it appears to him that the intervention of such officer is necessary in consequence of the existence of any nuisance injurious to health, or of any overcrowding in a house, he shall forthwith inform the medical officer thereof.

(10) He shall, subject in all respects to the directions of the sanitary authority, attend to the instructions of the medical officer of health with respect to any measures which can be lawfully taken by him under the sanitary Acts for preventing the spread of any contagious, infectious, or epidemic disease of a dangerous character.

(11) He shall enter from day to day, in a book to be provided by the sanitary authority, particulars of his inspections and of the action taken by him in the execution of his duties. He shall also keep a book or books, to be provided

by the sanitary authority, so arranged as to form, as far as possible, a continuous record of the sanitary condition of each of the premises in respect of which any action has been taken under the sanitary Acts, and shall keep any other systematic records that the sanitary authority may require.

(12) He shall at all reasonable times, when applied to by the medical officer of health, produce to him his books, or any of them, and render to him such information as he may be able to furnish with respect to any matter to which the duties of inspector of nuisances relate.

(13) He shall, if directed by the sanitary authority to do so, superintend and see to the due execution of all works which may be undertaken under their direction for the suppression or removal of nuisances within the district.

(14) In matters not specifically provided for in this Order he shall observe and execute all the lawful orders and directions of the sanitary authority, and the orders of the Local Government Board which may be hereafter issued, applicable to his office.

SECTION IV.—REMUNERATION.

Article 1.—The sanitary authority or authorities, as the case may be, shall pay to any officer appointed under this order such salary or remuneration as may be approved by the Local Government Board; and where such officer is appointed for two or more districts, the salary shall be apportioned amongst the districts in such manner as the said Board shall approve: Provided that the sanitary authority or authorities, with the approval of the Local Government Board, may pay to any such officer a reasonable compensation on account of extraordinary services, or other unforeseen circumstances connected with his duties or the necessities of the district or districts for which he is appointed.

Article 2.—The salary or remuneration of every such officer shall be payable up to the day on which he ceases to hold the office, and no longer, subject to any deduction which the sanitary authority or authorities may be entitled to make in respect of Section II. Article 3; and in case he shall die whilst holding such office, the proportion of salary

(if any) remaining unpaid at his death shall be paid to his personal representatives.

Article 3.—The salary or remuneration assigned to such officer shall be payable quarterly, according to the usual feast days in the year—namely, Lady Day, Midsummer Day, Michaelmas Day, and Christmas Day; but the sanitary authority or authorities may pay to him at the expiration of every calendar month such proportion as they may think fit on account of the salary or remuneration to which he may become entitled at the termination of the quarter.

Given under our seal of office this 11th day of November, in the year 1872.

JAMES STANSFELD,
President.

JOHN LAMBERT, *Secretary.*

To the Guardians of the Poor of the several Unions, Parishes, and Places in England and Wales, in which such Guardians act as a Rural Sanitary Authority under the Public Health Act, 1872 :

And to all others whom it may concern :

Whereas by Section 10 of the Public Health Act, 1872, it is enacted that it shall be the duty of every rural sanitary authority to appoint from time to time an inspector or inspectors of nuisances, for the purposes of the Sanitary Acts ;

And whereas it is thereby further enacted that the Local Government Board shall have the same powers as they have in the case of a district medical officer of a union, with regard to the qualification, appointment, duties, salary, and tenure of office of officers of sanitary authorities, any portion of whose salary is paid out of moneys voted by Parliament ; and that the same person may, with the sanction of the Local Government Board, be appointed the inspector of nuisances for two or more sanitary districts, by the joint or several appointment of the sanitary authorities of such districts :

Now we, the Local Government Board, deeming it expedient that regulations should be made with respect to the appointment, duties, salary, and tenure of office of inspectors of nuisances appointed by rural sanitary authorities, in all

those cases where any portion of the salary of any such officer is paid out of moneys voted by Parliament, do hereby order and direct as follows :—

SECTION I.—APPOINTMENT.

Article 1.—A statement shall be submitted to the Local Government Board, showing the population and extent of the district for which the sanitary authority propose to appoint the inspector or inspectors of nuisances, and the salary or remuneration intended to be assigned ; and where the circumstances render desirable the appointment of one inspector of nuisances for two or more sanitary districts, statements shall, in like manner, be submitted to the Local Government Board, showing the names of the districts to be combined for that purpose, the population and extent of each district, the mode in which it is intended that the appointment shall be made, whether jointly or severally by the sanitary authorities of those districts, and the amount of salary or remuneration proposed to be assigned to the officer appointed.

Article 2.—When the approval of the Local Government Board has been given to the proposals submitted to them, the sanitary authority or authorities shall proceed to the appointment of an inspector or inspectors of nuisances accordingly.

Article 3.—No appointment of an inspector of nuisances shall be made under this Order unless notice has been given at one of the two ordinary meetings next preceding the meeting or meetings at which the appointment is to be made by the sanitary authority or authorities, as the case may be, such notice being duly entered on the minutes, or unless an advertisement giving notice of the day when such appointment will be made shall have appeared in some public newspaper circulating in the district or districts, at least seven days before the day on which such appointment is made : Provided that no such notice or advertisement shall be necessary for the appointment of a temporary substitute.

Article 4.—Every appointment hereafter made shall, within seven days after it is made, be reported to the Local

Government Board by the clerk to the sanitary authority, or, in the case of a joint appointment, by the clerk to one of the sanitary authorities by whom the appointment is made.

Article 5.—Upon the occurrence of a vacancy in such office, the sanitary authority or authorities shall proceed to make a fresh appointment, which shall be reported to the Local Government Board as required by Section I. Article 4 of this Order; but if the sanitary authority or authorities desire to make any fresh arrangement with respect to the district or the terms of the appointment, they shall, before filling up the vacancy, supply the particulars of the arrangement to the Local Government Board, in the manner prescribed by Section I. Article 1, in regard to the first appointment, and if the approval of the Local Government Board be given, absolutely or with modifications, the sanitary authority or authorities shall then proceed to fill up the vacancy according to the terms of the approval so given.

Article 6.—If any officer appointed under this Order be at any time prevented by sickness or accident, or other sufficient reason, from performing his duties, the sanitary authority or authorities, as the case may be, may appoint a fit person to act as his temporary substitute, and may pay him a reasonable compensation for his services; and every such appointment shall be reported to the Local Government Board as soon as the same shall have been made.

SECTION II.—TENURE OF OFFICE.

Article 1.—Every officer appointed under this Order shall continue to hold office for such period as the sanitary authority or authorities appointing him may, with the approval of the Local Government Board, determine, or until he die, or resign, or be removed, by such authority or authorities with the assent of the Local Government Board, or by the Local Government Board: Provided that the appointments first made under this Order shall not be for a period exceeding five years.

Article 2.—Where any such officer shall be appointed for one or more sanitary districts, and any change in the extent of the district or districts, or in the duties, salary, or remuneration, shall be deemed necessary, and he shall decline to

acquiesce therein, the sanitary authority or authorities by whom he was so appointed may, with the consent of the Local Government Board, but not otherwise, and after six months' notice in writing, signed by their clerk or clerks, given to such officer, determine his office.

Article 3.—No person shall be appointed who does not agree to give one month's notice previous to resigning the office, or to forfeit such sum as may be agreed upon as liquidated damages.

SECTION III.—DUTIES.

The following shall be the duties of an inspector of nuisances in respect of the sanitary district for which he is appointed, or if he shall be appointed for more than one district, or for a part of a district, then in respect of each of such districts, or of such part :—

(1) He shall perform, either under the special directions of the sanitary authority or (so far as authorised by the sanitary authority) under the directions of the medical officer of health, or, in cases where no such directions are required, without such directions, all the duties specially imposed upon an inspector of nuisances by the sanitary Acts, so far as the same are in force in the district, or by the orders of the Local Government Board.

(2) He shall attend all meetings of the sanitary authority when so required.

(3) He shall by inspection of the district, both systematically at certain periods and at intervals as occasion may require, keep himself informed in respect of the nuisances existing therein that require abatement under the sanitary Acts.

(4) On receiving notice of the existence of any nuisance within the district, or of the breach of any by-laws or regulations made by the sanitary authority for the suppression of nuisances, he shall, as early as practicable, visit the spot, and enquire into such alleged nuisance or breach of by-laws or regulations.

(5) He shall report to the sanitary authority any noxious or offensive businesses, trades, or manufactories established within the district, and the breach or non-observance of any by-laws or regulations made in respect of the same.

(6) He shall report to the sanitary authority any damage done to any works of water supply, or other works belonging to them, and also any case of wilful or negligent waste of water supplied by them, or any fouling by gas, filth, or otherwise, of water used for domestic purposes.

(7) He shall, from time to time, and forthwith upon complaint, visit and inspect the shops and places kept or used for the sale of butcher's meat, poultry, fish, fruit, vegetables, corn, bread, or flour, or as a slaughterhouse, and examine any animal, carcass, meat, poultry, game, flesh, fish, fruit, vegetables, corn, bread, or flour which may be therein; and in case any such article appear to him to be intended for the food of man, and to be unfit for such food, he shall cause the same to be seized, and take such other proceedings as may be necessary in order to have the same dealt with by a justice: Provided that, in any case of doubt arising under this clause, he shall report the matter to the medical officer of health, with the view of obtaining his advice thereon.

(8) He shall, when and as directed by the sanitary authority, procure and submit samples of food or drink and drugs suspected to be adulterated to be analysed by the analyst appointed under the Adulteration of Food Act, 1872, and upon receiving a certificate stating that the articles of food or drink or drugs are adulterated cause a complaint to be made, and take the other proceedings prescribed by that Act.

(9) He shall give immediate notice to the medical officer of health of the occurrence within his district of any contagious, infectious, or epidemic disease of a dangerous character; and whenever it appears to him that the intervention of such officer is necessary in consequence of the existence of any nuisance injurious to health, or of any overcrowding in a house, he shall forthwith inform the medical officer thereof.

(10) He shall, subject in all respects to the directions of the sanitary authority, attend to the instructions of the medical officer of health with respect to any measures which can be lawfully taken by him under the sanitary Acts for preventing the spread of any contagious, infectious, or epidemic disease of a dangerous character.

(11) He shall enter from day to day, in a book to be pro-

vided by the sanitary authority, particulars of his inspections and of the action taken by him in the execution of his duties. He shall also keep a book or books, to be provided by the sanitary authority, so arranged as to form, as far as possible, a continuous record of the sanitary condition of each of the premises in respect of which any action has been taken under the sanitary Acts, and shall keep any other systematic records that the sanitary authority may require.

(12) He shall at all reasonable times, when applied to by the medical officer of health, produce to him his books, or any of them, and render to him such information as he may be able to furnish with respect to any matter to which the duties of inspector of nuisances relate.

(13) He shall, if directed by the sanitary authority to do so, superintend and see to the due execution of all works which may be undertaken under their direction for the suppression or removal of nuisances within the district.

(14) In matters not specifically provided for in this Order he shall observe and execute all the lawful orders and directions of the sanitary authority, and the orders which the Local Government Board may hereafter issue, applicable to his office.

(15) Where more than one inspector of nuisances shall be appointed by a sanitary authority, such authority, with the approval of the Local Government Board, may either assign to each of the inspectors a portion of the district or may distribute the duties of inspector of nuisances amongst such inspectors.

SECTION IV.—REMUNERATION.

Article 1.—The sanitary authority or authorities, as the case may be, shall pay to any officer appointed under this Order such salary or remuneration as may be approved by the Local Government Board; and where such officer is appointed for two or more districts, the salary shall be apportioned amongst the districts in such manner as the said Board shall approve: Provided that the sanitary authority or authorities, with the approval of the Local Government Board, may pay to any such officer a reasonable compensation on account of extraordinary services, or other unforeseen

circumstances connected with his duties or the necessities of the district or districts for which he is appointed.

Article 2.—The salary or remuneration of every such officer shall be payable up to the day on which he ceases to hold the office, and no longer, subject to any deduction which the sanitary authority or authorities may be entitled to make in respect of Section II. Article 3 ; and in case he shall die whilst holding such office, the proportion of salary (if any) remaining unpaid at his death shall be paid to his personal representatives.

Article 3.—The salary or remuneration assigned to such officer shall be payable quarterly, according to the usual feast days in the year, namely, Lady Day, Midsummer Day, Michaelmas Day, and Christmas Day ; but the sanitary authority or authorities may pay to him at the expiration of every calendar month such proportion as they may think fit on account of the salary or remuneration to which he may become entitled at the termination of the quarter.

Given under our seal of office, this 11th day of November, in the year 1872.

JAMES STANSFELD,
President.

JOHN LAMBERT, *Secretary.*

CHAPTER I.

DUTIES SPECIALLY IMPOSED BY SANITARY ACTS, ETC.

1. HE SHALL PERFORM, EITHER UNDER THE SPECIAL DIRECTIONS OF THE SANITARY AUTHORITY OR (SO FAR AS AUTHORISED BY THE SANITARY AUTHORITY) UNDER THE DIRECTIONS OF THE MEDICAL OFFICER OF HEALTH, OR IN CASES WHERE NO SUCH DIRECTIONS ARE REQUIRED, WITHOUT SUCH DIRECTIONS, ALL THE DUTIES SPECIALLY IMPOSED UPON AN INSPECTOR OF NUISANCES BY THE SANITARY ACTS SO FAR AS THE SAME ARE IN FORCE IN THE DISTRICT, OR BY THE ORDERS OF THE LOCAL GOVERNMENT BOARD.

2. HE SHALL ATTEND ALL MEETINGS OF THE SANITARY AUTHORITY WHEN SO REQUIRED.

It is desirable, before entering upon his labours, that the inspector of nuisances should inform himself as to the Acts under which he is required to perform the duties of his office, for the regulations issued by the Local Government Board do not quote them, although they do not impose any duty which had not been previously authorised by them. The following are the chief Acts referred to:—

I.—AS TO HIS APPOINTMENT.

THE TOWN IMPROVEMENT CLAUSES ACT, 1847.

(10 & 11 Vict. c. 34.)

[When incorporated in by-laws or public Acts.]

Appointment.

Section 9.—The commissioners shall appoint some person by the title of *inspector of nuisances* to superintend and enforce the due execution of all duties to be performed by the scavengers appointed under this or the special Act, and to report to the commissioners any breach of the provisions of this or the special Act, or of any Act incorporated therewith, or of the by-laws, rules, and regulations of the commissioners, and the existence of any nuisances within the limits of the special Act; and the commissioners shall duly publish the name of any inspector of nuisances appointed by them, and shall require him to provide and keep a book in which shall be entered all reasonable complaints made by any householder of the district within the limits of the special Act, of any breach of the provisions of this or the special Act, or of any Act incorporated therewith, or of the by-laws, rules, and regulations made by the commissioners for the preservation of due order and cleanliness, or for the suppression of nuisances; and the *inspector of nuisances* shall forthwith enquire into the truth of such complaints, and report upon the same to the commissioners at their next meeting; and such report and the order of the commissioners thereon shall be entered in the said book, and shall be kept at the office of the commissioners, and shall be open at all reasonable times to the inspection of any inhabitant of the said district, or other person interested; and it shall be the duty of such *inspector of nuisances*, subject to the direction of the commissioners, to make complaint before justices, and take legal proceedings for the punishment of any person who has committed any offence under this or the special Act, or under any by-laws made by virtue thereof.

Section 10.—The commissioners may, if they think fit, appoint the same person to be both surveyor and inspector of nuisances.

THE PUBLIC HEALTH ACT, 1848.

(11 & 12 Vict. c. 63.)

Appointment.

Section 37.—And be it enacted that the local board of health shall from time to time appoint fit and proper persons to be surveyor, *inspector of nuisances*, clerk, and treasurer, for the purposes of this Act, and shall appoint or employ such collectors and other officers and servants as may be necessary and proper for the efficient execution of this Act, and shall make *by-laws* for regulating the duties and conduct of the several officers and servants appointed or employed;

And the said local board may pay out of the general district rates to be levied under this Act to such officers and servants such reasonable salaries, wages, or allowances, as the said local board may think proper;

And every such officer and servant shall be removable by the said local board at their pleasure :

Provided always that the same person may be both surveyor and inspector of nuisances.

THE MARKETS' AND FAIRS' CLAUSES ACT, 1847.

(10 & 11 Vict. c. 14.)

Section 15 provides for the appointment of *inspectors of provisions*.*

THE NUISANCES' REMOVAL AND DISEASES' PREVENTION ACT, 1860.

(23 & 24 Vict. c. 77.)

Appointment.

Section 9.—Local authorities under this Act may, for the purposes of this Act, severally appoint or employ *inspectors of nuisances*, and make such payment as they see fit for the remuneration and expenses of such inspectors.

* See page 125.

THE ARTISANS' AND LABOURERS' DWELLINGS ACT, 1868.

(31 & 32 Vict. c. 130.)

Appointment.

Section 3.—“Officers of health” shall mean and include medical officer of health, sanitary inspector, or any sanitary officer performing the duties which a medical officer or sanitary inspector performs under or by virtue of any Act of Parliament.

Section 4.—If in any place to which this Act applies there is no *officer of health* within the meaning of this Act, the local authority, with the approval of one of Her Majesty's principal Secretaries of State, shall forthwith appoint such an officer for such period as shall be necessary, shall assign him his duties, and pay him such salary or emolument out of the local rate as they, with such approval as aforesaid, shall think fit.

The local authority, with the like approval, may from time to time remove any officer appointed under this section, and in manner aforesaid appoint another officer in his place.

AN ACT TO AMEND THE LAW FOR THE PREVENTION OF ADULTERATION OF FOOD AND DRINK AND OF DRUGS, 1872.

(35 & 36 Vict. c. 74.)

Section 6 imposes duties to be performed by the inspector of nuisances, which will be referred to at length in the chapter on this subject.

II.—AS TO POWER OF ENTRY.

Efficient powers of entry for sanitary purposes are given by various Acts.

THE DISEASES' PREVENTION ACT, 1855.

(18 & 19 Vict. c. 116.)

Power of Entry.

Section 4.—The local authority and their officers shall have power of entry for the purposes of this Act, and for executing or superintending the execution of the regulations and directions of the General Board issued under this Act.

THE REMOVAL OF NUISANCES ACT, 1855.*

(18 & 19 Vict. c. 121.)

Power of Entry.

Section 11.—The *local authority* shall have power of entry for the following purposes of this Act, and under the following conditions :—

- (1) To ground proceedings ;
- (2) To examine premises where nuisances exist, to ascertain the course of drains, and to execute or inspect works ordered by justices to be done under this Act ;
- (3) To remove or abate a nuisance in case of non-compliance with or infringement of the order of justices, or to inspect or examine any carcass, meat, poultry, game, flesh, fish, fruit, vegetables, corn, bread, or flour, under the powers and for the purposes of this Act.

* See also pages 38 and 127.

THE NUISANCES' REMOVAL ACT FOR ENGLAND (AMENDMENT) ACT, 1863.

(26 & 27 Vict. c. 117.)

This Act gives power to the inspector of nuisances to inspect and examine various kinds of food, as quoted on page 127.

THE COMMON LODGING-HOUSES ACT, 1851.

(14 & 15 Vict. c. 28.)

To Enter Lodging-houses.

Section 12.—The keeper of a common lodging-house, and every other person having or acting in the care or management thereof, shall at all times, when required by *any officer of the local authority*, give him free access to such house or any part thereof.

THE BAKEHOUSE REGULATION ACT, 1863.

(26 & 27 Vict. c. 40.)

Power of Entry and Inspection.

Section 5.—No place on the same level with a bakehouse situate in any city, town, or place, containing according to the last census a population of more than five thousand persons, and forming part of the same building, shall be used as a sleeping-place, unless it is constructed as follows, that is to say :

Unless it is effectually separated from the bakehouse by a partition extending from the floor to the ceiling ;

Unless there be an external glazed window of at least nine superficial feet in area, of which at the least four and a half superficial feet are made to open for ventilation ;

And any person who lets, occupies, or continues to let, or knowingly suffers to be occupied, any place contrary to this Act shall be liable for the first offence to a penalty not exceeding twenty shillings, and for every subsequent offence to a penalty not exceeding five pounds.

THE WORKSHOPS' REGULATION ACT, 1867.

(30 & 31 Vict. c. 146.)

Power to Officers appointed by Local Authority, &c. to enter Workshops.

Section 9.—If on the complaint of any officer of health, *inspector of nuisances*, or other officer appointed by a local authority, or of any superintendent of police, it appears to any justice of the peace that there is reasonable cause for believing that any of the provisions of this Act, or of the Sanitary Act, 1866, are contravened in any workshop, it shall be lawful for such justice by order under his hand to empower the complainant to enter into such workshop, at any time within forty-eight hours from the date of such order, and to examine such workshop. And any person so empowered may examine touching any matter within the provisions of this Act, or of the Sanitary Act, 1866, or so far as relates to such workshop, any person whom he finds in such workshop.

Penalty on Persons refusing Admission.

Any person refusing admission to any person so empowered, or obstructing him in the discharge of his duty, shall for each offence incur a penalty not exceeding twenty pounds.

[This clause is now transferred to the inspectors of the Factory Acts.]

THE METROPOLIS' LOCAL MANAGEMENT ACT, 1855.

(18 & 19 Vict. c. 120.)

Inspection of Drain, Water-closet, &c.

Section 82.—It shall be lawful for any such vestry or board, or for their surveyor or inspector or such other person as they appoint, to inspect any drain, water-closet, privy, cesspool, or water supply or sinks, traps, syphons, pipes, and other works or apparatus connected therewith, within the parish or district of such vestry or board, and for that purpose at all reasonable times in the daytime.

III.—AS TO OBSTRUCTION.

The inspector of nuisances is protected in the due execution of his duties from wilful obstruction on the part of any person.

THE PUBLIC HEALTH ACT, 1848.

(11 & 12 Vict. c. 63.)

If Obstructed.

Section 148.—And be it enacted that whosoever wilfully obstructs any superintending inspector or any member of the local board of health, or *any officer or person* duly employed in the execution of this Act, or destroys, pulls down, injures, or defaces any board upon which any by-law, notice, or other matter is inscribed shall, if the same were put up by authority of the local board . . . be liable for every offence to a penalty not exceeding five pounds.

THE DISEASES' PREVENTION ACT, 1855.

(18 & 19 Vict. c. 116.)

Section 14.—Whoever wilfully obstructs *any person* acting under the authority or employed in the execution of this Act, and whosoever wilfully violates any direction or regulation issued . . . as aforesaid, shall be liable for every such offence to a penalty not exceeding five pounds, to be appropriated in or towards the defraying the expenses of executing this Act.

THE LABOURERS' DWELLINGS ACT, 1868.

(31 & 32 Vict. c. 130.)

Obstructing.

Section 35.—Where any person at any time obstructs the officer of health, or any other person acting in performance of anything which the local authority or their officers respectively are by this Act required or authorised to do, every person so offending shall for every offence forfeit not exceeding twenty pounds.

Section 36.—If the occupier of any premises prevents the owner thereof, or if the owner or occupier of any premises prevents the officer of health or their officers, agents, servants, or workmen, from carrying into effect with respect to the premises any of the provisions of this Act after notice of the intention so to do has been given to the occupier, or, as the case may be, to the owner, any justice on proof thereof may make an order in writing requiring the occupier to permit the owner, or, as the case shall be, requiring the owner or occupier, or both, to permit the officer of health, or the local authority and their officers, agents, servants, and workmen, to do all things requisite for carrying into effect with respect to the premises the provisions of this Act;

And if at the expiration of ten days after the service of such order of the justice the occupier or owner fails to comply therewith, every person so offending shall for every day during which the failure continues forfeit not exceeding twenty pounds:

Provided that during any such failure by the occupier the owner, unless consenting thereto, shall not be liable to the forfeiture.

THE NUISANCES' REMOVAL ACT FOR ENGLAND (AMENDMENT) ACT, 1863.

(26 & 27 Vict. c. 117.)

Section 3.—In case any person shall in any manner prevent such medical officer of health or inspector of nuisances from entering any slaughterhouse, shop, building, market, or other place where such animal, carcass, meat, poultry, or fish is kept for the purpose of sale or of preparation for sale, or shall in any manner obstruct or impede him, or his servant, or assistant, when duly engaged in carrying the provisions of this Act into execution, such person shall be liable to a penalty not exceeding five pounds.

IV.—AS TO IMMUNITY IN THE DISCHARGE OF HIS DUTY.

He is also defended from legal proceedings in the due discharge of his duty.

THE PUBLIC HEALTH ACT, 1848.

(11 & 12 Vict. c. 63.)

If Sued.

Section 139.—And be it enacted that no writ or process shall be sued out against or served upon any superintending inspector or any officer or person acting in his aid nor against the local board of health or any member thereof, or the officer of health, clerk, surveyor, *inspector of nuisances*, or any other officer for anything done or intended to be done under the provisions of this Act, until the expiration of one month next after notice in writing shall have been delivered to him or left at their or his office or usual place of abode, clearly and explicitly stating the cause of action, and the name and place of abode of the intended plaintiff or of his attorney or agent in the cause ;

And upon the trial of any such action the plaintiff shall not be permitted to go into evidence of any cause of action which is not stated in the last-mentioned notice ;

And unless such notice be proved the jury shall find for the defendant ;

And every such action shall be brought or commenced within *six months next* after the accrual of the cause of action and not afterwards, and shall be laid and tried in the county or place where the cause of action occurred, *and not elsewhere* ;

And the defendant shall be at liberty to plead the general issue, and give this Act and all special matter in evidence thereunder ;

And any person to whom any such notice of action is given as aforesaid may tender amends to the plaintiff, his

attorney or agent, at any time within one month after service of such notice, and in case the same be not accepted may plead such tender as bar, and (by leave of the court with the general issue or other plea or pleas) ;

And if upon issue joined upon any plea pleaded to the whole action the jury find generally for the defendant, or if the plaintiff be nonsuited or discontinued, or if judgment be given for the defendant, then the defendant shall be entitled to full costs of suit, and have judgment accordingly ;

And in case amends have not been tendered as aforesaid, or in case the amends tendered be insufficient, the defendant may by leave of the court at any time before trial pay into court under plea such sum of money as he may think proper, and (by the like leave) may plead the general issue or other plea or pleas, any rule of court or practice to the contrary notwithstanding.

Held Harmless.

Section 140.—And be it enacted that no matter or thing done or contract entered into by the local board of health, nor any matter or thing done by any superintending inspector or any member of the said local board, or by any officer of health, clerk, surveyor, *inspector of nuisances*, or other officer or person whomsoever acting under the direction of the said local board, shall, if the matter or thing were done or the contract were entered into *bona fide* for the purpose of executing this Act, subject them or any of them personally to any action, liability, claim, or demand whatsoever ;

And any expense incurred by such local board, member, officer of health, clerk, surveyor, *inspector of nuisances*, or other officer or person acting as aforesaid shall be borne and repaid out of the general district rates levied under the authority of this Act.

Such is the general legislation under the preceding parts of this subject, and it is always associated with the performance of the duties of the office ; but as the duties have been arranged under different heads in the Order of the

Local Government Board now under consideration, it will be more convenient to refer to them on future pages.

Duties imposed upon this officer by the by-laws of the sanitary authority may be ascertained only by reference to the proceedings of each authority, and cannot, therefore, be discussed here ; but as they are not in contravention of any legal enactment, they must correspond in principle with those which will be quoted under their appropriate headings.

It is, however, most desirable in the interests of the officer himself that the by-laws should enter as minutely and specifically into each sanitary question as the subject will allow ; since they will thus be a guide both to himself and to the inhabitants of the district, and will be obeyed by the latter more readily than any injunctions which the officer might give. At the same time they will relieve him from much of the odium which is apt to attach itself to his office, and probably from some errors into which he would fall if left to act at his discretion.

Whilst obeying the by-laws or other directions of the sanitary authority, and inducing the inhabitants to do so also, it may be well to caution him to always follow their spirit rather than their letter if the latter be not clear, or if in its application to a particular case it may seem to be unduly onerous. It will not be possible to frame by-laws which shall apply with equal propriety to all the cases of even one class ; and to unduly force their application might be virtually to strain the meaning of the law, and thereby to cause the infliction of an injury, and needlessly originate a conflict between the officer and the inhabitants, thereby rendering his position less agreeable, and, indeed, less useful.

No such difficulty, however, will arise if the spirit of the law be fairly appreciated and duly insisted upon, even to the modification, if need be, of the stringency of the letter. These remarks are not, however, intended to excuse any neglect of duty on the part of the inspector, or the cultivation of a cowardly and timid spirit, but to render him a wise, discreet, and useful officer.

The second regulation, by which he is required to attend the meetings of the sanitary authority when requested, is of great value, and should extend to all such meetings; since misunderstandings are apt to occur in respect of details with which he will be occupied, and it will be easy for him to correct them if an opportunity be offered whilst they are under discussion. This should not, however, on the one hand be any excuse for careless and slovenly reports; nor, on the other, should it be regarded as loss of time; but, in reference to the latter, it is desirable that he should induce the sanitary authority to fix an hour for the consideration of the subjects in which he is interested, and to obtain permission to leave so soon as they shall have been disposed of. Without due care it is possible that this valuable regulation may lead to careless and desultory habits.

CHAPTER II.

PERSONAL INSPECTION OF DISTRICT.

3. HE SHALL, BY INSPECTION OF THE DISTRICT, BOTH SYSTEMATICALLY AT CERTAIN PERIODS AND AT INTERVALS AS OCCASION MAY REQUIRE, KEEP HIMSELF INFORMED IN RESPECT OF THE NUISANCES EXISTING THEREIN THAT REQUIRE ABATEMENT UNDER THE SANITARY ACTS.

4. ON RECEIVING NOTICE OF THE EXISTENCE OF ANY NUISANCE WITHIN THE DISTRICT, OR OF THE BREACH OF ANY BY-LAWS OR REGULATIONS MADE BY THE SANITARY AUTHORITY FOR THE SUPPRESSION OF NUISANCES, HE SHALL, AS EARLY AS PRACTICABLE, VISIT THE SPOT, AND ENQUIRE INTO SUCH ALLEGED NUISANCE OR BREACH OF BY-LAWS OR REGULATIONS.

THE leading idea in these directions is that the inspector of nuisances should personally inspect the district assigned to him both systematically and at uncertain periods ; and it expressly includes action on the receipt of information.

The discharge of the duty of seeking out nuisances should be performed with great discretion, so that, whilst nothing important may escape his attention, he shall not be too prying or too much of the busybody ; but the law has devolved upon him, rather than upon any other

officer, and certainly more than upon the general public, the duty of ascertaining the existence of nuisances, and of proceeding to effect their removal. If the district assigned to him be not too large, he should hold himself responsible for at least knowing every nuisance in it, and be ready to give information thereon to the medical officer of health, or to the sanitary authority; but it does not follow that he would act wisely if he were always to take action for the removal of it immediately he has become aware of its existence.

It will be possible to obtain this knowledge quietly, and without ostentation or obtrusiveness, and without making more verbal enquiries of the neighbours than the necessity demands; and he should carefully note his observations at the time of inspection. It will also facilitate the performance of this part of his duty if he will arrange his entries in a very clear topographical order, so that he may at any time find the part of his memorandum book in which he is about to make or has made them, and also to indicate in some very clear manner such cases as have been disposed of. Hence a series of books corresponding with different parts of his district (if a large one) will be more convenient for portage and reference than one large one. He should also enter his observations in ink, and in a very legible and careful manner, so that they may preserve and accurately reproduce the ideas which were in his mind when he made them. Slipshod, pencil, or blotted memoranda will certainly lead to waste of time, and probably to error, which may be injurious to others as well as to his own reputation.

All information as to the existence of a nuisance which

is communicated to him, or which reaches him by rumour, should be received and recorded, but no more weight should be attached to it than to induce him to visit the place indicated and to see and judge for himself. No principle of action should be better established than this—that he should never believe, much less act upon, any information until he has authenticated it by his own careful observation; for in such matters it is not merely a fact to be believed or disbelieved, but action to be taken against other persons. In recording it he should add the name of his informant and the date; and if there be reason to suspect any sinister influence, as ill-will, on the part of his informant, the surmise should be noted also. No part of his duty will require more caution than this, so that he may not be the dupe of ill-will or idle rumour, or be led into gossiping: whilst he should not repel those who would give him information.

There will probably be little difficulty in ascertaining the facts if the inspector be acquainted generally with the locality, for they will often be arranged in classes and apply to many places at the same time; such as questions of petties, pigstyes, rubbish heaps, and defective drainage; and these, with other similar questions, will be dealt with by by-laws which will define them as well as prohibit them, and direct the officer in the course to be pursued.

The frequency with which the systematic inspection of each part of his district should take place must necessarily vary with the extent of the district and the frequency with which he visits it in the daily discharge of his duties. It is also probable that it should vary with the known requirements of a locality; for it would be waste of time to inspect a neighbourhood of genteel residences supplied with water

and drainage as frequently as streets or localities inhabited by the poor, and abounding in unsanitary conditions, and particularly such parts as have manufactures of an offensive character, or which are injurious to health. Yet none of these considerations should cause him to neglect periodical visits to and inspection of every part ; and it is desirable that he should, with the concurrence of the medical officer of health, determine the periods beforehand, and rigorously adhere to them. In no case should the systematic visitations be less frequent than quarterly, whilst, if the district be small or the unsanitary condition marked, it should be more frequent, or twice during each quarter of the year.

But whenever it may be made, it should be thorough ; so that the officer may be assured, at the end of it, that he is perfectly acquainted with the state of every part of his district, and, on reference to his orderly and well-prepared notes, he can satisfy the medical officer of health and the sanitary authority that such is the case.

This regulation refers to a difficulty which will beset the inspector of nuisances daily, viz. the meaning of the term "nuisance."

In numerous instances the law has specifically defined the conditions which shall be deemed a nuisance, and such are the following :—

NUISANCE DEFINED.

THE SANITARY ACT, 1866.

(29 & 30 Vict. c. 90.)

Section 19.—The word "nuisance," under the Nuisances' Removal Acts, shall include—

- (1) Any house or part of a house so overcrowded as to be dangerous or prejudicial to the health of the inmates ;
- (2) Any factory, workshop, or work-place (not already under the operation of any general Act for the regulation of factories or bakehouses) not kept in a cleanly state, or not ventilated in such a manner as to render harmless, as far as practicable, any gases, vapours, dust, or other impurities generated in the course of the work carried on therein that are a nuisance or injurious or dangerous to health, or so overcrowded while work is carried on as to be dangerous or prejudicial to the health of those employed therein ;
- (3) Any fireplace or furnace which does not as far as practicable consume the smoke arising from the combustible used in such fireplace or furnace, and is used, within the district of a nuisance authority, for working engines by steam, or in any mill, factory, dye-house, brewery, bakehouse, or gasworks, or in any manufacturing or trade process whatsoever ;

Any chimney (not being the chimney of a private dwelling-house) sending forth *black* smoke in such quantity as to be a nuisance :

Provided first that places where at the time of the passing of this Act no enactment is in force compelling fireplaces or furnaces to consume their own smoke the foregoing enactment as to fireplaces and furnaces consuming their own smoke shall not come into operation until the expiration of one year from the date of the passing of this Act :

Secondly that, when a person is summoned before the justices in respect of a nuisance arising from a fireplace or furnace which does not consume the smoke arising from the combustible used in such fireplace or furnace, the justices may hold that no nuisance is created within the meaning of this Act, and dismiss the complaint if they are satisfied that such fireplace or furnace is constructed in such manner as to consume, *as far as practicable*, having regard to the nature of the manufacture or

trade, *all* smoke arising therefrom, and that such fireplace or furnace has been carefully attended to by the person having the charge thereof.

THE METROPOLIS' WATER ACT, 1871.*

(34 & 35 Vict. c. 113.)

Section 33.—The absence in respect of any premises of the prescribed fittings after the prescribed time shall be a nuisance within Section 11 and Sections 12–19 (inclusive) of the Nuisances' Removal Act for England, 1855, and within all provisions of the same or any other Act applying, amending, or otherwise relating to those sections; and that nuisance, if in any case proved to exist, shall be presumed to be such as to render the premises unfit for human habitation within Section 13 of the Nuisances' Removal Act for England, 1855, unless and until the contrary is shown to the satisfaction of the justices acting under that section.

THE NUISANCES' REMOVAL AND DISEASES' PREVENTION
ACTS CONSOLIDATION AND AMENDMENT ACT, 1855.

(18 & 19 Vict. c. 121.)

Section 8.—The word “nuisance,” under this Act, shall include—

- Any premises in such a state as to be a nuisance or injurious to health ;
- Any pool, ditch, gutter, water-course, privy, urinal, cess-pool, drain or ash-pit, so foul as to be a nuisance or injurious to health ;
- Any animal so kept as to be a nuisance or injurious ;
- Any accumulation or deposit which is a nuisance, or injurious to health :

Provided always that no such accumulation or deposit as shall be necessary for the effectual carrying on of any business or manufacture shall be punishable as a nuisance under this section when it is proved to the satisfaction of the justices that the accumulation or deposit has not been kept longer than is necessary for the purposes of such business

* See also page 79.

or manufacture, and that the best available means have been taken for protecting the public from injury to health thereby.

In other instances the word "nuisance" is qualified with the words "injurious to health," and the clause reads "nuisance injurious to health," so that the definition devolves upon the medical officer of health, and it will be the duty of the inspector of nuisances to take the opinion and instructions of that officer in reference to any nuisance so qualified by an Act of Parliament.

In a third class of cases the word "nuisance" is undefined and unqualified, and in such it will be necessary for the inspector of nuisances to form his own opinion thereon. It is however to be observed that even then it must have some reference to health, and be not only some substance disagreeable to the smell, or disorderly to the eye, for the action to be taken is under the sanitary Acts. The question of degree will however materially aid the officer in arriving at a sound decision, for a very offensive smell is more clearly a nuisance than one slightly offensive; a widely spread cause of offence than a mere point, and a large mass of dirt or rubbish than a small one. Thus, whilst it is not possible to frame a definition which shall apply to all cases, there are conditions which by common consent or public opinion would be called a nuisance; whilst about others there would be much difference of opinion, or such a general toleration as would exclude them from the class under discussion. Yet here there is a further difficulty. That which the common opinion of the neighbourhood may not regard as a nuisance—because it has been allowed for generations—may be estimated differently by those who have not been so familiarised with it; or the common opinion of to-day may

be changed by an improvement in taste and manners. Such, for example, is the allowance of pigstyes, to which further reference will be made.

There is yet a fourth class to which reference must be made, viz. those Acts in which the words occur, "nuisance, or injurious to health." The remarks already made, and the juxtaposition of these two conditions, will probably lessen the distinction which seems to exist between them, and may cause them to be read as in the third clause. Yet the words are distinct, and there can be no doubt that such an enactment contemplates the existence of a condition which may be called a nuisance, and which yet cannot be proved to be injurious to health. Such an illustration is that of gas-works.

Hence it will be the duty of the inspector to make himself acquainted with such legal definitions of the word as the Acts of Parliament supply ; to know the views of the medical officer of health under whose direction he acts, and to estimate properly the public opinion of the neighbourhood.

The following are enactments with which he should be familiar, besides those already quoted :—

THE ENCLOSURE ACTS AMENDMENT ACT, 1857.

(20 & 21 Vict. c. 31.)

Protecting from Nuisances Town and Village Greens and Allotments for Exercise and Recreation.

Section 12.—And whereas it is expedient to provide summary means of preventing nuisances in town greens and village greens, and on land allotted and awarded upon any enclosure under the said Acts as a place for exercise and recreation : If any person wilfully cause any injury or damage to any fence of any such town or village green or land, or wilfully and without lawful authority lead or drive any cattle

or animal thereon, or wilfully lay any manure, soil, ashes, or rubbish, or other matter or thing thereon, or do any other act whatsoever to the injury of such town or village green or land, or to the interruption of the use or enjoyment thereof as a place for exercise and recreation, such person shall for every such offence, upon a summary conviction thereof before two justices, upon the information of any churchwarden or overseer of the parish in which such town or village green or land is situate, or of the person in whom the soil of such town or village green or land may be vested, forfeit and pay, in any of the cases aforesaid, and for each and every such offence, over and above the damages occasioned thereby, any sum not exceeding forty shillings; and it shall be lawful for any such churchwarden or overseer or other person as aforesaid to sell and dispose of any such manure, soil, ashes, and rubbish, or other matter or thing as aforesaid; and the proceeds arising from the sale thereof, and every such penalty as aforesaid, shall, as regards any such town or village green not awarded under the said Acts or any of them to be used as a place for exercise and recreation, be applied in aid of the rates for the repair of the public highways in the parish, and shall, as regards the land so awarded, be applied by the persons or person in whom the soil thereof may be vested in the due maintenance of such land as a place for exercise and recreation; and if any manure, soil, ashes, or rubbish be not of sufficient value to defray the expense of removing the same, the person who laid or deposited such manure, soil, ashes, or rubbish shall repay to such churchwarden or overseer or other person as aforesaid the money necessarily expended in the removal thereof; and every such penalty as aforesaid shall be recovered in manner provided by the Act of the session holden in the 11th and 12th years of Her Majesty, chapter 43; and the amount of damage occasioned by any such offence as aforesaid shall, in case of dispute, be determined by the justices by whom the offender is convicted; and the payment of the amount of such damage, and the repayments of the money necessarily expended in the removal of any manure, soil, ashes, or rubbish, shall be enforced in like manner as any such penalty.

THE NUISANCES' REMOVAL ACT FOR ENGLAND, 1855.

(18 & 19 Vict. c. 121.)

To Enter Private Premises and Examine them.

Section 11.—The local authority shall have power of entry for the following purposes of this Act, and under the following conditions:—

(1) To ground proceedings.

For this purpose, when they or *any of their officers* have reasonable grounds for believing that a nuisance exists on any private premises, demand may be made by them or their officer on any person having custody of the premises of admission to inspect the same at any hour between nine in the morning and six in the evening, and if admission be not granted, any justice having jurisdiction in the place may, on oath made before him of belief in the existence of the nuisance, and after reasonable notice of the intended application to such justice being given in writing to the party on whose premises the nuisance is believed to exist, by order under his hand require the person having the custody of the premises to admit the local authority or their officer; and if no person having custody of the premises can be discovered, any such justice may and shall, on oath made before him of belief in the existence of such nuisance, and of the fact that no person having custody of the premises can be discovered, by order under his hand authorise the local authority or their officers to enter the premises between the hours aforesaid.

(2) To examine premises where nuisances exist, to ascertain the course of drains, and to execute or inspect works ordered by justices to be done under this Act.

Drains.

For these purposes, whenever under the provisions of this Act a nuisance has been ascertained to exist, or where an order of abatement or prohibition under this Act has been made, or when it becomes necessary to ascertain the course of a drain, the local authority may enter on the premises by

themselves or their officers, between the hours aforesaid, until the nuisance shall have been abated, or the course of the drain shall have been ascertained, or the works ordered to be done shall have been completed, as the case may be.

THE METROPOLIS' LOCAL MANAGEMENT ACT, 1855.

(18 & 19 Vict. c. 120.)

Inspection of Drain, Water-closet, &c.

Section 82.—(See page 22.)

THE SANITARY ACT, 1866.

(29 & 30 Vict. c. 90.)

Power to Abate Nuisance.

Section 20.—It shall be the duty of the nuisance authority to make, from time to time, either by *itself or its officers*, inspection of the district, with a view to ascertain what nuisances exist calling for abatement under the powers of the Nuisances' Removal Acts, and to enforce the provisions of the said Acts, in order to cause the abatement thereof, also to enforce the provisions of any Act that may be in force within its district requiring fireplaces and furnaces to consume their own smoke.

And any justice, upon complaint upon oath, may make an order to admit the nuisance authority or their officers, for these purposes, as well as to ground proceedings under the 11th section of the Nuisances' Removal Act, 1855.

THE PUBLIC HEALTH ACT, 1848.

(11 & 12 Vict. c. 63.)

As to Filthy Houses.

Section 60.—And be it enacted that, if upon the certificate of the *officer of health*, if any, or of any two medical practitioners, it appears to the local board of health that any house, or part thereof, is in such a filthy or unwholesome condition that the health of any person is affected or endangered thereby, or that the whitewashing, cleansing, or purifying of any house or part thereof would tend to prevent or check infectious or contagious disease, the said local

board shall give notice in writing to the owner or occupier of such house or part thereof to whitewash, cleanse, or purify the same, as the case may require ;

And if the person to whom notice is so given fail to comply therewith within such time as shall be specified in the said notice, he shall be liable to a penalty not exceeding ten shillings for every day during which he continues to make default ;

And the said local board may, if they shall think fit, cause such house, building, or part thereof, to be whitewashed, cleansed, or purified, and the expenses incurred by them in so doing shall be repaid by the owner or occupier in default, and be recoverable from either of them in the summary manner hereinafter provided.

THE METROPOLIS' LOCAL MANAGEMENT ACT, 1855.

(18 & 19 Vict. c. 120.)

Water-closet, Privy, &c.

Section 81.—After the commencement of this Act it shall not be lawful newly to erect any house or rebuild any house pulled down to the extent aforesaid within any parish mentioned in Schedule (A) to this Act, or any district mentioned in Schedule (B) to this Act, without a sufficient water-closet or privy and ash-pit furnished with proper doors and coverings, and also furnished as regards the water-closet with suitable water supply and water supply apparatus and with suitable trapped soil-pan and other suitable works and arrangements.

THE TOWNS' IMPROVEMENT ACT, 1847.

(10 & 11 Vict. c. 34.)

[When incorporated.]

Privy.

Section 43.—The owner of any such house shall provide the same with a privy, with such door and covering of the same, and with such ash-pit as aforesaid, to the satisfaction of the commissioners, within one month next after notice in writing for that purpose given by the commissioners to him or the occupier of the house.

DRAINAGE.

The drainage of houses is of the utmost importance to health, and has been the subject of many legislative enactments. The following are extracted from the Towns' Improvement Act of 1847, and the Metropolis' Local Management Act, 1855, but the subject will be discussed at greater length elsewhere.*

THE TOWNS' IMPROVEMENT ACT, 1847.

(10 & 11 Vict. c. 34.)

[When incorporated.]

Sewer trapped.

Section 33.—All sewers and drains within the limits of the special Act, whether public or private, shall be provided by the commissioners, or other persons to whom they severally belong, with proper traps or other coverings or means of ventilation so as to prevent stench.

Level to allow Drainage.

Section 36.—No house or building within the limits of the special Act shall be built upon a lower level than will allow of the drainage of the wash and refuse of such house or building into some sewer belonging to the commissioners either then existing or marked out upon the map hereinbefore directed to be made by them, or into the sea.

Stagnant Water in Cellars. Overflow of Cesspool.

Section 99.—No person shall suffer any waste or stagnant water to remain in any cellar or other place within the house belonging to or occupied by him, within the limits of the special Act, so as to be a nuisance; and every person who so suffers such water to remain forty-eight hours after receiving notice from the commissioners to remove the same, and every person who allows the contents of any privy or

* See also pages 105, &c.

cesspool to overflow, or soak therefrom, to the annoyance of the occupiers of any adjoining property, shall for every offence be liable to a penalty not exceeding forty shillings, and to a further penalty not exceeding five shillings for every day during which such nuisance continues.

THE METROPOLIS' LOCAL MANAGEMENT ACT, 1855.

(18 & 19 Vict. c. 120.)

Drained Houses.

Section 73.—If any house or building, whether built before or after the commencement of this Act, shall within any such parish or district be found not to be drained by a sufficient drain communicating with some sewer and emptying itself into the same to the satisfaction of the vestry or board of such parish or district, and if a sewer of sufficient size be within one hundred feet of any part of such house or building on a lower level than such house or building, it shall be lawful for the vestry or board, at their discretion, by notice in writing, to require such owner of such house or building forthwith or within such reasonable time as may be approved by the vestry or board to construct and make such house or building into any such sewer a covered drain, and such branches thereto, of such materials, of such size, at such level, and with such fall, as shall be adequate for such house or building and its several floors or stories, and also of its areas, water-closets, privies, and offices (if any), and for conveying the soil drainage and wash therefrom into the said sewer, and to provide fit and proper paved or impermeable sloped surfaces for carrying surface water thereto, and fit and proper sinks, and fit and proper syphoned or otherwise trapped inlets and outlets for hindering stench therefrom, and fit and proper water supply and water supplying pipes, cisterns, and apparatus for scouring the same, and for causing the same to convey away the soil, and fit and proper sand-traps, expanding inlets, and all other apparatus for hindering the entry of improper substances therein.

SEWERAGE.

There can be no doubt that the two subjects which must engage the attention of the inspector under this head are the sewerage and the water-closets or petties, for they are everywhere the chief nuisances.*

It may not devolve upon him to suggest a special scheme, but with any system of sewerage care should be taken to properly ventilate the sewers, and to prevent the return of foul and noxious gases into the houses or water-closets. This will be required particularly at the higher level of the drains, since there the gases of light specific gravity accumulate ; but they should be also at other levels. Wherever placed, they should be carried to an elevation above that of the houses, and, if possible, should not be near habitations. Ventilating doors into the street are offensive and noxious, and not fit even for a barbarous age and people ; yet they are found in the most wealthy streets and squares of London and other large towns.

In effecting this, it may not be possible to entirely dis sever the system of large drains from that of the small communications with houses, but it is clear that ventilation should be adopted in both, and also that in the latter the danger from want of ventilation, or from an erroneous plan of ventilation, is the greatest.

It must also be added that the utmost watchfulness should be exercised over the fittings of water-closets with a view to insist upon a sufficient and constant supply of water and perfect trapping. Moreover, such improvements in the con-

* See also page 105.

struction of water-closets as not only effect these two objects with the greatest simplicity and completeness, but also deodorise the liquid, solid, and gaseous excreta, should be recommended.

But in small villages it may be impossible, at any reasonable cost per head of the population, to provide a general system of sewerage; and, moreover, it is at least very doubtful whether the valuable fœcal matter may not be equally well and more readily utilised without it.

The present cesspit arrangement is usually offensive, and from the decomposition of the nitrogenous material, a considerable reduction in the value of the excreta as manure is effected. It is true that, if the cesspit be of suitable dimensions and covered over, yet so that dry ashes can be thrown over the mass, much decomposition may be prevented, and the offensive smell is perceived chiefly or only within the privy. If such a cesspit were emptied every few weeks, and the whole material at once used as manure, it would be very valuable, but such an operation gives rise to offensive odours at the cesspit itself, in the route of the conveyed matter, and on the land where it is ultimately placed.

EARTH CLOSETS.

Nearly all these evils are prevented by the use of the earth-closet system, and the value of the product abundantly repays the labour and care expended on it. All that is necessary is to provide a box instead of a cesspool for the petty, which is placed under the seat, and another box to contain fine ashes or dry earth, of which a portion is to be cast into the seat-box after every occasion of its use. The

ashes are readily obtained from coal ashes, and particularly in those parts of the country where there is an ash-pit and grate in front of the fireplace to contain the riddled ashes ; and elsewhere the garden soil may be dried by keeping a portion of it in the house, or, where possible, by drying it on the oven plate.

It is not, however, so convenient in those parts of the country where coal is particularly dear, nor to those classes who are not able to make a fire daily, or who have not a patch of garden land.

The seat-box is but of small cost, and may be made of wood iron-bound, or of iron, and neither so large nor so heavy as to offer much difficulty in its removal.

Several patents have been taken out in reference to the material used, as well as to the apparatus employed, and companies have been established to give effect to them. In some places, as at Manchester, the material is ashes ; whilst a coarse kind of peat is now largely used for the same purpose, and becomes itself a part of the manure.

Mr. Chesshire, of Birmingham, has devised an efficient apparatus by which the urine is separated from the fæces, and such a separation is also provided for in many kinds of earth-closets.*

M. Badin has patented a plan now in use experimentally at the Great Eastern Railway, by which this separation is effected by the aid of spent tan, which is at length mixed up with the fæces as manure. The following short description appeared in the *Lancet* of February 8, 1873 :—

The apparatus consists of a truncated cone of wire gauze, which is fixed, base downwards, in a cylinder of perforated

* See the last chapter.

metal. The cylinder is surrounded by, and nearly fills, a strong water-tight cylinder of galvanised iron, connected by a union joint with an air-tight cistern. The outer cylinder is about three feet high. The space between the cone and the inner cylinder is filled with some porous substance—with spent tan, in the experiment which we witnessed. This substance, whatever it may be, is saturated with some powerful antiseptic compound. The excreta, both solid and liquid, fall into the cone, the mouth of which is about six inches in diameter. Here the solids are retained, while the liquids filter through the tan, are disinfected in their passage, and finally pass into the outer cylinder, and thence to the tank. The cylinders must, of course, be changed by the company when full, and the tank emptied; but it is calculated that the apparatus is large enough to retain the whole excreta of one adult for twelve months, so that with a family of six it would only be necessary to change the cylinder every two months. When full, the cylinder with its contents, and the liquid in the tank, are to be removed to the company's works, the liquid boiled down, and mixed with the solids, tan and all, taken from the cylinder. The whole is then dried, pulverised, and sold as "human guano."

Legal provision has been made for this object in the following clause :—

THE SANITARY ACT (1866) AMENDMENT ACT, 1868.

(31 & 32 Vict. c. 115.)

Earth Closets.

Section 7.—Any enactment of any Act of Parliament in force in any place requiring the construction of a water-closet shall, with the approval of the local authority, be satisfied by the construction of an earth-closet, or other place for the reception and deodorisation of fæcal matter, made and used in accordance with any regulation from time to time issued by the local authority ;

The local authority may, as respects any houses in which such earth-closets or other places as aforesaid are in use, with their approval dispense with the supply of water required by

any contract or enactment to be furnished to water-closets, in such houses, on such terms as may be agreed upon between such authority and the persons or body of persons providing or required to provide such water ;

The local authority may themselves undertake or contract with any person to undertake a supply of dry earth or other deodorising substances to any house or houses within their district for the purpose of any earth-closets or other places as aforesaid ;

The local authority may themselves construct or require to be constructed earth-closets or other such places as aforesaid in all cases where, under any enactment in force, they might construct water-closets or privies, or require the same to be constructed with this restriction, that no person shall be required to construct an earth-closet or other place as aforesaid in any house instead of a water-closet if he prefer to comply with the provisions of the enactment in force requiring the construction of a water-closet, and a supply of water for other purposes is furnished to such house, and that no person shall be put to greater expense in constructing an earth-closet or other place as aforesaid than he would be put to by compliance with the provisions of any enactment as to water-closets or privy accommodation which he might have been compelled to comply with if this section had not been passed.

Local authority shall for the purposes of this Act mean "any local board" and "any sewer authority."

CHAPTER III.

REPORT AS TO TRADES.

5. HE SHALL REPORT TO THE SANITARY AUTHORITY ANY NOXIOUS OR OFFENSIVE BUSINESSES, TRADES, OR MANUFACTORIES ESTABLISHED WITHIN THE DISTRICT, AND THE BREACH OR NON-OBSERVANCE OF ANY BY-LAWS OR REGULATIONS MADE IN RESPECT OF THE SAME.

THE inspector of nuisances will observe the two classes of trades referred to, viz. noxious and offensive.

The clause is defective in not further defining the term noxious in reference to the objects which the trades may affect injuriously, such as vegetables and animals, and, above all, man. There are certain trades which have been proved to be noxious to vegetable life without producing any very decided effect upon animals; such as are included in the inspection of alkali works; whilst there are others clearly noxious to man without being prejudicial to vegetables. The primary object in this legislation being the health of man, it may be presumed that the word had more immediate reference to him; but it seems to be the duty of the inspector of nuisances to give it a wider signification, and to report upon any trade which is noxious in any of the

senses now indicated. The determination of the noxious quality of a trade is, however, the special function of the medical officer of health, and the inspector of nuisances will thus have a mode of relieving himself of an onerous duty.

The offensive character of trades will refer chiefly to the sense of smell, as, for example, bone-boiling and artificial manure manufacture, and the question will be one of degree of intensity and diffusion ; but in others the offence will be one of sight, as, for example, a knacker's or butcher's yard which is not kept in a proper state, or the operations of the trade under due regulation.

The list of trades which fall under one or both of these catalogues is very extensive, but only a few of them will be found in each locality, and thus the duty devolving upon the inspector of nuisances will probably not be very onerous. The following list of such trades in France will be a useful guide for this country, although it may not contain all those which will come under the observation of the inspector.



DANGEROUS, NOXIOUS, OR OFFENSIVE TRADES.

ARRANGEMENT OF WORKS IN FRANCE, 1867.

FIRST CLASS.

Names of Manufactures.	Cause of Complaint.
Acid, arsenic (manufacture of). <i>By means of arsenious acid and nitric acid.</i> <i>When the nitrous products are not absorbed</i>	Injurious emanations.
—, hydrochloric (production of). <i>By the decomposition of the chloride of magnesium, of aluminium, &c.</i> <i>When the acid is not condensed .</i>	Do.
—, oxalic (manufacture of). <i>By nitric acid.</i> <i>Without destruction of injurious gases</i>	Fumes.
—, picric. <i>When the injurious gases are not burnt</i>	Injurious vapours.
—, stearic (manufacture of). <i>By distillation</i>	Smell and danger of fire.
—, sulphuric (manufacture of). <i>By the combustion of sulphur and pyrites</i>	Injurious emanations.
Acids (refining of gold and silver by)	Do.
Aldehyde (manufacture of)	Danger of fire.
Archil (manufacture of). <i>In open vessels</i>	Smell.
Blood. <i>Workshops for separating fibrine, albumen, &c.</i>	Do.
<i>Dépôts of, for the manufacture of Prussian blue and other industrial products</i>	Do.
<i>Manufacture of powder of, for clarifying wines</i>	Do.

FIRST CLASS—*continued.*

Names of Manufactures.	Cause of Complaint.
Bone fat (manufacture of)	Smell; pollution of water; danger from fire.
Bones (torrefaction of) for manure.	
<i>When the gases are not burnt</i>	Smell and danger of fire.
—, fresh (dépôts of, on large scale)	Smell; injurious emanations.
Bristles of swine (preparation of).	
<i>By fermentation</i>	Smell.
Burning of marine plants in permanent establishments	Smell and smoke.
Carbonising of animal matters in general	Smell.
Carriage grease	Smell; danger from fire.
Chrysalides (workshop for extracting the silk)	Smell.
Coke (manufacture of).	
<i>In the open air, or in kilns not smoke-consuming</i>	Smoke and dust.
Cyanide of potassium and Prussian blue (manufacture of).	
<i>By the direct calcining of animal matters with potash</i>	Smell.
Dogs (infirmaries for)	Smell and noise.
Ether (manufacture and dépôts of)	Danger from fire and explosion.
Fat in the naked flame (melting of)	Smell; danger of fire.
— or thick oil, for the use of chamois leather dressers and curriers (manufacture of)	Do. do.
— varnish (manufacture of)	Do. do.
Fatty waters (extraction of the oils contained in) for the manufacture of soap and other purposes.	
<i>In open vessels</i>	Do. do.
Felts and patent shades (manufacture of)	Do. do.
Fireworks (manufacture of)	Danger from fire and explosion.
Flesh, débris, and offal (dépôts of), arising from the slaughter of animals	Smell.

FIRST CLASS—continued.

Names of Manufactures.	Cause of Complaint.
Fulminating mercury (manufacture of) .	Danger of fire and explosion.
Glue (manufacture of)	Smell; pollution of water.
Greaves (manufacture of)	Smell and danger of fire.
Guano (dépôts of).	
<i>When the quantity exceeds 25,000 kilogrammes</i>	Smell.
Gut manufactures (working of fresh intestines for all purposes)	Smell; injurious emanations.
Ivory black and animal charcoal (distillation of bones or manufacture of).	
<i>When the gases are not burnt</i>	Smell.
Lignites (incineration of)	Smoke; injurious emanations.
Manures (dépôts of) from middens.—Animal remains.	
<i>Not prepared or in uncovered stores</i>	Smell.
— (manufacture of).	
<i>By means of animal matters</i>	Do.
Matches (manufacture of).	
<i>With detonating and explosive substances</i>	Danger of explosion and fire.
—, quick (manufacture of).	
<i>With explosive materials</i>	Do. do.
Menageries	Danger from animals.
Mud and impurities (dépôts of), and sewers	Smell.
Nightsoil, desiccated, and other manures from animal matters (manufacture of) .	Smell and pollution of water.
Nitrate of iron (manufacture of).	
<i>When the injurious vapours are not absorbed or decomposed</i>	Injurious emanations.
Oil, fish (manufacture of)	Smell; danger of fire.

FIRST CLASS—*continued.*

Names of Manufactures.	Cause of Complaint.
Oil, neatsfoot (manufacture of). <i>With employment of matters in putrefaction</i>	Smell; danger of fire.
Oils and other fatty bodies extracted from the remains of animal matters (extraction of) — (mixed, hot or boiled).	Do. do.
<i>In open vessels</i>	Do. do.
— of petroleum and other hydrocarbons (cleaning of tissues and waste wool by)	Danger of fire.
— of petroleum, of schist, and of tar and other hydrocarbons employed for lighting, heating, manufacture of colours and varnishes, the cleaning of cloths, and other purposes.	Danger of fire.
<i>Manufacture, distillation, and work on a grand scale</i>	Smell; danger of fire.
<i>Very inflammable substances, that is to say, emitting vapours liable to take fire at a temperature of less than 35 degrees.</i>	Smell; danger of fire.
<i>If the quantity stored is, even temporarily, 1050 litres or more</i>	Do. do.
<i>Less inflammable substances, that is to say, emitting vapours liable to take fire, at a temperature of 35 degrees and above.</i>	Do. do.
<i>If the quantity stored is, even temporarily, 10,500 litres or more</i>	Do. do.
—, red (manufacture of).	Do. do.
<i>By the extraction of greaves and fatty remnants, at a high temperature</i>	Do. do.
—, resinous (manufacture of)	Do. do.
Olive-oil cakes (preparation of).	Danger from fire.
<i>By sulphuret of carbon</i>	Danger from fire.
Patent leather (manufacture of)	Smell and danger of fire.
Pearl ashes.	Smoke and smell.
<i>With discharge of fumes outside</i>	Smoke and smell.
Phosphorus (manufacture of).	Danger of fire.
Piggeries	Smell; noise.

FIRST CLASS—continued.

Names of Manufactures.	Cause of Complaint.
Potash, arseniate of (manufacture of). <i>By means of saltpetre.</i> <i>When the vapours are not absorbed</i>	Injurious emanations.
Powder and fulminating substances (manufacture of)	Danger of explosion and fire.
Powders, explosive (manufacture of)	Danger of explosion.
Printing ink (manufacture of)	Smell; danger of fire.
Pyritous and aluminous earths (roasting of)	Smoke; injurious emanations.
Red, Prussian and English	Injurious emanations.
Resins, gallipot and common resin (work on a large scale for melting and purifying)	Smell and danger of fire.
Retting in quantity, hemp and flax	Injurious emanations and pollution of water.
Sabots (workshop for smoking). <i>By the combustion of the horn or other animal matters, in the towns</i>	Smell and smoke.
Scalding-houses. <i>For the industrial preparation of animal remains</i>	Smell.
Skinning of animals	Smells; injurious emanations.
Slaughterhouses, public	Smell and tainting of water.
Soda, raw, from sea-weed (manufacture of). <i>In permanent establishments</i>	Smell and smoke.
Starch-works. <i>By fermentation</i>	Smells, injurious emanations, and pollution of water.
Sulphate of ammonia (manufacture of). <i>By distillation of animal matters</i>	Smell.
— of copper (manufacture of). <i>From roasting pyrites</i>	Injurious emanations.
— of mercury (manufacture of). <i>When the vapours are not absorbed</i>	Do.
— of soda (manufacture of). <i>By the decomposition of common salt by sulphuric acid, without condensation of the hydrochloric acid</i>	Do.

FIRST CLASS—*continued.*

Names of Manufactures.	Cause of Complaint.
Sulphuret of carbon (manufacture of) .	Smell; danger of fire.
— (manufactures in which they employ on a large scale the)	Danger of fire.
Sulphurous minerals (roasting of) . .	Smoke; injurious emanations.
Taffeta and glazed or waxed cloth (manufacture of)	Smell; danger of fire.
Tallow, brown (manufacture of) . .	Do. do.
— candles (melting-houses for). <i>Using naked flame</i>	Do. do.
Tarpaulings (manufacture of). <i>By using oil</i>	Danger of fire.
Tars (special processes for the boiling of). <i>From various sources</i>	Smell; danger from fire.
— and vegetable resins (elaboration of). <i>From various sources</i>	Do. do.
Tobacco (calcination of the midribs of) .	Smell and smoke.
Triperies annexed to the slaughterhouses	Smell and pollution of water.
Turf (charring of). <i>In open vessels</i>	Smell and smoke.

SECOND CLASS.

Names of Manufactures.	Cause of Complaint.
Acid, arsenic (manufacture of). <i>By means of arsenious acid and nitric acid.</i>	
<i>When the nitrous products are absorbed</i>	Injurious vapours.
—, hydrochloric (production of). <i>By the decomposition of the chloride of magnesium, of aluminium, &c.</i>	
<i>When the acid is condensed</i>	Accidental emanations.
—, oxalic (manufacture of). <i>By sawdust and potash</i>	Vapour.
—, pyroligneous (manufacture of). <i>When the gaseous products are not burned</i>	Smoke and smell.
—, pyroligneous (purification of)	Smell.
—, stearic (manufacture of). <i>By saponifying</i>	Smell and danger of fire.
Alcohol (rectification of)	Danger of fire.
Alkaline chlorides, eau de javelle (manufacture of)	Smell.
Animal charcoal from refineries and sugar works (revivification of)	Injurious emanations ; smell.
Arsenate of potash (manufacture of). <i>By saltpetre.</i>	
<i>When the vapours are absorbed</i>	Accidental emanations.
Artificial fuel or bricks of coal (manufacture of). <i>With fat resin</i>	Smell ; danger of fire.
Asphalts and bitumens (working of). <i>By the naked fire</i>	Do. do.
Baryta (decolorising of sulphate of). <i>By hydrochloric acid, in open vessels</i>	Injurious emanations.
Bleaching. <i>Of yarns, of cloths, and of pulp for paper by chlorine</i>	Smell ; injurious emanations.
<i>Of yarns and woollen fabrics, and silks, by sulphurous acid</i>	Do. do

SECOND CLASS—*continued.*

Names of Manufactures.	Cause of Complaint.
Bones (torrefication of) for manure .	Smell and danger of fire.
<i>When the gases are burnt</i> . . .	Do. do.
Carbonisation of woods.	
<i>In the open air, in permanent establishment, and otherwise than in the forest</i> . . .	Smell and smoke.
<i>In close vessels, disengaging into the air the gaseous products of distillation</i> . . .	Do. do.
Carpet-beating on a large scale . . .	Noise and dust.
Chamois leather factories . . .	Smell.
Chlorine (manufacture of).	
<i>On a large scale</i> . . .	Do.
Cocoons.	
<i>Treatment of coloured cocoons</i> . . .	Pollution of water.
<i>Spinning of cocoons</i> (see <i>Cocoons</i> , Class III.)	
Coke (manufacture of).	
<i>In smoke-consuming kilns</i> . . .	Dust.
Cooperage on a large scale.	
<i>Working on casks impregnated with fatty and putrescent matters</i> . . .	Noise, smell, and smoke.
Crockery (manufacture of).	
<i>With kilns not smoke-consuming</i> . . .	Smoke.
Currying works . . .	Smell.
Cyanide of potassium and Prussian blue (manufacture of).	
<i>By employing matters previously carbonised in close vessels</i> . . .	Do.
Dairies on a large scale, in the towns .	Do.
Enamelled earths (manufacture of).	
<i>With kilns not smoke-consuming</i> . . .	Smoke.
Engines and waggons (workshops for construction of) . . .	Noise ; smoke.
Fatty waters (extraction for the manufacture of soap, and other uses of oils contained in).	
<i>In close vessels</i> . . .	Smell ; danger of fire.

SECOND CLASS—continued.

Names of Manufactures.	Cause of Complaint.
Felt, tarred (manufacture of) Forges and boiler works for great works employing machine hammers Furnaces, blast	Smell ; danger of fire. Smoke ; noise. Smoke and dust.
Gases for lighting and firing (manufacture of <i>For the public use</i> Glassworks, crystal works, and manufac- tures of mirrors. <i>In kilns not smoke-consuming</i>	Smell. Smell and danger of fire. Smoke and danger of fire.
Hairs and pigs' bristles (preparation of). <i>Without fermentation</i> (see also <i>Bristles, by fermentation, Class I.</i>)	Smell.
Indiarubber (working of). <i>Employing essential oils or sulphuret of carbon</i> —, (application of coatings of) Ivory and animal black (distillation of bones or manufacture of). <i>When the gases are burnt</i>	Smell ; danger of fire. Danger of fire. Smell.
Laces and cloths of gold and silver (burning on a great scale of), in the towns Lamp black (manufacture of). <i>By the distillation of oils, tars, bitu- mens, &c.</i> Leather, raw, and fresh hides (dépôts of) Lime-kilns. <i>Permanent</i>	Do. Smoke ; smell. Smell and dust. Smoke ; dust.
Manures (dépôts of) from middens.—Ani- mal remains. <i>Dried or disinfected, and in covered stores when the quantity exceeds 25,000 kilogrammes</i>	Smell.

SECOND CLASS—continued.

Names of Manufactures.	Cause of Complaint.
Murexide (manufacture of). <i>In close vessels, by the reaction of nitric acid, and of the uric acid of guano</i>	Injurious emanations.
Nitro-benzine, aniline, and matters derived from benzole (manufacture of)	Smell, injurious emanations, and danger of fire.
Oil, neatsfoot (manufacture of). <i>When the matters employed are not putrefied</i>	Smell.
Oilcloths for packing cloth, tarred cords, tarred papers, pasteboards, and bituminous tubes (manufacture of). <i>By hot method</i>	Smell and danger of fire.
Oils (burning). <i>When alcohol and essential oils are used</i>	Danger of fire and explosion.
— (mixing by heat or boiling of). <i>In close vessels</i>	Smell and danger of fire.
— of petroleum, of schist, and of tar, light oils, and other hydrocarbons employed in lighting and heating and in the manufacture of colours and varnishes, cleaning stuffs, &c. <i>Very inflammable substances, that is to say, emitting vapours liable to take fire at a temperature of less than 35 degrees (or 95° Fahr.) on approach of a lighted match.</i>	
<i>If the quantity above 150 litres does not reach 1050 litres</i>	Do. do.
<i>Less inflammable substances, that is to say, emitting vapours liable to take fire only at a temperature of 35 degrees and above.</i>	
<i>If the quantity stored above 1050 litres does not reach 10,500 litres</i>	Do. do.
Onions (drying of), in the towns	Smell.
Parchment factories	Do.

SECOND CLASS—continued.

Names of Manufactures.	Cause of Complaint.
Pearl ashes.	
<i>With combustion and condensation of the smoke</i>	Smoke and smell.
Plaster (kilns for).	
<i>Permanent</i>	Smoke and dust.
Porcelain (manufacture of)	Smoke.
Potash (manufacture of).	
<i>By carbonising the residue of molasses</i>	Smoke and smell.
Protochloride, or salt of tin (manufacture of)	Injurious emanations.
Resinous torches (manufacture of)	Smell and danger of fire.
Retting (on a great scale) of hemp and flax.	
<i>By the action of acids, of warm water, and of vapour</i>	Injurious emanations and pollution of water.
Rogue (dépôt of brine used for salting)	Smell.
Sal ammoniac and sulphate of ammonia (manufacture of).	
<i>By employing animal matters</i>	Smell; injurious emanations.
—, extracted from the waters of gas-works (special manufacture of)	Smell.
Salt provisions (establishments for) and smoking of fish	Do.
Salted fish (dépôts of)	Unpleasant smell.
Sardines (preparation of preserved), in the towns	Smell.
Sausages (manufactures on a great scale of)	Do.
Silk hats or other preparations, by means of a finish (manufacture of)	Danger of fire.
Skins or fur of hares and rabbits (cleaning of)	Smell.
Slaughterhouses	Smell and danger from the animals.
Starch-works.	
<i>By the separation of the gluten, and without fermentation</i>	Pollution of water.
Stripping of flax, hemp, and jute on large scale	Dust and smoke.

SECOND CLASS—*continued.*

Names of Manufactures.	Cause of Complaint.
Sugar refinery and manufacture . . .	Smoke and smell.
Sulphate of mercury (manufacture of).	
<i>When the vapours are absorbed . . .</i>	Slight emanations.
— of peroxide of iron (manufacture of).	
<i>By sulphate of protoxide of iron and nitric acid (nitro-sulphate of iron).</i>	Injurious emanations.
— of soda (manufacture of).	
<i>With complete condensation of the hydrochloric acid . . .</i>	Do.
Sulphur (fusion or distillation of) . . .	Injurious emanations ; danger from fire.
Tallow-candles (smelting-houses for).	
<i>In the water-bath or by steam . . .</i>	Smell.
Tanneries . . .	Do.
Tarpaulings (manufacture of).	
<i>Without boiling in oil . . .</i>	Danger of fire.
Tars (treatment of) in gas manufactures .	Smell and danger of fire.
— and bituminous fluid matters (dépôts of) . . .	Do. do.
Tobacco (manufacture of) . . .	Smoke and dust.
— pipes (manufacture of).	
<i>With kilns not smoke-consuming . . .</i>	Smoke.
Turf (carbonisation of).	
<i>In close vessels . . .</i>	Smell.
Varnish (manufactures of).	
<i>With spirits of wine . . .</i>	Smell and danger of fire.

THIRD CLASS.

Names of Manufactures.	Cause of Complaint.
Acid, nitric —, oxalic (manufacture of). <i>By nitric acid.</i>	Injurious emanations.
<i>With destruction of injurious gases</i> —, picric.	Accidental fumes.
<i>With destruction of injurious gases</i> —, pyroligneous (manufacture of).	Injurious vapours.
<i>When the gaseous products are burned</i> —, sulphuric (manufacture of).	Smoke and smell.
<i>Of Nordhausen, by the decomposition of sulphate of iron</i>	Injurious emanations.
Albumen (manufacture of). <i>From the fresh serum of blood.</i>	Smell.
Alcohols other than from wine. <i>Without works for rectification</i>	Pollution of water.
— (agricultural distillery)	Do.
Ammonia (manufacture on a large scale of). <i>By the decomposition of ammoniacal salts</i>	Smell.
Ammoniacal cochineal (manufacture of)	Do.
Archil (manufacture of). <i>In close vessels, and employing am- monia to the exclusion of urine</i>	Do.
Artificial fuel or bricks of coal (manu- facture of). <i>With dry resin</i>	Do.
Asphalts, bitumens, resins, and bituminous solid matters (dépôts of)	Smell; danger of fire.
Bacon (workplaces for smoking)	Smell and smoke.
Bark beaters, in the towns	Noise and dust.
Bleaching. <i>Linen threads and tissues, hemp and cotton, by the alkaline chlorides (hypochloride)</i>	Smell; pollution of water.
Breweries	Smell.
Brickworks. <i>With kilns not smoke-consuming</i>	Smoke.
Button makers and other metal embossers by mechanical means	Noise.

THIRD CLASS—*continued.*

Names of Manufactures.	Cause of Complaint.
Candles and other articles in wax and stearic acid	Danger of fire.
— (manufacture of)	Smell; danger of fire.
— of paraffin and others of mineral origin (moulding of)	Do. do.
Carbonising wood. <i>In close vessels, with combustion of the gaseous products of distillation .</i>	Smell and smoke.
Ceruse, or white lead (manufacture of) .	Injurious emanations.
Cheeses (dépôts of) in the towns	Smell.
Chloride of lime (manufacture of). <i>In works manufacturing at most 300 kilogrammes per day</i>	Do.
Chromate of potash (manufacture of) .	Do.
Coal-washing	Pollution of water.
Cocoons (spinning of). <i>Workshops on a large scale, that is to say, employing at least six winders</i>	Smell; pollution of water.
Coffee (roasting on a large scale of) .	Smell and smoke.
Copper (solution of). <i>By acids</i>	Smell; injurious emanations.
Cotton and greased cotton (bleaching waste of)	Pollution of water.
— waste (dépôts of). <i>On a large scale, in the towns</i>	Danger of fire.
Cowhouses. <i>In towns of more than 5000 inhabitants</i>	Smell and drainage of urine.
Distilleries in general; spirits, gin, kirschwasser, absinthe, and other alcoholic liquors	Danger of fire.
Dyeing	Smell and pollution of water.
— of skins	Smell.
Earthenware (manufacture of). <i>With smoke-consuming kilns</i>	Accidental smoke.
— <i>With kilns not smoke-consuming</i>	Smoke.
Enamel (application of) on metals	Do.
Enamels (manufacturing). <i>With kilns not smoke-consuming</i>	Do.

THIRD CLASS—continued.

Names of Manufactures.	Cause of Complaint.
Enamelled ware (manufacture of). <i>With smoke-consuming kilns</i> . . .	Accidental smoke.
Fattening of fowls in the towns (establishments for)	Smell.
Felt hats (manufacture of)	Smell and dust.
Flints (kilns for calcining)	Smoke.
Founding and rolling of lead, zinc, and copper	Noise ; smoke.
Foundries for the second fusion	Smoke.
— of copper, brass, and bronze	Metallic fumes.
Gases for lighting and heating (manufacture of). <i>For particular use.</i>	Smell ; danger of fire.
Gasometers for particular uses, not adjoining manufacturing works	Do. do.
Gelatine for food, and gelatines derived from fresh skins and dressing, and fresh hides	Smell.
Gilding and silvering of metals	Injurious emanations.
Glassworks, crystalworks, and manufactories of mirrors. <i>With smoke-consuming kilns</i>	Danger of fire.
Glucose and syrups from fecula (manufacture of)	Smell.
Gold and silver beaters	Noise.
Goldsmiths' waste (treatment of). <i>By lead.</i>	Metallic fumes.
Guano (dépôts of). <i>For sale by retail</i>	Smell.
Gypsum (kilns for). <i>Only working one month</i>	Smoke and dust.
Herrings (salting of)	Smell.
Hungary leather tanneries	Do.
Leather-dressing establishments	Smell.
Lime-kilns. <i>Not working more than one month in the year</i>	Smoke and dust.

THIRD CLASS—*continued.*

Names of Manufactures.	Cause of Complaint.
Litharge (manufacture of)	Noxious dust.
Manures (dépôts of) from middens.—Animal remains. <i>Dried or disinfected, and in covered store, when the quantity is less than 2500 kilogrammes</i>	Smell.
Massicot (manufacture of)	Noxious emanations.
Mechanical pounding of drugs	Noise and dust.
Mills for grinding lime, flints, and puozzolane	Dust.
Mineral charcoal (manufacture of). <i>By pounding the residue of distillation of bituminous schists</i>	Smell and dust.
Morocco leather manufactories	Smell.
Nitrate of iron (manufacture of). <i>When the injurious vapours are absorbed or decomposed</i>	Injurious emanations.
Oak bark (mills for)	Noise and dust.
Oilcloths for packing textures, tarred cords, tarred papers, pasteboards, and bituminous tubes (manufacture of). <i>By cold method</i>	Smell ; danger of fire.
Oils (purification of)	Do. do.
Oil-works and oil-mills	Do. do.
Olives (pickling of)	Pollution of water.
Painted cloths (manufacture of)	Smell.
Paper (manufacture of). . . .	Danger of fire.
— pulp (preparation of). <i>By means of straw and other combustible matters</i>	Pollution of water.
Pasteboard makers	Smell.
— snuff-boxes (manufacture of)	Smell ; danger of fire.
Plates and polished metals	Do. do.
Perchloride of iron (manufacture of). <i>By solution of peroxide of iron</i>	Injurious emanations.
Porcelain (manufacture of). <i>With smoke-consuming kilns</i>	Accidental smoke.
Puozzolane, artificial (kilns for)	Smoke.

THIRD CLASS—continued.

Names of Manufactures.	Cause of Complaint.
Quicksilvering of mirrors . . .	Injurious emanations.
Rags (dépôts of) . . .	Smell.
Red lead (manufacture of) . . .	Injurious emanations.
— prussiate of potash . . .	Do.
Refrigerating preparations.	
<i>By ammonia</i> . . .	Smell.
<i>By ether, or other similar and com- bustible liquids</i> . . .	Danger of explosion and fire.
Salt of soda (manufacture of).	
<i>With sulphate of soda</i> . . .	Smoke; injurious emana- tions.
Salting and preparation of meats . . .	Smell.
— (dépôts for), in the towns . . .	Do.
Scalding-houses.	
<i>For the preparation of parts of ani- mals proper for food</i> . . .	Do.
Sealing-wax (manufacture of) . . .	Danger of fire.
Sheepskins (drying of) . . .	Smell and dust.
Soapworks . . .	Smell.
Sponges (washing and drying of) . . .	Smell; pollution of water.
Starch manufactories . . .	Do. do.
Steel (manufacture of) . . .	Smoke.
Sulphate of iron, alumina, and alum (manufacture of).	
<i>By the washing of roasted pyrites and aluminous earth</i> . . .	Smoke and pollution of water.
— of protoxide of iron or green copperas (manufacture on a large scale of).	
<i>By the action of sulphuric acid on old iron</i> . . .	Smoke; injurious emana- tions.
Sulphur (pulverising and sifting of) .	Dust; danger of fire.
Thrashing and washing (spacious work- shops for) worsteds, hairs, and waste of woollen and silk threads, in the towns . . .	Noise and dust.

THIRD CLASS—*continued.*

Names of Manufactures.	Cause of Complaint.
Thrashing, carding, and bleaching wool-lens, hairs, and feathers for bedding .	Smell and dust.
— hides (hammer for)	Noise and disturbance.
Tileworks. <i>With kilns not smoke-consuming</i>	Smoke.
Tin-plate (manufacture of)	Do.
Tobacco-pipes (manufacture of). <i>With smoke-consuming kilns</i>	Accidental smoke.
Wadding (manufacture of)	Dust and danger of fire.
Wash-houses	Pollution of water.
— for wool	Do.
Whalebone (working)	Unpleasant emanations.
White of zinc (manufacture of). <i>By the combustion of the metal</i>	Metallic fumes.
Wire-drawing works	Noise and smoke.
Wood carbon, in the towns (dépôts or stores of).	Danger of fire.
Yards for firewood, in the towns	Injurious emanations ; danger of fire.

NOXIOUS GASES.

The noxious gases and fumes which are emitted in the processes of trade are very numerous, and include the following :—

Hydrochloric acid, from alkali and steel works.

Sulphurous and sulphuric acid, from copper and steel works and bleaching.

Sulphuretted hydrogen, in many trades.

Carbonic acid, carbonic oxide, and sulphuric acid, from brickfields and cement works.

Arsenical fumes from copper smelting.

Bisulphide of carbon, from some india-rubber works.

Carbonic oxide, from iron furnaces, to the extent of 22 to 25 per cent.

Carbonic oxide, from copper furnaces, to the extent of 15 to 19 per cent.

DISEASES PRODUCED.

The injurious effects of trades upon health result from a variety of causes, as, for example, the mechanical or chemical action of the inhaled particles upon the air-passages; the action upon special organs or the general system of substances introduced into the blood; the inhalation of air rendered impure by overcrowding, or the fumes of gas combustion; and close confinement.

The following have been well established :—

1. Throat, nose, and pulmonary affections, which are due to the inhalation of solid particles :—

Pottery workers, china scourers, grinders of steel, button makers, pin pointers, weavers, flax

hacklers and spinners, grindstone makers, cement manufacturers, sulphuric acid makers, operatives in alkali and numerous chemical works, and compositors.

2. Other causes of disease :—

Brassfounders, coppersmiths, and tin-plate workers, sometimes have a peculiar ague.

Plumbers, painters, manufacturers in white lead are liable to paralysis.

Workers in mercury, as silvering mirrors and water gilding, are subject to a form of paralysis and salivation called “mercurialismus.”

Workmen in arsenical papers for walls and artificial flowers suffer from slow poisoning, and arsenic has been detected in their urine.

Chimney sweeps, subject to cancer.

Workers with phosphorus, as in making lucifer matches.

Lime-burners, well-sinkers, coal-miners, are liable to suffocation from the inhalation of carbonic acid and other poisonous or explosive gases.

The following are the chief legal sanitary provisions in reference to trades with which the inspector of nuisances is associated :—

THE BAKEHOUSE REGULATION ACT, 1863.

(26 & 27 Vict. c. 40.)

Section 4.—The inside walls and ceiling, or top of every bakehouse, situate in any city, town, or place containing, according to the last census, a population of more than five

thousand persons, and the passages and staircase leading thereto, shall either be painted with oil or be lime-washed or partly painted and partly lime-washed; where painted with oil, there shall be three coats of paint, and the painting shall be renewed once at least in every seven years, and shall be washed with hot water and soap once at least in every six months; where lime-washed, the lime-washing shall be renewed once at least in every six months.

Every bakehouse, wherever situate, shall be kept in a cleanly state, and shall be provided with proper means for effectual ventilation, and be free from effluvia arising from any drain, privy, or other nuisance.

If the occupier of any bakehouse fails to keep the same in conformity with this section, he shall be deemed to be guilty of an offence against this Act, and to be subject in respect of such offence to a penalty not exceeding five pounds.

The court having jurisdiction under this Act may, in addition to or instead of inflicting any penalty in respect of an offence under this section, make an order directing that, within a certain time to be named in such order, certain means are to be adopted by the occupier for the purpose of bringing his bakehouse into conformity with this section; the court may, upon application, enlarge any time appointed for the adoption of the means directed by the order; but any noncompliance with the order shall, after the expiration of the time as originally limited or enlarged by subsequent order, be deemed to be a continuing offence, and to be punishable by a penalty not exceeding one pound for every day that such noncompliance continues.

Section 6.—It shall be the duty of the local authority to enforce within their district the provisions of this Act, and in order to facilitate the enforcement thereof, any officer of health, inspector of nuisances, or any other officer appointed by the local authority, hereinbefore referred to as the *inspector*, may enter into any bakehouse at all times during the hours of baking, and may inspect the same, and examine whether it is or not in conformity with the provisions of this Act; and any person refusing to admit the inspector, or obstructing him in his examination, shall for each offence incur a penalty not exceeding twenty pounds.

And it shall be lawful for any inspector who is refused admission to any bakehouse, in pursuance of this section, to apply to any justice for a warrant authorising him, accompanied by a police-constable, to enter such bakehouse for the purpose of examining the same, and to enter the same accordingly.

THE WORKSHOPS' REGULATION ACT, 1867.

(30 & 31 Vict. c. 146.)

[Its provisions are referred to on page 22.]

THE PUBLIC HEALTH ACT, 1848.

(11 & 12 Vict. c. 63.)

As to Slaughterhouses, &c.

Section 64.—And be it enacted that the business of a blood-boiler, bone-boiler, fellmonger, slaughterer of cattle, horses, or animals of any description, soap-boiler, tallow-melter, tripe-boiler, or other noxious or offensive business, trade, or manufacture, shall not be *newly* established in any building or place after the Act is applied to the district in which such building or place is situate without the consent of the local board of health ;

And whosoever offends against this enactment shall be liable for each offence to a penalty of fifty pounds, and a further penalty of forty shillings for each day during which the offence is continued ;

And the said local board may from time to time make such by-laws with respect to any such businesses so newly established as they may think necessary and proper in order to prevent or diminish the noxious or injurious effects thereof.

It was held by the judges, in reference to the meaning of the words "noxious and offensive business," that it must be analogous to those mentioned before these words. Mr. Justice Willes remarked "that the substances which are

dealt with in the trades which are specified are substances which, without anything being done to them, must be, or by progress of time must necessarily become, a nuisance and annoyance to the neighbourhood;" and he held it "necessary to be extremely cautious in construing this Act, whereby trades are brought within the jurisdiction of the justices."

It may also be added, in reference to the assent of the local board, that it would not be any bar to an action against any one carrying on a noxious and offensive trade within the meaning of the clause.

AS TO CANDLEHOUSES, BLOOD-BOILING, &c.

THE NUISANCES' REMOVAL ACT FOR ENGLAND, 1855.
(18 & 19 Vict. c. 121.)

Section 27.—If any candlehouse, melting-house, melting-place, or soap-house, or any slaughterhouse, or any building or place for boiling offal, or blood, or for boiling, burning, or crushing bones, or any manufactory, building, or place used for any trade, business, process, or manufacture, causing effluvia, be at any time certified to the local authority by *any medical officer, or any two legally qualified medical practitioners*, to be a nuisance, or injurious to the health of the inhabitants of the neighbourhood, the local authority shall direct complaint to be made before any justice, who may summon before any two justices in petty sessions assembled at their usual place of meeting the person by or on whose behalf the work so complained of is carried on, and such justices shall enquire into such complaint; and if it shall appear to such justices that the trade or business carried on by the person complained against is a nuisance, or causes any effluvia injurious to the health of the inhabitants of the neighbourhood, and that such person shall not have used

the best practicable means for abating such nuisance, or preventing or counteracting such effluvia, the person so offending (being the owner or occupier of the premises, or being a foreman or other person employed by such owner or occupier) shall upon a summary conviction for such offence forfeit and pay a sum of not more than five pounds, nor less than forty shillings, and upon a second conviction for such offence the sum of ten pounds, and for each subsequent conviction a sum double the amount of the penalty imposed for the last preceding conviction, but the highest amount of such penalty shall not in any case exceed the sum of two hundred pounds :

Provided always that the justices may suspend their final decision in any case upon condition that the person so complained against shall undertake to adopt within a reasonable time such means as the said justices shall judge to be practicable and order to be carried into effect for abating such nuisance, or mitigating or preventing the injurious effects of such effluvia, or shall give notice of appeal in the manner provided by this Act, and shall enter into recognisances to try such appeal, and shall appeal accordingly :

Provided always that the provisions hereinbefore contained shall not extend or be applicable to any place without the limits of any city, town, or populous district :

Provided also that, if upon his appearance before such justices the party complained against object to have the matter determined by such justices, and enter into recognisances with sufficient sureties, to be approved by the justices, to abide the event of any proceedings at law or in equity that may be laid against him on account of the subject matter of complaint, the local authority shall thereupon abandon all proceedings before the justices, and shall forthwith take proceedings at law or in equity in Her Majesty's superior courts for preventing or abating the nuisance complained of.

CHAPTER IV.

REPORT AS TO WATERWORKS AND
WATER SUPPLY.

6. HE SHALL REPORT TO THE SANITARY AUTHORITY ANY DAMAGE DONE TO ANY WORKS OF WATER SUPPLY, OR OTHER WORKS BELONGING TO THEM, AND ALSO ANY CASE OF WILFUL OR NEGLIGENT WASTE OF WATER SUPPLIED BY THEM, OR ANY FOULING BY GAS, FILTH, OR OTHERWISE, OF WATER USED FOR DOMESTIC PURPOSES.

THIS is one of the most important, as, if properly performed, it will be one of the most onerous, duties devolving upon the inspector of nuisances, both from the close connection which it has with disease in its most fatal forms and from the degree of detail which will devolve upon a careful officer in instituting enquiries and by personal observation.

The first part of the regulation has especial reference to the pecuniary advantage of the proprietors of the waterworks, by which the water supplied by them shall not be wasted, but be reserved for the use of the inhabitants. Ill constructed and worn fittings, as well as careless drawing of the water and imperfect stoppage of the cocks, are everywhere causes of waste of water, although the fears of the water companies may have exaggerated the evil. At

the same time, it is a prime consideration that an essential to life which has been accumulated and distributed at so large a cost should be utilised to the utmost, and not wasted ; and constant personal supervision and enquiry will be requisite to afford the desired protection. This evil is, moreover, greater in those towns which are without a general system of drainage ; since the wasted water cannot be carried away and utilised by flushing sewers, but causes the yards and roads to be wet and untidy, if not unhealthful. In towns with proper drainage there should be due arrangement for the flushing of sewers apart from the uncertain amount of wasted water, and when such exists, the waste referred to cannot be utilised.

IMPURE WATER.

The Legislature has made abundant provision for the supply of good water, but has not made it compulsory on the local authority. It has also provided against the contamination of an article so necessary to health and life.

AS TO SUPPLY.

THE PUBLIC HEALTH ACT, 1848.

(11 & 12 Vict. c. 63.)

Section 75.—And be it enacted that the local board may provide their district with such a supply of water as may be proper and sufficient for the purposes of this Act, and for private use to the extent required by this Act ;

And any waterworks company may contract with the local board of health to supply water for the purposes of this Act

in any manner whatsoever, or may sell and dispose of or lease their waterworks to any local board of health wishing to take the same ;

And the said local board may provide and keep in repair any waterworks constructed or laid down by them under the powers of this Act for a supply of pure and wholesome water, and the water so supplied may be constantly laid on at such pressure as will carry the same to the top story of the highest dwelling-house within the district supplied.

Section 76.—And be it enacted that if, upon the report of the surveyor, it appear to the local board of health that any house is without a proper supply of water, and that such supply of water can be furnished thereto at a rate not exceeding twopence per week, the said local board shall give notice in writing to the occupier requiring him within a time to be specified therein to obtain such supply, and to do all such works as may be necessary for that purpose.

Section 78.—And be it enacted that the local board of health may cause all existing public cisterns, pumps, wells, reservoirs, conduits, aqueducts, and works used for the gratuitous supply of water to the inhabitants, to be constructed, maintained, and plentifully supplied with water, or they may substitute, continue, maintain, and plentifully supply with water any other such works equally convenient.

THE COMMON LODGING-HOUSES ACT, 1853.

(16 & 17 Vict. c. 41.)

Section 6.—Where it appears to the local authority that a common lodging-house is without a proper supply of water for the use of the lodgers, and that such a supply can be furnished thereto at a reasonable rate, the local authority may, by notice in writing, require the owner or keeper of the common lodging-house within a specified time to obtain such supply, and to do all works necessary thereto.

And if the notice be not complied with accordingly, the local authorities may remove the common lodging-house from the register until it be complied with.

CONSTANT SUPPLY.

Provision for a constant supply of water is made in

THE METROPOLIS' WATER ACT, 1871.

(34 & 35 Vict. c. 113.)

Companies to provide Constant Supply of Water.

Section 7.—Subject to the provisions of this Act, every company may, and from and after the expiration of eight months from the passing of this Act every company shall, when required so to do, in the manner directed by this Act, provide and keep throughout their water limits, or throughout such parts of such limits as they may be required in manner aforesaid, a constant supply of pure and wholesome water sufficient for the domestic purposes of the inhabitants within such water limits constantly laid on at such pressure as will make such water reach the top story of the highest houses within such water limits (but not exceeding the level prescribed by the special Act) of such company (which supply is in this Act referred to as a “constant supply”); and every such company shall, subject to the provisions of the special Act as the same are amended by this Act, give and continue to give to such inhabitants a constant supply for domestic purposes in manner prescribed.

AS TO FITTINGS.

THE PUBLIC HEALTH ACT, 1848.

(11 & 12 Vict. c. 63.)

Section 79.—And be it enacted that whosoever shall wilfully or carelessly break, injure, or open any lock cock, waste-pipe, or waterworks belonging to or under the management or control of the local board of health, or constructed, continued, or maintained under this Act, in any parish or place in which there shall be no local board of health ;

Or shall unlawfully flush, draw off, divert, or take water from any waterworks belonging to or under the management

or control of the said local board, or so constructed, continued, or maintained, in any such parish or place, or from any waters or streams by which such waterworks are supplied ;

Or shall wilfully or negligently waste or cause to be wasted any water with which he is supplied by the said local board,

Shall, for every such offence, forfeit a sum not exceeding five pounds, and a further penalty of twenty shillings for each day whilst the offence is continued after written notice in that behalf ;

Which penalties shall be paid to the said local board, or, in the case of a parish or place in which there shall be no local board of health, to the churchwardens and overseers of the poor, to be by them applied in aid of the rate for the relief of the poor of such parish or place :

Provided always that nothing herein contained shall prevent the owner of any premises through or by which any stream may flow from using the same as they would have been entitled to do if this Act had not been passed.

THE LOCAL GOVERNMENT ACT, 1858.

(21 & 22 Vict. c. 98.)

Section 66.—If any person wilfully injures any works or materials belonging to any local board, he shall, in cases where no other penalty is provided by the Public Health Act, 1848, or any Act incorporated therewith, incur for every such offence a penalty not exceeding five pounds, to be recovered in a summary manner.

THE SANITARY ACT, 1866.

(29 & 30 Vict. c. 90.)

Section 45.—If any person wilfully damages any works or property belonging to any local board, sewer authority, or nuisance authority, he shall be liable to a penalty not exceeding five pounds.

THE METROPOLIS' WATER ACT, 1871.

(34 & 35 Vict. c. 113.)

SUPPLY OF PRESCRIBED FITTINGS.

*Notice relating to Constant Supply to be published in
'London Gazette,' &c.*

Section 26.—When notice in relation to a constant supply in any district has been served upon or by any company, the party by whom or on whose behalf such notice shall be served shall, within five days after the service thereof, cause to be published a copy of the same once in the *London Gazette*, and copies of the same once at least in each of two successive weeks in any two daily newspapers circulated within the limits of this Act.

*Company may issue Notice upon Owners and Occupiers to
provide prescribed Fittings.*

Section 27.—Where in any district any company is required or has proposed to provide a constant supply, such company may, at any time after the expiration of one month after the publication in the *London Gazette* of a copy of the notice requiring or proposing such constant supply, unless a memorial or application has been presented or made to the Board of Trade objecting to such constant supply or seeking an extension of time, and if any such memorial or application has been presented or made, then at such time after the determination of the Board of Trade in relation to such memorial or application as such Board shall approve and order, cause to be served on the owner or occupier of any premises within such district a notice requiring such owner or occupier to supply such premises with the prescribed fittings.

Owner or Occupier to provide prescribed Fittings.

Section 28.—Every owner or occupier of premises upon whom notice to that effect has been served shall, within two months after the date of the service of such notice, provide

the prescribed fittings, and shall from time to time keep the same in proper repair.

In case of Default by Owner or Occupier, Company may provide or repair prescribed Fittings.

Section 29.—Where in any district any company is required or has proposed to provide a constant supply ; and

Any owner or occupier of premises upon whom notice to provide prescribed fittings has been served by such company makes default in providing the prescribed fittings, such company, if they think fit, may provide such fittings ; or

Where in any such district the fittings of any person are out of order, and not as prescribed, such company may by notice in writing require such person, within twenty-four hours after the date of the service of such notice, to cause the same to be repaired, so as to prevent any waste of water ; and if any person fail to comply with the terms of such notice, such company (if they think fit) may repair the fittings of such person.

The expenses incurred by such company in providing such fittings or in making such repairs shall be paid to them by the person liable to pay the rate for the water supplied, or on whose credit the water is supplied by means of such fittings, or by the owner of the premises.

All such expenses may be recovered, with costs, from the owner, and to the extent of any rent due by the occupier of the premises from such occupier, by proceedings in a court of summary jurisdiction, or by action in any court having jurisdiction locally in the matter, as if the same were an ordinary simple contract debt ; and any sum and costs so recovered from an occupier may be deducted by him from the rent payable by him to the owner, and shall be allowed by the owner and every other person interested in the rent, as if the same had been actually paid as rent ; but if in any case an occupier fails to disclose the amount of rent due by him, or the name or address of the owner, he shall be liable to pay the whole amount of such expenses and costs : Provided that as between any such owner and occupier nothing herein contained shall be taken to affect any contract made between them respecting the payment of the expenses of any such works as aforesaid.

Power to enter Premises for Inspection and Repair of Fittings.

Section 30.—Where in any district any company is required or has proposed to provide a constant supply, the officers or agents of such company, or of the party requiring such supply, or any person appointed for such purpose by the Board of Trade, may, at all reasonable times, enter any premises within such district, in order to inspect the premises for the purposes of this Act, and examine the same with a view to ascertain whether there are in or about the same the prescribed fittings, or, where authorised under the provisions of this Act, to provide or repair the fittings; and if any person hinder any such officer, agent, or person from entering and making such inspection or examination, or providing or repairing such fittings, every person so offending shall for every such offence be liable to a penalty not exceeding five pounds.

Settlement of Disputes as to Sufficiency, &c. of Fittings.

Section 31.—In the event of any dispute as to whether the fittings of any person are as prescribed, such dispute shall be settled by the court of summary jurisdiction, on the application of either party, which court may make such order as to the amount of the costs of the proceedings before such court as seems just, and the decision of such court shall be final and binding on all parties.

Penalties for Non-compliance with the Provisions of Act.

Section 32.—Where in any district any company is required or has proposed to provide a constant supply—

If any person supplied with water by such company wilfully or negligently causes or suffers any fittings to be out of repair, or to be so used or contrived as that the water supplied to him by such company is or is likely to be wasted, misused, unduly consumed, or contaminated, or so as to occasion or allow the return of foul air or other noisome or impure matter into any pipe belonging to or connected with the pipes of such company, he shall for every such offence be liable to a penalty not exceeding five pounds; or

If any person supplied with water by such company wrongfully does or causes or permits to be done anything in contravention of any of the provisions of the special Act or this Act, or wrongfully fails to do anything which, under any of those provisions, ought to be done for the prevention of the waste, misuse, undue consumption, or contamination of the water of such company, they may (without prejudice to any remedy against him in respect thereof) cut off any of the pipes by or through which water is supplied by them to him or for his use, and may cease to supply him with water, so long as the cause of injury remains or is not remedied; and in every case of so cutting off or ceasing to supply, the company shall within twenty-four hours thereafter give to the nuisance authority, as defined by the Sanitary Act, 1866, notice thereof.

AS TO CONTAMINATION.

The fouling of water is, however, of infinitely greater importance than the waste of it, since it may induce typhoid fever and other diseases of a fatal character, and no part of the duty of the inspector can be so important as that which makes him acquainted with the state of every well and other source of water supply for the use of the inhabitants of his district.

The chief causes of fouling wells are, surface washings or slops, drains, overflowing privies, and pigstyes; whilst in reference to brooks and rivers, sewerage and the refuse of manufactories, dyeing-works, and gas-works are the most frequent sources.

The colour, smell, and taste of water will generally reveal the presence of any impurity, and if not satisfactory, the water should be submitted to analysis.

It is not presumed that inspectors of nuisances will be intimately acquainted with chemical operations, but the fol-

lowing general directions by Professor Wanklyn, which have been extracted from our *Manual* for the use of medical officers of health, and the testing apparatus described in Appendix B, may be useful to them :—

EXAMINATION OF DRINKING WATER.

Examine the water as to clearness. This is best done by filling a good-sized flask with the water. The flask is now to be held in front of a dark-coloured or black wall, a strong light falling on the flask from one side or from above. Any small particles floating in the water will now become readily visible. Care must be taken not to confound minute bubbles of air with suspended matter.

The colour of the water should also be noted. It is best seen by placing the flask containing the water on a sheet of white paper, and placing by its side a similar flask filled with pure distilled water. The two flasks should stand in good diffused daylight. Very minute shades of colour can be seen in this way, and as the glass of which flasks are made is very thin, and but very slightly coloured, we are not liable to mistake the colour of the vessel for that of the water. Dr. Letheby recommends the use of a long cylinder for the purpose of ascertaining the colour, and if such a cylinder of clear thin colourless glass can be obtained, it is a very good plan. Unfortunately, however, most cylinders are made of thick glass, with a decided purplish or green colour. Such vessels are very liable to mislead.

Should the water contain much suspended matter, or be very dark in colour, it may, we think, be said to be unfit for drinking purposes in its then state, though filtration may render it quite good.

Observe the smell of the water. This is best done by shaking up some of the water in a flask with a short and wide neck about one-third full, and then inhaling the air in the upper part of the flask. Should it smell disagreeable in any high degree, the water may be said to be unfit to drink.

Now warm the water slightly and smell again. Warming

will often bring out the smell of a water when none could be detected in the cold.

Now add a little caustic potash to the warm water; should this cause any unpleasant smell, we may be pretty sure that the water contains organic matter in some quantity. Notice if a precipitate occurs on the addition of the potash; if so, whether much or little, whether coloured or white. The occurrence of a precipitate indicates hardness; the colour may either be caused by organic colouring matter in the water or by iron.

Add Nessler test to about four ounces of this water, either in a cylinder or small flask. Should this produce a yellow or brown colour, or a brown precipitate, the water contains ammoniacal salts. This is a most suspicious circumstance, and is almost enough in itself to condemn the water for drinking purposes.

Add iodide of potassium, acetic acid, and starch paste to four ounces of the water. A blue colour indicates nitrites: this also is a most suspicious circumstance, and should the colour be at all deep, the water can hardly be fit to drink. It is to be noted that inasmuch as iodide of potassium often contains iodate, the acetic acid, starch, and iodide, should be mixed before adding them to the water, so as to make sure that the colour is really produced by the water, and not by any iodate that the reagent may contain.

Boil about four ounces of this water in a flask with a few drops of sulphuric acid, remove from the source of heat, and add sulphuretted hydrogen water. Should a brown or black colouration be produced, the presence of lead or copper may be inferred, and the water condemned (bismuth, mercury, and silver, would of course give the same reaction, but are hardly likely to be present). Should no colour be detected, add a little ammonia or potash. Should this produce a blackish precipitate, iron is almost sure to be present.

Boil a little of the water for a few moments with red litmus. Should the litmus not turn blue, repeat the operation with blue litmus. We learn from this whether the water has an alkaline or an acid reaction. This observation is seldom of importance except when the water comes from a manufacturing district; it is then often of the greatest value.

The preliminary examination described above takes up a

very short time, and gives us much information. It does not require more than a pint of water, and may be conducted with less. The water used in the examination for clearness, colour, &c. is not reckoned, because it can be employed afterwards in other parts of the analysis.

We may here remark that, if a water contains suspended matter, it should, in our opinion, be analysed with that suspended matter in it. If the nature and quantity of the suspended matter be required, the water should be examined both before and after filtration. The difference between the two results is the value for the suspended matter. This double examination extends only to the total solid residue and the organic matter. The nitric acid and chlorine will not be affected by the suspended matter. A slight difference will sometimes be found between the hardness before and after filtration, but it is not of sufficient moment to render a second determination requisite.

Nessler's reagent is prepared as follows:—Dissolve 540 grains of iodide of potassium in a small quantity of distilled water, and add to it a strong watery solution of bichloride of mercury (corrosive sublimate), which will cause a red precipitate that disappears on shaking up the mixture. Add the solution of bichloride of mercury, carefully shaking up as that liquid is added, so as to dissolve the precipitate as fast as it is formed. After continuing the addition of the bichloride of mercury for some time, a point will ultimately be reached at which the precipitate will cease to dissolve. When the precipitate begins to be insoluble in the liquid, stop the addition of the bichloride of mercury. Filter. Add to the filtrate 120 grammes of caustic soda in strong aqueous solution (or about 160 grammes of potash).

After adding the solution of alkali as just described, dilute the liquid so as to make its volume equal to about $1\frac{3}{4}$ pint. Add to it about 85 grains, or minims, of a saturated aqueous solution of bichloride of mercury, allow to subside, and decant the clear liquid.

The most important contaminating substance is organic matter, or matter derived from animals or vegetables, which has not been rendered harmless by perfect decomposition.

The presence of it is readily ascertained by adding a little water containing it to a solution of permanganate of potash, when the colour of the latter will be removed. The inspector may readily obtain this test from the medical officer of health, and carry it with him on his visits for immediate use.*

CONTAMINATION BY GAS.

THE NUISANCES' REMOVAL ACT, 1855.

(18 & 19 Vict. c. 121.)

Section 23.—Any person or company engaged in the manufacture of gas, who shall at any time cause or suffer to be brought or to flow into any stream, reservoir, or aqueduct, pond, or place for water, or into any drain communicating therewith, any washing or other substance produced in making or supplying gas, or shall wilfully do any act connected with the making or supplying of gas whereby the water in any such stream, reservoir, aqueduct, pond, or place for water, shall be fouled, shall forfeit for every such offence the sum of two hundred pounds.

FOULING WATERCOURSES.

THE SEWAGE UTILISATION ACT, 1865.

(28 & 29 Vict. c. 75.)

Section 10.—A sewer authority, with the sanction of Her Majesty's Attorney-General in England, may take such proceedings by indictment, bill in chancery, action, or otherwise, as it may deem advisable for the purpose of protecting any watercourse within its jurisdiction from pollution arising from sewage either within or without its district; and the costs of and incidental to any such proceedings, including any costs that may be awarded to the defendant, shall be deemed to be expenses properly incurred by the sewage authority in carrying into effect the purposes of this Act.

* See Appendix B, p. 289.

Section 11.—Nothing contained in this Act, or in the Acts referred to therein, shall authorise any sewer authority to make a sewer so as to drain direct into any stream or watercourse.

FOULING RESERVOIRS, ETC.

THE PUBLIC HEALTH ACT, 1848.

(11 & 12 Vict. c. 63.)

Section 80.—And be it enacted that whosoever shall bathe in any stream, reservoir, conduit, aqueduct, or other waterworks belonging to or under the management or control of the local board of health, or in any reservoir, conduit, aqueduct, or other waterworks constructed, continued, or maintained under this Act in any parish or place in which there shall be no local board of health ;

Or shall wash, cleanse, throw or cause to enter therein any animal, rubbish, filth, stuff or thing of any kind whatsoever ;

Or shall cause, or permit, or suffer to run or be brought therein the water of any such sewer, drain, engine, or boiler, or other filthy, unwholesome, or improper water ;

Or shall do anything whatsoever whereby any water belonging to the said local board, or under their management or control, or whereby any water of or contained in any such reservoir, conduit, aqueduct, or other waterworks so constructed, continued, or maintained in any such parish or place aforesaid shall be fouled,

Shall for every such offence forfeit a sum not exceeding five pounds, and a further sum of twenty shillings for each day whilst the offence is continued after written notice in that behalf ;

And whosoever, being proprietor of any gasworks, or being engaged or employed in the manufacture or supply of gas, cause or suffer to be brought to or to flow into any stream, reservoir, conduit, aqueduct, or waterworks belonging to or under the management or control of the said local board, or into any drain or pipe communicating therewith, any washing or other substance produced in the manufac-

ture or supply of gas, or shall wilfully do any act connected with the manufacture or supply of gas whereby the water in any such stream, reservoir, aqueduct, or waterworks is fouled, shall forfeit to the said local board for every such offence the sum of two hundred pounds, and after the expiration of twenty-four hours' notice in writing from them on this behalf a further sum of twenty pounds for every day during which the offence is continued, or during the continuance of the act whereby the water is fouled ;

And if any water supplied by, or belonging to, or under the management or control of, the said local board be fouled in any manner by the gas of any such proprietor of premises last aforesaid, he shall forfeit to the local board for every such offence a sum not exceeding twenty pounds, and a further sum not exceeding ten pounds for every day whilst the offence is continued after the expiration of twenty-four hours' notice in writing from the said local board in this behalf ;

And for the purpose of ascertaining whether such water is fouled by the gas of any such proprietor or person, the said local board may lay open and examine any pipes, conduits, and works from which the gas is supposed to escape ;

Provided that, before beginning so to do, twenty-four hours' notice in writing be given to the person to whom such pipes, conduits, or works belong, or under whose management or control they may be, of the time at which the examination is intended to be made.

THE PUBLIC HEALTH ACT, 1858.

(21 & 22 Vict. c. 98.)

Section 73.—Nothing in this Act, or any Act incorporated therewith, shall be construed to authorise any local board to injuriously affect any reservoir, river, or stream, or the feeders of any reservoir, river, or stream, or the supply, quality, or fall of water contained in any reservoir, river, or stream, unless such board shall have first obtained the consent in writing of such company or individuals so entitled as aforesaid.

CHAPTER V.

AS TO EPIDEMICS, NUISANCES, AND
OVERCROWDING.

9. HE SHALL GIVE IMMEDIATE NOTICE TO THE MEDICAL OFFICER OF HEALTH OF THE OCCURRENCE WITHIN HIS DISTRICT OF ANY CONTAGIOUS, INFECTIOUS, OR EPIDEMIC DISEASE OF A DANGEROUS CHARACTER ; AND WHENEVER IT APPEARS TO HIM THAT THE INTERVENTION OF SUCH OFFICER IS NECESSARY IN CONSEQUENCE OF THE EXISTENCE OF ANY NUISANCE INJURIOUS TO HEALTH, OR OF ANY OVERCROWDING IN A HOUSE, HE SHALL FORTHWITH INFORM THE MEDICAL OFFICER THEREOF.

10. HE SHALL, SUBJECT IN ALL RESPECTS TO THE DIRECTIONS OF THE SANITARY AUTHORITY, ATTEND TO THE INSTRUCTIONS OF THE MEDICAL OFFICER OF HEALTH WITH RESPECT TO ANY MEASURES WHICH CAN BE LAWFULLY TAKEN BY HIM UNDER THE SANITARY ACTS FOR PREVENTING THE SPREAD OF ANY CONTAGIOUS, INFECTIOUS, OR EPIDEMIC DISEASE OF A DANGEROUS CHARACTER.

THESE are very important and comprehensive clauses, and demand the careful attention of the inspector, since the continuance or extension of disease will probably depend upon the action which is taken at its first appearance.

It is presumed that the inspector will daily enquire as to the existence of any epidemic or contagious disease in the routine discharge of his duties, and will not be content to wait until information is brought to him. This should be a fundamental rule of conduct, so that it may be impossible for disease to have spread without his knowledge.

The diseases which will most frequently come under his notice will be fevers of various kinds, but they will also include small-pox and scarlet-fever, and diseases of less frequent occurrence, as cholera and influenza. It is also possible that other diseases of this class, as measles, which are not usually fatal, may assume a dangerous character, and require the attention of the medical officer of health.

It may not be always easy to ascertain the nature of such diseases at their first appearance, but the inspector should report to the medical officer of health so soon as he has well-grounded suspicions, and not wait until the nature of the fever has been ascertained. The character of the locality will, in a degree, assist him, for fever has its special haunts, and is rarely absent from some of them.

A discretionary power appears to be committed to him by Clause 9, since it states, "whenever it appears to him that the intervention of such officer is necessary;" but it will not be wise for him to assume too much responsibility in reference to the causes of disease, and he should err rather in giving information too early than in deferring his report until disease has really arisen therefrom.

Although the general tenour of both these clauses is to make the inspector a reporter to the medical officer of health, rather than an independent agent, in seeking to remove existing evils, it will assist him in the discharge of his duty

if he be acquainted with the legislation under which either the medical officer or himself may take action, and we will therefore extract the principal clauses.

I.—AS TO INFECTION.

THE SANITARY ACT, 1866.

(29 & 30 Vict. c. 90.)

As to the Disinfection of Houses, &c.

Section 22.—If the nuisance authority shall be of opinion upon the certificate of any *legally qualified medical practitioner* that the cleansing and disinfecting of any house or part thereof, and of any article therein likely to retain infection, would tend to prevent or check infectious or contagious disease, it shall be the duty of the nuisance authority to give notice in writing requiring the owner or occupier of such house or part thereof to cleanse and disinfect the same, as the case may require ;

And if the person to whom notice is so given fail to comply therewith within the time specified in the notice, he shall be liable to a penalty of not less than one shilling, and not exceeding ten shillings, for every day during which he continues to make default ;

And the nuisance authority shall cause such house or part thereof to be cleansed and disinfected, and may recover the expenses incurred from the owner or occupier in default in a summary manner.

When the owner or occupier of any such house or part thereof as is referred to in this section is from poverty or otherwise unable in the opinion of the nuisance authority effectually to carry out the requirement of this section, such authority may, without enforcing such requirements on such owner or occupier, with his consent, at his own expense, cleanse and disinfect such house or part thereof, and any articles therein likely to retain infection.

As to Use of Public Conveyance by Infected Persons.

Section 25.—If any person suffering from any dangerous infectious disorder shall enter any public conveyance without previously notifying to the owner or driver thereof that he is so suffering, he shall, on conviction thereof before any justice, be liable to a penalty not exceeding five pounds, and shall also be ordered by such justice to pay to such owner and driver all the losses and expenses they may suffer in carrying into effect the provisions of this Act ;

And no owner or driver of any public conveyance shall be required to convey any person so suffering until they shall have been first paid a sum sufficient to cover all such losses and expenses.

As to Removal of Infected Persons to Hospitals, and Destruction of Infected Clothing.

Section 26.—Where a hospital or place for the reception of the sick is provided within the district of a nuisance authority, any justice may, with the consent of the superintending body of such hospital or place, by order on a certificate signed by a *legally qualified medical practitioner*, direct the removal to such hospital or place for the reception of the sick, at the cost of the nuisance authority, of any person suffering from any dangerous, contagious, or infectious disorder being without proper lodging or accommodation, or lodged in a room occupied by more than one family, or being on board any ship or vessel.

As to the Burial of Infected Persons.

Section 27.—Any nuisance authority may provide a proper place for the reception of dead bodies, and where any such place has been provided, and any dead body of one who has died of any infectious disease is retained in a room in which persons live or sleep, or any dead body which is in such a state as to endanger the health of the inmates of the same house or room, is retained in such house or room, any justice may, on a certificate signed by a *legally qualified medical practitioner*, order the body to be removed to such proper

place of reception at the cost of the nuisance authority, and direct the same to be buried within a time to be limited in such order :

And unless the friends or relatives of the deceased undertake to bury the body within the time so limited, and do bury the same, it shall be the duty of the relieving officer to bury such body at the expense of the poor rate, but any expense so incurred may be recovered by the relieving officer in a summary manner from any person legally liable to pay the expense of such burial.

As to a Post-mortem House.

Section 28.—Any nuisance authority may provide a proper place (otherwise than at a workhouse or at a mortuary house, as lastly hereinbefore provided for) for the reception of dead bodies for and during the time required to conduct any post-mortem examination ordered by the coroner of the district or other constituted authority, and may make such regulations as they may deem fit for the maintenance, support, and management of such place.

As to Wilful Exposure of Infected Persons.

Section 38.—Any person suffering from any dangerous infectious disorder who wilfully exposes himself without proper precautions against spreading the said disorder, in any street, public place, or public conveyance, and any person in charge of one so suffering who so exposes the sufferer, and any owner or driver of a public conveyance who does not immediately provide for the disinfection of his conveyance after it has with the knowledge of such owner or driver conveyed any such sufferer, and any person who without previous disinfection gives, lends, sells, transmits, or exposes any bedding, clothing, rags, or other things which have been exposed to infection from such disorders, shall, on conviction of such offence before any justice, be liable to a penalty not exceeding five pounds :

Provided that no proceedings under this section shall be taken against persons transmitting with proper precautions any such bedding, clothing, rags, or other things for the purpose of having the same disinfected.

As to Letting Infected Rooms or Houses.

Section 39.—If any person knowingly lets any house, room, or part of a house in which any person suffering from any dangerous infectious disorder has been, to any other person, without having such house, room, or part of a house, and all articles therein liable to retain infection, disinfected to the satisfaction of a *qualified medical practitioner*, as testified by a certificate given by him, such person shall be liable to a penalty not exceeding twenty pounds.

For the purposes of this section the keeper of an inn shall be deemed to let part of a house to any person admitted as a guest into such inn.

THE COMMON LODGING-HOUSES ACT, 1851.

(14 & 15 Vict. c. 28.)

As to Infection in Common Lodging-houses.

Section 11.—The keeper of a common lodging-house shall, when a person in such house is ill of fever or any infectious or contagious disease, give immediate notice thereof to the local authority, or some officer of the local authority.

Section 14.—If the keeper of a common lodging-house, or any other person having or acting in the care or management thereof, offend against any of the provisions of this Act, or any of the by-laws or regulations made in pursuance of this Act, or if any person in any common lodging-house be confined to his bed for forty-eight hours by fever or any infectious or contagious disease without the keeper of such house giving notice thereof as required by this Act, every person so offending shall for every such offence be liable to a penalty not exceeding five pounds, and to a further penalty not exceeding forty shillings for every day during which the offence continues.

Power to remove infected persons from lodging-houses was conferred by the Common Lodging-houses Act, 1853, and is as follows:—

THE COMMON LODGING-HOUSES ACT, 1853.

(16 & 17 Vict. c. 41.)

Section 7.—When a person in a common lodging-house is ill of fever or any infectious or contagious disease, the local authority may cause such person to be removed to an hospital or infirmary, with the consent of the authorities thereof, and on the certificate of the medical officer of the parish, place, or district that the disease is infectious or contagious, and that the patient may be safely removed, and may, so far as the local authority think requisite for preventing the spread of disease, cause any clothes or bedding used by such person to be disinfected or destroyed, and may, if the local authority think fit, award to the owner of the clothes and bedding so disinfected or destroyed reasonable compensation for the injury or destruction thereof;

And such compensation shall be paid to such owners by the proper officer of the parish or union in which the common lodging-house is situate out of the rates applicable to the relief of the poor of such parish, the amount of such compensation being first certified in writing upon a list of such articles.

THE SANITARY ACT, 1866.

(29 & 30 Vict. c. 90.)

As to Providing a Disinfecting Apparatus.

Section 23.—The nuisance authority in each district may provide a proper place with all necessary apparatus and attendance for the disinfection of woollen articles, clothing, or bedding which have become infected, and they may cause any articles brought for disinfection to be disinfected free of charge.

As to Providing a Carriage for Conveyance of Infected Persons.

Section 24.—It shall be lawful at all times for the nuisance authority to provide and maintain a carriage or carriages suitable for the conveyance of persons suffering under any

contagious or infectious disease, and to pay the expense of conveying any person therein to a hospital or place for the reception of the sick, or to his own home.

A very similar clause exists in the Nuisances' Removal and Diseases' Prevention Act, 1860, and is as follows :—

THE NUISANCES' REMOVAL AND DISEASES' PREVENTION
ACT, 1860.

(23 & 24 Vict. c. 77.)

Section 12.—It shall be lawful for the local authority for executing the said Diseases' Prevention Act to provide and maintain a carriage or carriages suitable for the conveyance of persons suffering under any contagious or infectious disease, and to convey such sick and diseased persons as may be residing within such locality to any hospital or other place of destination, and the expense thereof shall be deemed to be an expense incurred in executing the said Act.

THE SANITARY ACT, 1866.

(29 & 30 Vict. c. 90.)

As to Erection of Hospitals for Infected Persons.

Section 37.—The sewer authority, or, in the metropolis, the nuisance authority, may provide for the use of the inhabitants within its district hospitals or temporary places for the reception of the sick.

Such authority may itself build such hospitals or places of reception, or make contracts for the use of any existing hospital or part of a hospital, or for the temporary use of any place for the reception of the sick.

It may enter into any agreement with any person or body of persons having the management of any hospital for the reception of the sick inhabitants of its district, on payment by the sewer authority of such annual or other sum as may be agreed upon.

The carrying into effect this section shall, in the case of a

sewer authority, be deemed to be one of the purposes of the said Sewage Utilisation Act, 1865, and all the provisions of the said Act shall apply accordingly.

Two or more authorities having respectively the power to provide separate hospitals may continue in providing a common hospital, and all expenses incurred by such authorities in providing such hospital shall be deemed to be expenses incurred by them respectively in carrying into effect the purposes of this Act.

As to Infection in Boats or Ships.

Section 29.—Any nuisance authority may, with the sanction of the Privy Council, signified in manner provided by the Public Health Act, 1858, lay down rules for the removal to any hospital to which such authority is entitled to remove patients, and for keeping in such hospital so long as may be necessary any persons brought within their district by any ship or boat who are infected with a dangerous and infectious disorder, and they may by such rules impose any penalty not exceeding five pounds on any person committing any offence against the same.

Section 30.—For the purposes of this Act any ship, vessel, or boat that is in a place not within the district of a nuisance authority shall be deemed to be within the district of such nuisance authority as may be prescribed by the Privy Council, and until a nuisance authority has been prescribed, then of the nuisance authority whose district nearest adjoins the place where such ship, vessel, or boat, is lying, the distance being measured in a straight line, but nothing in this Act contained shall enable any nuisance authority to interfere with any ship, vessel, or boat that is not in British waters.

Section 31.—The power of entry given to the authorities by the 11th section of the Nuisances' Removal Act, 1855, may be exercised at any hour when the business in respect of which the nuisance arises is in progress, or is usually carried on.

And any justice's order once issued under the said section shall continue in force until the nuisance has been abated or the work for which the entry was necessary has been done.

Section 32.—Any ship or vessel lying in any river, harbour, or other water, shall be subject to the jurisdiction of the nuisance authority of the district within which such river, harbour, or other water, is and be within the provisions of the Nuisances' Removal Acts in the same manner as if it were a house within such jurisdiction, and the master or other officer in charge of such ship shall be deemed for the purposes of the Nuisances' Removal Acts to be the occupier of such ship or vessel.

But this section shall not apply to any ship or vessel belonging to Her Majesty or to any foreign government.

Section 52.—Every vessel having on board any person affected with a dangerous or infectious disorder shall be deemed to be within the provisions of the Act of the 6th year of King George IV., chapter 78, although such vessel has not commenced her voyage, or has come from or is bound for some place in the United Kingdom.

ORDER OF THE LOCAL GOVERNMENT BOARD

(SUBSTITUTED FOR THE ORDERS OF THE PRIVY COUNCIL)
AS TO CHOLERA.

The Local Government Board, by Order dated July 17, 1873, addressed to all urban, rural, and port sanitary authorities, to all officers of Customs, to all masters of ships, and to all others whom it may concern, rescinded the Orders of the Privy Council on the subject of cholera (except so far as they apply to Scotland) dated July 29 and August 3 and 5, 1871, and substituted the following:—

DEFINITIONS.

Article 1.—In this Order the term “ship” includes vessel or boat; the term “officer of Customs” includes any person having authority from the Commissioners of Customs; the term “master” includes the officer or person for the time being in charge or command of a ship;

the term "cholera" includes choleraic diarrhoea; the term "sanitary authority" has the same meaning as in the Public Health Act, 1872; the term "clothing and bedding" includes all clothing and bedding in actual use and worn or used by the person attacked at the time of or during the attack of cholera.

For the purposes of this Order, every ship shall be deemed infected with cholera in which there is or has been during the voyage, or during the stay of such ship in a foreign port in the course of such voyage, any case of cholera.

I.—REGULATIONS AS TO CUSTOMS INSPECTION.

Article 2.—If any officer of Customs, on the arrival within the limits of any port in England of any ship, ascertains from the master of such ship, or otherwise, or has reason to suspect, that the ship is infected with cholera, he may detain such ship, and order the master forthwith to moor or anchor the same; and thereupon the master shall forthwith moor or anchor the ship in such position as such officer of Customs shall direct.

Article 3.—While such ship shall be so detained, no person shall leave the same.

Article 4.—The officer of Customs detaining any ship, as aforesaid, shall forthwith give notice thereof, and of the cause of such detention, to the port sanitary authority, if there be *one*, or otherwise to the sanitary authority of the district within which the ship shall be detained.

Article 5.—Such detention by the officer of Customs shall cease as soon as the said ship shall have been duly visited and examined by the proper officer of the sanitary authority; *or*, if the ship shall, upon such examination, be found to be infected with cholera, as soon as the same shall be anchored or moored in pursuance of Article 9 of this Order:

Provided that, if the examination be not commenced within twelve hours after notice given as aforesaid, the ship shall, on the expiration of the said twelve hours, be released from detention.

II.—REGULATIONS AS TO SANITARY AUTHORITIES.

Article 6.—The port or other sanitary authority at every port shall, as speedily as practicable, with the approval of the chief officer of Customs of such port, fix some place or places within the said port where any ship may be detained, moored, or anchored, for the purpose of these regulations.

Article 7.—Any officer appointed by such sanitary authority to see to the carrying out of this Order, if he have reason to believe that any ship arriving within the district of such authority, whether examined by the officer of Customs or not, is infected with cholera, or shall have come from a place infected with cholera, may visit and examine such, for the purpose of ascertaining whether it is so infected; and the master of such ship shall suffer the *same* to be so visited and examined.

Article 8.—The sanitary authority, on notice being given to them by an officer of Customs, under this Order, shall forthwith cause the ship in regard to which such notice shall have been given to be visited and examined by their medical officer of health, or some other legally qualified medical practitioner, for the purpose of ascertaining whether it is infected with cholera.

Article 9.—The master of every ship which is infected with cholera shall, after any such examination as aforesaid, as long as the ship is within the district of a sanitary authority, moor or anchor her in such a position as, from time to time, the said authority shall direct.

Article 10.—No person shall leave any such ship until the examination hereinafter mentioned shall have been made.

Article 11.—The sanitary authority shall, as soon as possible after the arrival of any such ship, cause all persons on board of the same to be examined by their medical officer of health, or some other legally qualified medical practitioner, and shall permit all persons who shall not be certified by him, as hereafter mentioned, to land immediately.

Article 12.—Every person certified by the medical officer of health or medical practitioner making such examination to be suffering from cholera shall be dealt with under any rules that may have been made by the sanitary authority, under the 29th section of the Sanitary Act, 1866, or, where no such rules shall have been made, shall be removed, if the condition of the patient admit of it, to some hospital or place previously appointed for such purpose by the said authority; and no person so removed shall leave such hospital or place until the medical officer of health of the authority, or some other legally qualified medical practitioner appointed by them, shall have certified that such person is free from the said disease.

If any person suffering from cholera cannot be removed, the ship shall remain subject, for the purposes of this Order, to the control of the medical officer of health, or some other legally qualified medical practitioner appointed by the said authority; and the infected person shall not be removed from, or leave the ship, except with the consent in writing of the medical officer of health or other medical practitioner.

Article 13.—Such medical officer of health or medical practitioner shall give directions and take such steps as may appear to him to be necessary for preventing the spread of the infection; and the master of the said ship shall forthwith carry into execution such directions as shall be given to him by such officer or practitioner.

Article 14.—Any person certified by such medical officer of health or medical practitioner as aforesaid to be suffering from a diarrhoeal or other illness which he may suspect to be cholera may either be detained on board the ship or taken to some hospital or other previously appointed place, and detained there for any period not exceeding two days, until it be ascertained whether the illness is or is not cholera.

Any such person who, while so detained, shall be certified by the medical officer of health or medical practitioner to be suffering from cholera shall be dealt with as in the above article relating to patients suffering from that disease.

Article 15.—In the event of any death from cholera taking place on

board of such vessel while so detained, the master shall cause the dead body to be taken out to sea and committed to the deep, properly loaded to prevent its rising.

Article 16.—The master shall cause the clothing and bedding of every person who may have suffered from cholera on board such vessel, or who, having at any time been on board such vessel, shall have suffered from cholera during the stay of such vessel in a foreign port, to be disinfected or (if necessary) destroyed; and if the master shall have neglected to do so before the ship arrives in port, he shall forthwith, or upon the direction of the said authority, cause the same to be disinfected or destroyed, as the case may require; and if the said master neglect to comply with such direction within a reasonable time, the authority shall cause the same to be carried into execution.

Article 17.—The master shall cause every part of the ship, and every article therein, other than those last described, which may probably be infected with cholera, to be disinfected or destroyed, when required to do so by the said authority, or by their medical officer of health.

Given under our seal of office, this 17th day of July, in the year 1873.

JAMES STANSFELD,

President.

JOHN LAMBERT,

Secretary.

Notice.—The statute 35 and 36 Vict. c. 79 provides, in Section 52, “any person wilfully neglecting, or refusing to obey or carry out, or obstructing the execution of any rule, order, or regulation made by the Local Government Board under Section 52 of the Sanitary Act, 1866, shall be guilty of an offence punishable on summary conviction before two justices, and be liable to a penalty not exceeding 50*l*.”

The importance of these enactments cannot be over-estimated, for there can be no doubt that infection and contagion are spread by actual contact with infected persons, and that a most effectual mode of preventing the further spreading of the disease is to prevent further possibility of contact. This contact may be of the skin, as in scarlet-fever, where the exuviae of the skin pass from the infected persons; or through the atmosphere, as in typhus-fever and exanthematous diseases, where it is connected with emanations from the lungs, skin, and excreta; or with the excreta themselves, as in cholera.

It may, however, be through the intervention of linen which has been in contact with the infected person, or saturated with his excretions, or by other substances or articles which he has touched, as table utensils, books, letters, materials used in process of trade, carriages, and articles of domestic furniture. It is probable that contact with the body and linen are the most frequent modes of infection, but diligent enquiry should be made as to any other modes. The extent to which infection may pass through the atmosphere and retain its infectious quality has not been determined, but it is clear that dilution lessens the probability of infection, whilst concentration increases it. Such a problem is thus essentially connected with that of renewal of the air, and the rapidity of the removal of the infected air, but in a moderately ventilated room it may be doubted whether infection in a degree dangerous to health can take place at a distance greater than perhaps six feet from the infected person or article, especially if the infected person be kept to leeward, or not in the line of the air-current from him.

II.—AS TO CAUSES OF DISEASE.

DECOMPOSING ANIMAL AND VEGETABLE SUBSTANCES AND FILTHY HOUSES.

The Public Health Act, 1848; the Common Lodging-houses Act, 1851; the Nuisances' Removal Act of 1855; and the Sanitary Act of 1866, contain provisions which the

inspector of nuisances will find very useful. Some have been already quoted.

THE SANITARY ACT, 1866.

(29 & 30 Vict. c. 90.)

Section 53.—Where notice has been given by the nuisance authority, *or their officer or officers*, for the periodical removal of manure and other refuse matter from mews, stables, or other premises (whether such notice shall be by public announcement in the locality or otherwise), and subsequent to such notice the person or persons to whom the manure or other refuse matter belongs shall not so remove the same, or shall permit a further accumulation, and shall not continue such periodical removal at such intervals as the nuisance authority *or their officer or officers* shall direct, he or they shall be liable without further notice to a penalty of twenty pounds per day for every day during which such manure or other refuse matter shall be permitted to accumulate, such penalty to be recovered in a summary manner :

Provided always that this section shall not apply to any place where the board of guardians or overseers of the poor are the nuisance authority.

THE PUBLIC HEALTH ACT, 1848.

(11 & 12 Vict. c. 63.)

As to Pigstyes and Filth.

Section 59.—And be it enacted that whosoever keeps any swine or pigstye in any dwelling-house, or so as to be a *nuisance* to any person, or suffer any waste or stagnant water to remain in any cellar or place within any dwelling-house for twenty-four hours after written notice to him from the local board of health to remove the same, and whosoever allows the contents of any water-closet, privy, or cess-pool to overflow or break therefrom, shall for every such

offence be liable to a penalty not exceeding forty shillings, and to a further penalty of five shillings for every day during which the offence is continued.

And the said local board shall abate or cause to be abated every such nuisance, and the expenses incurred by them in so doing shall be repaid to them by the occupier of the said premises upon which the same exists, and be recoverable from him in the summary manner hereinafter provided.

And if at any time it appears to the inspector of nuisances that any accumulations of manure, dung, soil, or filth, or other offensive or noxious matter whatsoever, ought to be removed, he shall give notice to the person to whom the same belongs, or to the occupier of the premises wherein it exists, to remove the same.

And if at the expiration of twenty-four hours after such notice the same be not complied with, the manure, dung, soil, or filth, or matter referred to, shall be vested in and be sold or disposed of by the said local board, and the proceeds thereof shall be carried to the district fund account hereinafter mentioned.

THE COMMON LODGING-HOUSES ACT, 1851.

(14 & 15 Vict. c. 28.)

As to cleansing Common Lodging-houses.

Section 13.—The keeper of a common lodging-house shall thoroughly cleanse all the rooms, passages, stairs, floors, windows, doors, walls, ceilings, privies, cesspools, and drains thereof to the satisfaction of and so often as shall be required by or in accordance with any regulation or by-law of the local authority, and shall well and sufficiently and to the like satisfaction limewash the walls and ceilings thereof in the first week of each of the months of April and October in every year.

SEWAGE EMANATIONS.

These act injuriously, whether in the gaseous or liquid state, and whether they contaminate the air or the drinking water.

In the former case, the sewage smell is generally perceptible, and reveals the fact of the escape, as well as the position of it. It will often be found in a kitchen sink, or in a waste water-pipe in some part of the house ; but not unfrequently it is due to a defective state of the water-closet, either by the fixing being unsound, by the trap being insufficiently filled with water, by the water in the trap being charged with it, or by the escape of it into the cistern with the small quantity of water which is sometimes thrown back when the handle falls.

It is, however, quite possible that an inodorous poisonous gas may pervade inhabited places, in a proportion far beyond that of foul gas, and thus escape due attention, and be the more dangerous in that its action is insidious.

The air in sewers varies greatly in composition, but consists of sulphuretted hydrogen, carburetted hydrogen, ammonium sulphide, nitrogen, oxygen, carbonic acid, ammonia, and certain foetid gases allied to the compound ammonias. These vary very much in their relative quantities ; but sulphuretted hydrogen has been found to the extent of 3 per cent. ; carbonic acid, 15·9 per cent. ; and light carburetted hydrogen, 88·5 per cent. ; whilst the oxygen has been reduced so low as 2 and the nitrogen to 5·35 per cent. ; but these are extreme quantities. In well-ventilated sewers, the sulphuretted hydrogen may be reduced to a trace, carbonic

acid to 0.307 per cent., or even to a less amount, whilst the oxygen may be 20.71 per cent. These quantities are, however, extremes in the other direction.

The presence of the more important gases may be roughly determined in a very ready manner. Thus sulphuretted hydrogen blackens paper moistened with a solution of acetate of lead, besides having a special and very offensive odour.

Carbonic acid throws down a white deposit with lime-water or baryta water.

Ammonium sulphide is detected by using a slip of paper dipped in a solution of nitro-prusside of sodium.

Light carburetted hydrogen, or marsh-gas, may be ignited as it escapes in bubbles.

Ammonia is determined, as stated elsewhere, by Nessler's process. A known quantity of the air containing it is drawn through Nessler's test, and the weight of the precipitate is determined. After this the following formula will determine the quantity :—

$$559 : 17 :: \text{weight of precipitate} : x.$$

The influence of water mixed with sewage in the production of typhoid fever is believed to be well established, and, when contaminated with the discharges of cholera patients, is believed to be the cause of cholera. In the former case, the poisonous matter, whether specific or otherwise, acts upon Peyer's glands, and tends to produce inflammation, ulceration, and perforation; but in the latter, it is affirmed to be a specific poison, although it has not been isolated and demonstrated, which can be derived only from a patient afflicted with the same disease. Dr. Hüter

has recently affirmed that the presence of monads in the blood is the cause of fever by blocking up some of the capillaries, and thus obstructing or arresting the circulation. The introduction of putrid matter gives rise to the monads, and connects fever with defective sanitary arrangements. This is known as the mechanical theory of fever. These should be regarded as theories rather than as proved facts ; but they have sufficient weight to demand that the first attention of sanitary officers should be directed to them.

III.—AS TO DISINFECTION.

The subject of disinfection of rooms and clothing demands special consideration. It should be well understood that to deodorise is not necessarily to disinfect ; neither will it suffice to attempt to overpower a particular odour by another ; and yet it is probable that many so-called disinfectants are simply deodorisers, so far as refers to living organisms and animal products generally. Hence, the prudent course is to really disinfect whenever it is practicable to do so.

It may be admitted that for all sanitary purposes boiling water, if properly applied, will really disinfect. The clothes, linen, and bedding should be placed in boiling water as they are removed from the patient, and kept boiling for about half an hour, being stirred with a stick from time to time, so that every part of the mass shall acquire a temperature of 212° . It is not sufficient to throw them into boiling water and then allow the temperature to fall, and to remove them quickly, for time and care are required to raise every part of

a mass of material in boiling water to the temperature of 212° . When, however, they have been properly treated, there is no ground to fear spread of infection from them. This may be effected without difficulty in almost any locality, for a boiler which may be properly heated will be found near, or one may be quickly and cheaply erected.

It is also necessary to bear in mind that much mischief may be done by the linen before it reaches the boiling water, and therefore the most precise directions should be given for it to be conveyed by one person direct from the patient to the boiler, and delivered into the boiling water. No accumulation of such infected material should be allowed, nor several persons allowed to handle it.

The effectual application of dry heat is much more difficult, since it requires a special apparatus, and in practice it is found that the heat produced is very uncertain, sometimes burning the clothes, and at others remaining below 212° . If a convenient oven be at hand, and the temperature can be so regulated that it shall not be less than 212° , or more than 300° , it may be used, but it is somewhat doubtful whether the same reliance can be placed upon 212° dry heat as on the same temperature of water, having regard to the power of solution which water possesses by which the infection may be more readily removed from the linen. Bearing in mind that the application of boiling water is always practicable, and that the proper temperature is indicated by the fact of its boiling, that method is to be preferred.

Various kinds of disinfecting stoves have been patented, and all are costly, whilst they have the defects just pointed out. That which is in the most general use adds the influence of sulphur to dry heat.

The following is a description of Fraser's patent disinfecting apparatus :—

FRASER'S PATENT DISINFECTING APPARATUS.

A brick oven or chamber, occupying a space of about eight feet square, is erected, with doors in front. In the lower portion of this is a covered furnace with flues capable of raising the air inside to the required temperature.

A closed truck, or carriage, is provided, with shelves, racks, dampers, and doors. The clothes and bedding are collected in this carriage from the infected houses, and conveyed to the chamber. The doors of the chamber are opened and the carriage placed inside. The process of disinfection then takes place, sulphur or other fumes being used. When the process is completed, the carriage is taken back to the house, and the articles removed.

The chief points are :—

The whole of the vapours given off during disinfection are, by a peculiar arrangement of flues, made to pass through the furnace, and thus consumed.

The clothing is not removed from the carriage till returned to the owner.

The carriage which conveys the clothing to the house and returns same is disinfected on each occasion with the clothes, &c.

The circumstances under which it may be necessary to burn clothing and linen are very few, as, for example, if it be already worn out and without value, or if the means of boiling it are not at hand, and the danger of infection is urgent. The bed-ticks may be boiled, but the flock, if saturated or otherwise infected, should be burnt. Feathers, hair, and cocoa-fibre may be disinfected by dry heat, or, as in the case of the cocoa-fibre, by hot water. As hair and fibre are nearly impervious to moisture, they are but rarely media of infection, and any infecting material which may attach to them is readily removed, but feathers may retain a

considerable amount of infectious matter, and, if they cannot be properly and readily exposed to dry heat, should be destroyed. It is not, however, necessary to destroy the bed because the tick may be infected, unless it be shown that the infecting material has passed through the tick.

The discharges of every kind should be buried in the soil where that is practicable, and, when otherwise, should be carefully carried away, and so disposed of that they cannot come again into contact with mankind.

The emanations from the breath and skin by which the air of the room may become charged cannot be entirely destroyed by any method so long as the patient remains in the room without possible injury to him, and may be rendered harmless only by dilution with air, and removal by complete ventilation. The use of chloride of lime or similar disinfectants in the sick room has the advantage of diminishing or destroying such disagreeable odours, and so far is valuable, but it would not be wise to assume that the air had thus been disinfected, and is harmless as respects the healthy. After the room has been emptied, it is possible to clear out the foul air, and by cleansing and lime-washing to remove infection from the walls or furniture, and as large an amount of chlorine gas may be generated as to materially assist in the process of disinfection.

It cannot be necessary to scrape the walls of an infected room unless they have been soiled with the infected matter, for whatever gases may have been absorbed by the lime or mortar will be destroyed by the solution of quicklime. The most satisfactory course is to leave the room unoccupied for a short time, and to completely renew the air by external openings night and day.

Cleansing the floors of infected rooms is oftentimes a difficult process, inasmuch as infected matter may have been absorbed by the wood and have entered in the joints between the boards. Special attention should therefore be given to the state of the floor, and disinfectants as well as boiling water used freely at the infected parts.

The cleansing of utensils is not usually very difficult, since they are commonly of earthenware or glass, and therefore impervious, and may be perfectly cleansed by the aid of boiling water. It is, however, of the highest moment to be assured that they have been properly cleansed.

The following is a list of the most useful disinfectants, and according to the experiments of Dr. Grace Calvert the most effectual are carbolic and cresylic acids.

- Chloride of lime, in powder ;
- Solution of chloride of lime ;
- Carbolic acid ;
- Carbolate of lime ;
- Chloralum ;
- Condy's red fluid ;
- Dry earth and ashes ;
- Charcoal ;
- Quicklime ;
- Perchloride and sulphate of iron ;
- Chlorine and bromine ;
- Sulphurous acid gas.

As near an approach to isolation as may be practicable is imperative in certain diseases of this class, as, for example, smallpox, whilst it is desirable in others, as in typhus-fever. When it is determined upon, it should be carefully carried

out, and the patient and one attendant strictly confined within certain limits. None should be allowed to go between the infected and the healthy. All linen and utensils should be disinfected either before leaving the hands of the attendant or immediately she has delivered them outside her *cordon sanitaire*. The attendant should frequently wash her hands, and her clothes and linen should also be disinfected.

The difficulty of effecting perfect isolation is extreme in any house where there are relatives and friends, and particularly in a cottage or single room, and in the latter case it may be impracticable. This implies the removal of the healthy. If it be possible to remove the sick to an hospital, the difficulty will be reduced to a minimum, but this can usually be effected only in a very early stage, and even then the friends may interpose, or the distance of the hospital may be too great. This is no doubt the proper course in all dangerous infectious diseases where it is practicable, and proper hospitals should be established at convenient distances.

There is also danger to others in the removal, as well as to the sick, lest the carriage should become infected, and give the infection of one disease to an infected person suffering from another disease, or that a carriage so treated should be used by the healthy. The danger will be lessened, but not entirely removed, when ambulances for this class of cases shall be within an easy distance of every sick person.

Many of these directions imply the necessity for a trustworthy and trained nurse to be employed at the homes of the sick.

Upon the care with which the first case or cases are treated will depend the possibility of perfectly arresting the disease, and the utmost efforts should then be made.

IV.—AS TO OVERCROWDING.

The subject of overcrowding is one of as much difficulty in treatment as importance, and particularly in towns. The term "overcrowding" is not limited to mere convenience, or even social propriety, but has special reference to health, and should be understood to be overcrowding in a degree injurious to health. The meaning of the word has not been determined by the Legislature, but so far as relates to metropolitan lodging-houses, there must be 30 feet of floor space and 240 cubical feet of air space for each inmate, and any quantity less than that would indicate overcrowding.

The question of overcrowding in a particular house must depend upon the position, surroundings, and construction of the house; for an ill-ventilated dwelling in a closed court in a town would clearly be overcrowded in the sense of injury to health with a smaller number of inmates than a house having the same cubical capacity under more favourable sanitary conditions. For the same reason a house which has been materially improved by ventilation might be no longer overcrowded in that sense, or might admit an increased number of inmates.

The steps which may be taken are defined by statute, but the inspector is entitled to take only such steps as the circumstances of the case may justify and require. He is not the only person who may have to determine whether in a particular case the circumstances do justify and require interference: but he is one of them, and his opinion will have much weight, although it may be challenged, and he is

entitled to act upon his opinion so long as he is within the statutes.

The following are the enactments relating to overcrowding, and to premises unfit for human habitation :—

THE NUISANCES' REMOVAL ACT FOR ENGLAND, 1855.

(18 & 19 Vict. c. 121.)

Overcrowded Houses.

Section 29.—Whenever the medical officer of health, if there be one, or, if none, whenever two qualified medical practitioners, shall certify to the local authority that any house is so overcrowded as to be dangerous or prejudicial to the health of the inhabitants, and the inhabitants shall consist of more than one family, the local authority shall cause proceedings to be taken before the justices to abate such overcrowding, and the justices shall thereupon make such order as they may think fit, and the person permitting such overcrowding shall forfeit a sum not exceeding forty shillings.

THE SANITARY ACT, 1866.

(29 & 30 Vict. c. 90.)

In Cities, Boroughs, or Towns, Secretary of State, on Application of Nuisance Authority, may empower them to make Regulations as to Lodging-houses.

Section 35.—On application to one of Her Majesty's principal Secretaries of State by the nuisance authority of the City of London, or any district or parish included within the Act for the Better Local Government of the Metropolis, or of any municipal borough, or of any place under the Local Government Act, 1858, or any local improvement Act, or of any city or town containing, according to the census for the time being in force, a population of not less than 5,000 inhabitants, the Secretary of State may, as he may think fit, by notice to be published in the *London Gazette*, declare the following enactment to be in force in the district

of such nuisance authority, and from and after the publication of such notice the nuisance authority shall be empowered to make regulations for the following matters ; that is to say :—

- (1) For fixing the number of persons who may occupy a house or part of a house which is let in lodgings or occupied by members of more than one family :
- (2) For the registration of houses thus let or occupied in lodgings :
- (3) For the inspection of such houses, and the keeping the same in a cleanly and wholesome state :
- (4) For enforcing therein the provision of privy accommodation and other appliances and means of cleanliness in proportion to the number of lodgings and occupiers, and the cleaning and ventilation of the common passages and staircases :
- (5) For the cleansing and lime-whiting at stated times of such premises :

The nuisance authority may provide for the enforcement of the above regulations by penalties not exceeding forty shillings for any one offence, with an additional penalty not exceeding twenty shillings for every day during which a default in obeying such regulations may continue ; but such regulations shall not be of any validity unless and until they shall have been confirmed by the Secretary of State.

But this section shall not apply to common lodging-houses within the provisions of the Common Lodging-houses Act, 1851, or any Act amending the same.

Cases in which Two Convictions have occurred within Three Months.

Section 36.—Where two convictions against the provisions of any Act relating to the overcrowding of a house, or the occupation of a cellar as a separate dwelling-place, shall have taken place within the period of three months, whether the persons so convicted were or were not the same, it shall be lawful for any two justices to direct the closing of such premises for such time as they may deem necessary, and in the case of cellars occupied as aforesaid, to empower the nuisance authority to permanently close the same in such manner as they may deem fit, at their own cost.

THE TOWNS' IMPROVEMENT CLAUSES ACT, 1847.

(10 & 11 Vict. c. 34.)

Definition of Public Lodging-house.

Section 116.—Every house shall be deemed a public lodging-house within the meaning of this Act in which persons are harboured or lodged for hire for a single night, or for less than a week at one time, or any part of which is let for any term less than a week.

THE ARTISANS' AND LABOURERS' DWELLINGS ACT, 1868.

(31 & 32 Vict. c. 130.)

Premises in a Condition unfavourable to Health.

Section 5.—If in any place to which this Act applies the officer of health finds that any premises therein are in a condition or state dangerous to health, so as to be unfit for human habitation, he shall report the same in the manner hereinafter provided to the local authority.

Section 6.—Every report made under this Act by the officer of health shall be made in writing and delivered to the clerk of the local authority, and the local authority shall refer such report to a surveyor or engineer, who shall thereupon consider the report so furnished to him, and report to the local authority what is the cause of the evil so reported on, and the remedy thereof, and, if such evil is occasioned by defects in any premises, whether the same can be remedied by structural alterations and improvements, or otherwise, or whether such premises, or any and what part thereof, ought to be demolished.

CHAPTER VI.

AS TO FOOD.

7. HE SHALL FROM TIME TO TIME, AND FORTHWITH UPON COMPLAINT, VISIT AND INSPECT THE SHOPS AND PLACES KEPT OR USED FOR THE SALE OF BUTCHER'S MEAT, POULTRY, FISH, FRUIT, VEGETABLES, CORN, BREAD, OR FLOUR, OR AS A SLAUGHTERHOUSE, AND EXAMINE ANY ANIMAL, CARCASS, MEAT, POULTRY, GAME, FLESH, FISH, FRUIT, VEGETABLES, CORN, BREAD, OR FLOUR WHICH MAY BE THEREIN; AND IN CASE ANY SUCH ARTICLE APPEAR TO HIM TO BE INTENDED FOR THE FOOD OF MAN, AND TO BE UNFIT FOR SUCH FOOD, HE SHALL CAUSE THE SAME TO BE SEIZED, AND TAKE SUCH OTHER PROCEEDINGS AS MAY BE NECESSARY IN ORDER TO HAVE THE SAME DEALT WITH BY A JUSTICE: PROVIDED THAT IN ANY CASE OF DOUBT ARISING UNDER THIS CLAUSE HE SHALL REPORT THE MATTER TO THE MEDICAL OFFICER OF HEALTH, WITH THE VIEW OF OBTAINING HIS ADVICE THEREON.

As a preliminary remark, we may call attention to the fact that the words "diseased, or unsound, or unwholesome," which appear in the Order addressed to the medical officer of health, are omitted here, whilst only the general expression, "unfit for the food of man," is addressed to the inspector of nuisances.

The minute detail involved in this regulation clearly implies that the inspector should not have a large district under his charge, since he must visit numerous shops in every village or in nearly every street of a town, and repeat his visits with great frequency in order to examine the ever varying stock of foods.

He will, however, find relief in two ways, since certain shops may be generally relied upon to exclude articles in a questionable condition, and only some of the substances mentioned can be properly estimated by him. This will allow him to devote his time to shops of ill repute, and to such perishable articles as fish and meat.

He will bear in mind that he is not called upon to enter upon the more difficult and scientific subject of adulteration of foods in the sense ordinarily understood, and also that he is to concern himself only with food for man, and, further, that, unless he is clear that the food under examination is unfit for the food of man, he is not justified in taking action.

The last-mentioned subject demands a further remark in reference to the meaning of the phrase "unfit for the food of man." It does not include any abstruse questions of diet as to how man (including men, women, and children) should be fed, nor the sufficiency or insufficiency of the food which they may be able to obtain, but simply the state and condition of the food in a sanitary point of view ; or, in other words, its fitness to induce disease. Thus, in illustration, it does not include the question as to whether meat or milk are necessary as food, nor the degree in which milk may be watered ; nor, indeed, as to whether sausages are in general good for food, but whether the particular sausages under

inspection were made from a diseased animal, or are otherwise unfit for food. Perhaps it might include the question as to whether they were made from an animal not commonly eaten as food, as a horse, cat, or rat, but then the unfitness would be regarded from a sentimental view, and would not be a strictly sanitary question, for it is well known that the flesh of these animals may be healthy and not unfitted to support nutrition ; yet the repugnance which exists in this country to the use of such food, and the implied understanding between consumer and producer that it is not used, would doubtless induce both the public and the justices to support the view of its unfitness for the food of man.

It is therefore evident that the chief attention of the inspector of nuisances in reference to food must be directed to perishable articles, as fish and meat. But as he is required to form an opinion as to the fitness of all the foods mentioned, it will be necessary to refer to them in their order, having however the fundamental idea already mentioned, viz. that they are intended, but unfit, for the food of man.

An animal must mean a living animal, and it must be only such as is intended for sale as food for man. It may have two conditions which demand attention during life in anticipation of its use as the food of man, viz. an infectious disease, and a state of general disease, by which the flesh would be rendered unfit for the food of man.

Butcher's meat, poultry, and game will involve three questions : the nature of the animal, the evidence of disease in the meat, and the state as to decomposition.

If the inspector have reason to believe that horse flesh is offered for sale as beef, goat as mutton, or cat as rabbit, he

would be justified in calling the attention of the sanitary authorities to the subject, and perhaps to seize it for the decision of the justices on the ground already laid down.

The determination of a diseased state of meat is often not so easy as is commonly believed. Mere leanness or want of condition of the animal, even if it were extreme, would not necessarily be due to disease, but to want of food, and although the meat would be less agreeable in flavour, and small in proportion to the bone, it would not produce disease or be unfit for the food of man. If there were marks of disease, as of the glands connected with the mass sold as fry, or of the liver, or evidences of inflammation in the pleura, or even in the lungs, it would not follow that the flesh of the animal was in a state of disease. Whether or not it would be proper to condemn the lungs or the liver would depend upon the extent of the mischief, for it often happens that a portion of the liver is diseased whilst the greater part is healthy, and that some of the glands attached to the air tubes in a sheep's fry are enlarged and even softened, whilst the lungs and heart, which really constitute the fry, are sound.

The marks of a general condition of the flesh which indicate a diseased state of the animal are great paleness of colour, with softness to the touch; a watery aspect, and a peculiar faint or putrid smell; or a state of discoloration due to great congestion of the blood vessels.* The former is however more truly the effect of disease, whilst the latter generally indicates that the animal had died naturally. In either case it is desirable that the inspector of nuisances should direct the attention of the medical officer of health

See also page 131.

to the food, but in the former he would certainly be justified in seizing it.

The question of fitness for the food of man of the flesh of an animal which has not been killed is also difficult, since the experience of Scotch farmers in eating braxy sheep—that is to say, sheep dying from a disease called braxy—shows that such meat is not injurious to health. There are also many instances of the consumption of calves which have been born prematurely without any evidences of ill effects.

Cases also occur of a cow which has burst its stomach through eating an excess of green clover, or an animal dying in a fit, or the result of an injury immediately preceding death.

It is probable that long continued disease, or disease of the general system, may so affect the flesh as to render it unwholesome, whilst an acute disease, ending in a few hours, would not alter the character of the flesh in an appreciable degree, and it is customary, in the latter state, to kill the animal, and eat it, rather than allow it to die naturally. If every animal which has some kind of disease, and is killed in anticipation of its dying, is held to be unfit for the food of man, much valuable food will be lost, and it may be hoped that justices will exercise a reasonable discretion when deciding on the particular cases brought before them.

Public feeling in this country, based as it is on a very proper fear lest disease should originate from this cause, would no doubt justify the inspector of nuisances in seizing, and the justices in condemning, it as unfit for human food ; still it should be understood as to how far that view rests upon sentiment and fear, and how far upon known injurious effects of such food.

The state of food as to decomposition is one much more within the power of observation and estimation of the inspector, yet even then the usages of society must be allowed due weight. Decomposition begins immediately after death, and it is usual to eat food in which the process is far advanced; so far, indeed, that whilst the rich man enjoys game in a state called "high," or long kept mutton, the poor would turn away from it in disgust. It is therefore needful to allow a wide latitude in the degree of decomposition which would render the food unfit for the use of man, yet there is a limit beyond which it should not be allowed. This must be determined in butcher's meat, poultry, and game separately, but the smell of putrefaction, the green colour, and other appearances of the food, will be good indications. The effect of cooking is to drive off this smell when the decomposition has been kept within due limits, and to leave the food of sufficient firmness and flavour to be enjoyed by certain persons; but beyond that point the flavour and softness of the meat render it disgusting as food for man.

As a general expression, butcher's meat and game may be kept in a state fit for food for a period much beyond that allowed for poultry; but this depends upon the state of the weather, and the mode in which the food is kept; for a single night often renders all such unfit for food, and particularly if the joints be packed together and kept warm and moist.

Certain foods prepared from flesh and blood, as black puddings and sausages, may be unfit for food by reason of the diseased state of the animal, or their degree of decomposition. The former can scarcely be ascertained when the

meat has been minced, and hence, whilst they are largely eaten, there is a very general prejudice against them.

This fact has given importance to the inspection of animals and carcasses intended for human food, for measly pork, for example, cannot be ascertained by the naked eye if it be minced. So also opportunity may be given to examine animals dying from disease, or the carcass of such an animal recently dead, before it is cut up into joints. It is possible that such opportunities may be more numerous than at present known, and will increase on enquiry; and probably no division of this part of his duty could be more usefully studied by the inspector.

There are no means of determining a diseased state of the blood used in preparing black puddings, but it is probable that complete cooking would cause the destruction of any diseased portion.

The state of decomposition in both black puddings and sausages is determined by the smell—not necessarily that of putrefaction, but of ammonia; and such a smell should cause the food to be condemned.

It is, however, to be observed that these foods and others of a similar nature, as meat pies, are not directly mentioned in this regulation; but it is most probable that any justice would regard that as butcher's meat which was in great part made from meat or blood, and particularly as the injurious quality, if any, would be chiefly in such part.

Fish of the ordinary kinds could be objected to only on the ground of advanced decomposition, and that would be determined by the smell and appearance. These are generally so marked that there is not much room for doubt.

Fruit must be objected to on the same grounds, but the

appearance of the decay with or without attendant vegetable growths, as mould, and the smell render the decision easy. It does not however follow that a portion of an apple or potato, for example, being decayed, the other portions may not be fit for food, and hence degree of decay must receive due consideration.

Vegetables become unfit for food by two processes, viz. decay, with or without the presence of living grubs or animalcules, and excessive drying.

The enormous amount of food which is condemned yearly by the sanitary authority of the City of London is shown in the following return by Dr. Letheby :—

This year (1872), in the markets and slaughterhouses of the City of London alone, the inspectors have condemned 195,522 lbs. of meat as being unfit for human food: 189,390 lbs. was condemned in the New Meat Market, 5084 lbs. at Aldgate, and 1039 lbs. at Leadenhall. 74,463 lbs. of it was diseased meat, 102,050 lbs. was putrid meat, 19,009 lbs. was the flesh of animals that had died from accidents and other causes which rendered it unwholesome. The returns embraced 913 sheep and lambs, 108 calves, 380 pigs, 736 quarters of beef, 2760 joints of meat, besides 3149 plucks, 12 baskets of kidneys and melts, 1572 kidneys, 51 hams, 190 sides and pieces of bacon, 4 barrels of pork, 17 pigs' chaps, 35 tongues, 35 ox-tails, 2 goats, 12 fawns, 100 quarters and pieces of venison, 142 hares, 5 boxes and cases of rabbits, 644 rabbits, 2146 head of game and poultry, 1 box of plovers' eggs, 2 hampers of eggs, 200 eggs, 29 cheeses, 1 cask of turtle, 1 barrel and 1 pad of fish, 1 basket of plaice, 1 barrel of cods' roes, 27 mats of dates, 6 boxes of grapes, 2 boxes of pears, 2500 oranges, and 106 cocoa-nuts. At Billingsgate and Columbia Markets were seized about 287 tons of fish, consisting of about 232,945 herrings, 171,826 plaice, 167,749 haddocks, 142,270 whittings, 129,050 smelts, 66,660 dabs, 2900 gurnets, 8586 thornbacks, 3457 codfish, 9105 soles, 19,300 of various descriptions of fish, 7907

lobsters and crabs, 205 bushels of sprats, 338 bushels of whelks, 216 bushels of mussels, 60 bushels of cockles, 9603 gallons of shrimps, 21 bushels of oysters, 235 bushels of periwinkles, and 8879 lbs. of salmon and eels.

The following are the chief legal enactments on this subject :—

THE MARKETS' AND FAIRS' CLAUSES ACT, 1847.

(10 & 11 Vict. c. 14.)

Section 15.—Every person who shall sell or expose for sale any *unwholesome meat or provisions* in the market or fair shall be liable to a penalty not exceeding five pounds for every such offence ;

And any inspector of provisions appointed by the undertakers may seize such *unwholesome meat and provisions*, and carry the same before a justice, and thereupon such proceedings shall be had as are hereinafter directed to be had in the case of any *cattle or carcass* seized in any slaughter-house, and carried before a justice ;

And every person who shall obstruct or hinder the inspector of provisions from seizing or carrying away such *unwholesome meat or provisions* shall be liable to a penalty not exceeding five pounds for every such offence.

THE TOWNS' IMPROVEMENT CLAUSES ACT, 1847.

(10 & 11 Vict. c. 34.)

[When incorporated.]

Section 131.—*The inspector of nuisances, the officer of health, or any other officer* appointed by the commissioners for that purpose, may at all reasonable times, with or without assistants, enter into and inspect any building or place whatsoever within the said limits kept or used for the sale of butcher's meat, or for slaughtering cattle, and examine whether any cattle or the carcass of any such cattle is deposited there, and in case such officer shall find any cattle or the carcass, or part of the carcass, of any beast which appears *unfit for the food of man*, he may seize and carry the same before a

justice, and such justice shall forthwith order the same to be further inspected and examined by competent persons ;

And in case upon such inspection and examination such *cattle, carcass, or part of a carcass*, be found to be *unfit for the food of man*, such justice shall order the same to be immediately destroyed, or otherwise disposed of in such a way as to prevent the same being exposed for sale or used for the food of man ;

And such justice may adjudge the person to whom such *cattle, carcass, or part of a carcass*, belongs, or in whose custody the same is found, to pay a penalty not exceeding ten pounds for every such *animal, or carcass, or part of a carcass*, so found ;

And the owner or occupier of any building or place kept or used for the sale of butcher's meat, or for slaughtering cattle, and every other person who obstructs or hinders such inspector or other officer from entering into and inspecting the same, and examining, seizing, or carrying away any such *animal, or carcass, or part of a carcass*, so appearing to be unfit for the food of man, shall be liable to a penalty not exceeding five pounds for each offence.

THE PUBLIC HEALTH ACT, 1848.

(11 & 12 Vict. c. 63.)

Section 63.—And be it enacted that the *inspector of nuisances* may be and he is hereby empowered at all reasonable times, with or without assistants, to enter into and inspect any shop, building, stall, or place kept or used for the sale of butcher's meat, poultry, or fish, or as a slaughter-house, and to examine any *animal, carcass, meat, poultry, game, flesh, or fish*, which may be therein ;

And in case any *animal, carcass, meat, poultry, game, flesh, or fish*, appear to him to be intended for the food of man, and to be unfit for such food, the same may be seized ;

And if it appear to a justice, upon the evidence of a competent person, that any such *animal, carcass, meat, poultry, game, flesh, or fish*, is unfit for the food of man, he shall order the same to be destroyed, or to be so disposed of as to prevent its being exposed for sale or used for such food ;

And the person to whom such *animal, carcass, meat, poultry, game, flesh, or fish*, belongs, or in whose custody the same is found, shall be liable to a penalty not exceeding ten pounds for every *animal, or carcass, fish, or piece of meat, flesh, or fish, or any poultry, or game*, so found, which penalty may be recovered before two justices in the manner hereinafter provided with respect to penalties the recovery whereof is not expressly provided for.

THE NUISANCES' REMOVAL ACT FOR ENGLAND, 1855.

(18 & 19 Vict. c. 121.)

Section 11.—

3. To remove or abate a nuisance, in case of non-compliance with or infringement of the order of justices, or to inspect or examine any *carcass, meat, poultry, game, flesh, fish, fruit, vegetables, corn, bread, or flour*, under the powers and for the purposes of this Act.

For this purpose the local authority, or their officer, may from time to time enter the premises where the nuisance exists, or the *carcass, meat, poultry, game, flesh, fish, fruit, vegetables, corn, bread, or flour*, is found, at all reasonable hours, or at all hours during which business is carried on on such premises without notice.

THE NUISANCES' REMOVAL ACT FOR ENGLAND AMENDMENT ACT, 1863.

(26 & 27 Vict. c. 117.)

Section 2.—The medical officer of health, or *inspector of nuisances*, may at all reasonable times inspect and examine any *animal, carcass, meat, poultry, game, flesh, fish, fruit, vegetables, corn, bread, or flour*, exposed for sale, or deposited in any place for the purposes of sale or of preparation for sale, and intended for the food of man—the proof that the same was not exposed or deposited for such purpose or purposes, or was not intended for the food of man, resting with the party charged ;

And in case any such animal, *carcass, meat, poultry, game, flesh, fruit, vegetables, corn, bread, or flour*, appear to him to be *diseased, or unsound, or unwholesome, or unfit for the food of man*, it shall be lawful for such medical officer of health or inspector of nuisances to seize, take, and carry away the same, or direct the same to be seized, taken, and carried away by any officer, servant, or assistant, in order to have the same dealt with by a justice ;

And if it shall appear to the justice that any such animal, or any of the said articles, is *diseased, or unsound, or unwholesome, or unfit for the food of man*, he shall order the same to be destroyed or so disposed of as to prevent such *animal or articles* from being exposed for sale or used for such food ;

And the person to whom such *animal, carcass, meat, poultry, game, flesh, fish, fruit, vegetable, corn, bread, or flour*, belongs or did belong at the time of sale or of exposure for sale, or in whose possession or on whose premises the same is found, shall, upon conviction, be liable to a penalty not exceeding twenty pounds for every *animal, carcass, or fish*, or piece of *meat, flesh, or fish*, or any *poultry, or game*, or for the parcel of *fruit, vegetables, corn, bread, or flour* so found, or at the discretion of the justice, without the infliction of a fine, to imprisonment in the common gaol or house of correction for a term of not more than three calendar months.

Great responsibility will devolve upon the inspector of nuisances in reference to the sale of diseased and unwholesome food, for the subject is of great importance alike to public health and to dealers in food, and any action to be taken by the medical officer of health or the justices will usually be initiated by him.

Whilst this sheet was passing through the press, a discussion of some interest occupied the courts of justice and the public papers, viz. the fitness for human food of animals killed during pregnancy or parturition. In a case at Lincoln the attorney for the prosecution stated, "So far as they

could judge from the appearance of the meat, there was not anything to lead the mind to the supposition that it was unfit for food." The man who killed the sheep said that "it had been down all night, and was not able to lamb." "He killed the ewe because he thought she would die if left to herself. He was of opinion that the ewe had been overfed, and was too fat for lambing."

Of the two experts who gave evidence, Dr. Harrison said he "did not exactly mean to say that people who eat of the meat would be poisoned; but he did mean to say that if people lived continuously on such meat, it would produce loss of appetite, sickness, and ultimately, in all probability, fever." Dr. Tidy said: "I consider every animal that is killed immediately before, or during, or immediately after parturition is unfit for food. I make no exception to that opinion." "It is a well accepted fact that the flesh of an animal is not fit for food if the animal be killed during the time I have named. I say that parturition is, as a rule, a natural operation and a healthy one too. I consider there was something unnatural in the case of this sheep. There would be an increased feverishness in connection with it which is evidence that the flesh is unfit for food." He was satisfied "that the eating of it might produce some very serious results; but he admitted that he had not met with any case in which disease in any person could be traced to the eating of flesh of an animal that had died during parturition, as it was very difficult to trace such disease."

Hence the prosecution really rested upon the general statement that the flesh of animals during parturition was unfit for food, but was not supported by any evidence of the truth of the assertion.

Can any one who observes the state of an animal in parturition, and considers the rapidity of the process and recovery, seriously believe that any marked change is proceeding in the flesh? Such a statement lacks inherent probability, and could be accepted only on some demonstration of the morbid state or its effects; but none has been made, and there is no evidence whatever to support even such an assumption. Yet the prosecution succeeded on the bare testimony of experts that the flesh was "unfit for human food."

Justices cannot but attach weight to the assertions on oath of scientific men; but it is clearly their duty to enquire into the grounds on which such are made, and to estimate the value of the opinions by the facts. I believe that the general doctrine thus laid down at Lincoln is not capable of proof, and should not be accepted by judicial authorities; and that in such cases the state of the flesh must alone determine the issue of the question of its fitness for human food. As a matter of sentiment, there is something to be said against using such animals as food; but that should not be sufficient to cause the confiscation of property and the destruction of a necessary kind of food.

With so many difficulties, it is desirable to place as much information as possible within the reach of the inspector of nuisances and the justices, and we cannot do better than extract a few pages from Dr. Letheby's *Lectures on Food*, which bear the impress of the ability and observation of a distinguished sanitary officer and chemist.

It is to be regretted that in the various Acts of Parliament which relate to the condemnation of unsound meat, there are no special rules for the guidance of the officers appointed to

investigate this matter—there being only a very loosely worded general provision to the effect that the medical officer of health, or the inspector of slaughterhouses, or the inspector of nuisances, may, at all reasonable times, inspect and examine any animal, carcass, meat, poultry, game, flesh, fish, &c., exposed for sale, or deposited in any place for the purpose of sale, or in preparation for sale, or intended for the food of man; and in case it appears to the medical officer of health, or the inspector, to be diseased, or unsound, or unwholesome, or unfit for the food of man, it shall be lawful for him to seize the same, and for a justice to order it to be destroyed. In this regulation there is no particular reference to the kind of food which is unwholesome, or to the circumstances which render it so, and, therefore, much is left to the discretion of the officer who examines it. In the city of London the practice is to condemn the flesh of animals infected with certain parasites, as measles, flukes, &c.; and of animals suffering from fever or acute inflammatory affections, as rinderpest, pleuro-pneumonia, and the fever of parturition, and of animals emaciated by lingering disease; and those which have died from accident or from natural causes; as well as all meat tainted with physic, or in a high state of putrefaction. A little practice is required to distinguish meat of this description, but generally it may be said that good meat has the following characters:—

1st. It is neither of a pale pink colour nor of a deep purple tint, for the former is a sign of disease, and the latter indicates that the animal has not been slaughtered, but has died with the blood in it, or has suffered from acute fever.

2nd. It has a marbled appearance from the ramifications of little veins of fat among the muscles.

3rd. It should be firm and elastic to the touch, and should scarcely moisten the fingers—bad meat being wet, and sodden, and flabby, with the fat looking like jelly or wet parchment.

4th. It should have little or no odour, and the odour should not be disagreeable, for diseased meat has a sickly cadaverous smell, and sometimes a smell of physic. This is very discoverable when the meat is chopped up and drenched with warm water.

5th. It should not shrink or waste much in cooking.

6th. It should not run to water or become very wet on standing for a day or so, but should, on the contrary, dry upon the surface.

7th. When dried at a temperature of 212° or thereabout, it should not loose more than from 70 to 74 per cent. of its weight, whereas bad meat will often loose as much as 80 per cent.

Other properties of a more refined character will also serve for the recognition of bad meat, as that the juice of the flesh is alkaline or neutral to test-paper, instead of being distinctly acid; and the muscular fibre, when examined under the microscope, is found to be sodden and ill-defined.

The signs of parasitic diseases are not always observable without careful examination. In the case of the fluke in the livers of sheep, and of measles in pork, and of hydatids in the brain or liver, the nature of the disease is at once discoverable, but it is not so with the smaller measles or cysticerci of beef and veal, and it is still less so with the trichina of pork—the microscope being required to reveal their presence.

And here, perhaps, we may ask, *What are the effects of diseased or putrid meat on the human system?* The question is undoubtedly very difficult to answer, for while, on the one hand, we have abundant evidence that such meat may frequently be eaten with impunity, so on the other we have many remarkable instances of injury occasioned by it. In Scotland, there is a disease called *braxy*, which attacks the sheep and lambs in spring and early summer. It is the cause of at least half the deaths in the flock during the year. The disease kills the animals very quickly, by causing stagnation of blood in the most important vital organs; and, as the carcass is the perquisite of the herdsman, he almost invariably eats it—taking the precaution to remove the offal, and to cut away the darker portions of the flesh where the blood has stagnated. He also salts it before he uses it; and if questioned on the subject, he will tell you that the meat is not unwholesome. Every now and then, however, when perhaps the diseased parts have not been entirely removed, or when the salting has not been sufficiently prolonged, or the cooking has not been thoroughly

effected, the most serious consequences result from it, inso-much that many medical practitioners who are acquainted with the habits of the Scotch shepherds in this respect, and have seen the mischief occasioned by the meat, declare that braxy mutton is a highly dangerous food for man. Again, it is a common practice with farm-labourers to eat the flesh of sheep affected with staggers, which is a parasitic disease of the brain, and even of animals dying from acute inflammatory diseases. There is a story told on the authority of Dr. Brücke, the professor of physiology in Vienna, that some years ago, when the *steppe murrain* was prevalent in Bohemia, and the infected animals were killed and buried by order of the government, the poor people dug the carcasses of the dead bullocks, and cooked them, and ate them, without injury. In this country, also, during the prevalence of *rinderpest* in 1863, enormous quantities of meat from the diseased animals were sent to market, and sold and eaten. The same has been the case with the carcasses of animals suffering acute *pleuro-pneumonia*; and if, as Professor Gamgee says, the practice of making salvage out of diseased animals is so common that at least one-fifth of the meat which is sold in the public markets is diseased, we may well ask, in the words of Mr. Simon, how it is that some sort of pestilence is not bearing witness to the fact; how it is that cattle having all the foulness of fever in their blood, or having local sores and infiltrations, that yield one of the deadliest of inoculable morbid poisons, or having their flesh thronged with larval parasites, do not, when slaughtered and eaten, produce a general poisoning. Parent du Chatelet has commented in very forcible language on the apparent immunity from disease even when the most foul and loathsome of animal foods are eaten. But is it not possible that the danger is averted by the operation of cooking? Not that the human stomach has not also a wonderful protective power in its own natural functions; for the deadly poison of the cobra or the rattle-snake may be swallowed with impunity. It is possible, however, that these safeguards may fail us occasionally, and then it is, perhaps, that the most serious consequences arise. I have often had to investigate cases of mysterious disease which had undoubtedly been caused by unsound meat. One of these, of more than ordi-

nary interest, occurred in the month of November 1860. The history of it is this. A fore-quarter of cow beef was purchased in Newgate Market by a sausage-maker who lived at Kingsland, and who immediately converted it into sausage meat. Sixty-six persons were known to have eaten of that meat, and sixty-four of them were attacked with sickness, diarrhoea, and great prostration of vital powers. One of them died; and at the request of the coroner, I made a searching enquiry into the matter, and I ascertained that the meat was diseased, and that it, and it alone, had been the cause of all the mischief. Dr. Livingstone tells us that when the flesh of animals affected with pleuro-pneumonia is eaten in South Africa, by either natives or Europeans, it invariably produces malignant carbuncle.

The Registrar-General of Scotland has directed public attention to this fact, saying that deaths from carbuncle are on the increase, and that the mortality from it has been getting larger and larger ever since the lung disease of cattle was imported into Scotland. This accords with the experience of medical practice; but as it is very difficult to trace the immediate connection of bad food with subsequent disease, there being so many circumstances to weaken the connection, it is not surprising that differences of opinion should exist as to the morbid effects of unsound meat; nothing, in short, but an experimental enquiry into the subject, as has already been done in Germany in the case of parasitic diseases, will bring the question to rest; and I see no reason why such an investigation should not be made on the persons of those who send diseased meat to the public market for sale; for, as the common defence of their conduct is that the meat is good for food, they cannot surely object to the penalty of being made to eat it. Here, for example, is a specimen of pork, covered with pustules of small-pox; it was seized by one of the City officers on the road to a notorious sausage-maker, and it may, notwithstanding its disgusting appearance, be good and wholesome food; then why not put the question to the proof by making the vendor of it eat it? In the year 1862, when small-pox was prevalent among the sheep in several parts of England, it was a common practice to send the carcasses of diseased animals to the London markets for sale as human food.

Later still, in 1863, there was an epidemic of what seemed to be scarlet-fever among the pigs of this metropolis, and their carcasses, with all the bright crimson look of the disease, were invariably sent to market for sale as food. Since then, the London pigs have been the subject of a virulent spotted fever, of the nature of typhus, and these also have been killed in the last stage of the disease, and sold for food. Abundant illustrations of this kind are constantly coming under my notice ; and I feel that the question of the fitness of such meat for food is in such an unsettled state that my action in the matter is often very uncertain, and I should like to have the question experimentally determined ; for, as it now stands, we are either condemning large quantities of meat which may be eaten with safety, and are, therefore, confiscating property, and lessening the supply of food, or we are permitting unwholesome meat to pass almost unchallenged in the public markets.

As regards the injurious quality of meat infected with parasitic disease, there can, however, be no question ; and perhaps, of all such infections, the most terrible is the *trichina* of pork. Fortunately, it is a rare affection in this country, although it is often common in Germany. The pork infected with the worm is generally darker than usual, on account of the irritating or inflammatory action of the creature lodged in the muscles ; and when the parasite is encysted, the meat presents a speckled appearance—the minute white cysts containing the worm being just visible to the naked eye. It is generally found in the human subject in an encysted state, when it has passed beyond its dangerous condition, and has become harmless. In most cases, when thus discovered, there is no record of its action, and therefore it was once thought to be an innocent visitor ; but we now know that while it was free—that is, before nature had barricaded it up in the little cyst—its presence was the cause of frightful disorder, killing about 50 per cent of its victims in terrible agony. In Germany, there have been frequent outbreaks of the disease, which, for a time, baffled the skill of the most experienced physicians ; in fact, we hardly know how long or how often the disease has attacked the pork-feeding population of Europe, for its actual nature was unknown until the

year 1860, when Dr. Zencker, of Dresden, discovered the pathology of the disease. Since then, there have been several visitations of it, as at Plauen, in Saxony, in 1862; at Hettstädt, near Eisleben, in 1863; and at Hedersleben, near Magdeburg, in Prussian Saxony, in 1866. In all these cases the same symptoms, or nearly the same, were observed; there was sometimes immediate disturbance of the digestive functions, but more commonly a day or two elapsed before any particular symptom was noticed, and then there was a feeling of lassitude, with a loss of appetite, and pains in the head and back. Then followed a serious disturbance of the alimentary canal, with vomiting and diarrhoea. This lasted for a day or two; and by the end of a week after the worm had been eaten, fever had set in, which became more and more severe; and by that time the young worms, which had been hatched in the body, had migrated to the distant muscles, causing the most excruciating pains, so that the patient, fearing to move his inflamed muscles, would lie motionless upon his back; and if he did not die in this state of the disorder, nature came to the rescue, and imprisoned the creature by surrounding it with a fibrinous cyst, where it lives for years, being ready at any moment to acquire activity when it is swallowed and released from its cell. Indeed, the way in which it becomes dangerous is this—flesh infected with the parasite is eaten; and the cyst being quickly dissolved by the gastric juice, the creature is set free. Finding itself in the midst of nourishing food, it rapidly grows, so that in two or three days it is three or four times its original size, and may be easily seen, like a bit of fine thread, with the naked eye. The worms are of different sexes, and they rapidly come to maturity—each female giving birth to from 300 to 500 minute thread-like worm, which immediately set out upon their travels, piercing the walls of the intestines and migrating to distant parts of the body, where they produce the terrible mischief I have described. Although the pig is the animal which is most commonly infested by it, yet it has been found in the muscles of dogs, foxes, badgers, sheep, moles, hedgehogs, rats, mice, frogs, and most carnivorous birds, all of which must have been subjects of the disease, but none appear to suffer from it like man; even children are less affected by it,

for they seem to sleep it away. Fortunately, there is an easy method of discovering its presence in animals, for the most certain seat of the creature is in the muscles of the eye; we have, therefore, only to examine these muscles with the microscope to declare whether the meat is infected or not; and, at the present time, the sausage-makers of Germany have the pork examined in this manner before it is used for food.

Other parasitic creatures, as *measles* in pork, and the smaller *Cysticerci* of beef and veal, are found as little sacs or bladders diffused through the lean of the meat—the *cysticercus* or *measle* of pork being easily seen, for it is as large as a hemp-seed, but the *cysticercus* of other animals is much smaller, and requires careful exploration to discover it. In both cases the sac contains a little creature with a sort of tuberculated head, crowned with a coronet of hooks, and having a bladder-like tail attached to it. Soon after it is swallowed, the enclosing sac is dissolved by the gastric juice, and the creature, being liberated, passes into the intestines, and there fixes itself by its little hooks, and quickly grows, joint after joint, into a tape-worm. In the case of the *cysticercus* of pork, it forms the variety of tape-worm called *Tenia solium*, and in that of beef and veal it produces the *Tenia mediocanellata*. The latter is the most common variety of it in the human intestines, and it is frequently seen where raw, or nearly raw, meat is made use of, as in Abyssinia and in Russia, where children are allowed to suck a piece of raw beef, on the supposition that it has a strengthening property.

Again, there is another class of parasite, called *Trematoda* or *flukes*, which infest the livers and intestines of men and herbivorous animals. The most common of them is the *Distoma hepaticum*, or *liver-fluke*, of the sheep. In wet seasons the animal is so constantly infested with them, and suffers so much emaciation from them, that the disease is called the rot. A few years ago (1863), when Professor Brown was lecturing on the liability of animals to disease from the present mode of feeding them, he said that once, when he wanted some animals for dissection, and applied for them to a large butcher, he received back five or six animals, which, though in a bad state of rot, were dressed for the market; and he

was told by a certain individual not far from London that within the space of six months he had killed no less than 750 of such animals, in a state of extreme disease, and he believed they were all sent to market and sold for food. What becomes, he says, of the hundreds and thousands of rotten sheep which we see in the fields? To bury them would require whole catacombs; the real catacombs are the intestinal canals of the human body. The way in which the disease is produced in sheep is curious. Ova are passed from the gall-bladder of infected animals into the intestines, and so upon the land; finding a moist situation, they are soon hatched into ciliated embryos, which swim about and become developed into cylindrical sacs of minute hydatids; these attach themselves to some mollusc, as a small snail. In wet weather the infected snails crawl upon the grass, and are eaten by the sheep, and then the hydatid speedily changes his condition and becomes a fluke. When it is found in the body of man, it has, perhaps, been drunk with water, or eaten with some aquatic plant, as watercress, &c.

Our safety against these intruders is to cook the meat thoroughly.

The flesh of animals that have been excited before death, as by over-driving, or by torture, has frequently proved unwholesome. A remarkable instance of this is quoted by Liebig, in his *Letters on Chemistry*, where a family of five persons were made seriously ill by the flesh of a roebuck which had been caught in a snare, and had struggled violently before death.

It is, moreover, a curious fact that meat may be even poisonous from the nature of the food made use of by animals shortly before they are killed; and this, too, without any indication of disorder in the animals themselves. Hares which have fed upon the *Rhododendron chrysanthemum* are frequently poisonous; the same is the case with pheasants in Pennsylvania and Philadelphia, which feed during the winter and spring on the buds of the laurel (*Calmia latifolia*); and I have known many instances of serious mischief from prairie birds, which are now largely imported into this country from America, and I attribute it to the food made use of by the bird. In certain districts of North

America, especially on the Alleghany Mountains, the flesh of all the cattle is poisonous, and so also is the milk they yield, and the cheese which is made from it. Oysters, mussels, lobsters, and crabs, have frequently caused disturbance of the human system ; and the probability is that they were made unwholesome by the food which they had eaten. A singular case is recorded in the medical journals of France in 1842, where a whole family at Toulouse were poisoned by a dish of snails, the animals having been gathered from a poisonous shrub (*Coriaria myrtifolia*) ; and it is not at all uncommon for honey to be unwholesome, on account of its having been collected by bees from poisonous plants. The honey of Trebizond, for example, has long been notorious for its deleterious properties ; it poisoned the soldiers of Xenophon during the famous retreat of the Ten Thousand. Pliny, too, speaks of it ; and to this day its intoxicating effect is frequently witnessed. It arises, no doubt, from the plants, chiefly the *Azalea pontica*, from which the honey is gathered. Mr. Barton has given us a similar account of the poisonous quality of the honey gathered by bees from the savannahs of New Jersey, where the *Calmia* and *Azalea* are the principle flowering shrubs. As with the followers of Xenophon, all who eat of the honey become intoxicated to a high degree ; and even when made into metheglin, it poisons all who partake of it, causing dimness of sight, giddiness, and then delirium, with sometimes a fatal termination.

Occasionally, we have examples of food which is in itself poisonous. This is so with many of the fish of tropical seas, and especially of the West Indies.

Putrid meat is, perhaps, wasteful, rather than actually injurious ; but there are plenty of cases in which it has caused disease. Foderé tells us that at the siege of Mantua, those who were shut up in the city, and were obliged to eat the half-putrid flesh of horses, suffered from gangrene and scurvy ; and in Czant's history of Greenland, there is an account of the death of thirty-two persons at a missionary station called Kangek, from a repast on the putrid brains of a walrus. Similar cases are recorded in all the books on legal medicine. Even game, when only sufficiently tainted to please the palate of the epicure, has caused severe

diarrhœa in persons unaccustomed to it ; but, as Dr. Christison observes, " the power of habit in reconciling the stomach to the digestion of decayed meat is inconceivable. Some epicures in civilised countries prefer a slight taint even in their beef and mutton ; and there are tribes of savages still further advanced in the cultivation of this department of gastronomy, who eat with impunity rancid oil, putrid blubber, and stinking offal." The Zulus of Natal, according to Dr. Colenso, are so fond of putrid meat that they call it *ubomi*, which literally means " to be superlatively happy." But, as a rule, there is a natural abhorrence of tainted food, insomuch that with most persons the mere commencement of decay is sufficient to excite disgust ; and rarely do we find, except among savages, that an entire meal is made of putrid flesh. A little game or venison, or ripe cheese, at the end of a feast, with just a piquant touch of decay, is, perhaps, not objectionable ; for it may, as Liebig supposes, promote digestion, by communicating its own quality of transformation to the rest of the food ; but it is another thing to fill the stomach with putrid flesh, for if the corrective power of the gastric juice should fail, the effect of it might be serious. We have, indeed, abundant evidence of the terrible consequences of admitting putrid matter into the circulation, for they were once too common among those engaged in the dissection of the human body. In fact, the mere handling of decomposing animal matter for any time will often produce disease of the hands or other parts of the body with which it comes into contact. Our safety, perhaps, in using such food is in the antiseptic power of good cooking.

But bad as this sort of tainted food is, it is nothing in comparison to the sausage poison, which is produced by a sort of modified putrefaction, to which the large sausages of Germany, and especially those of Würtemberg, are occasionally subject. According to an official return, there have been more than 400 cases of poisoning from these sausages in Würtemberg alone during the last fifty years, and of these about 150 were fatal. The effects are generally observed in spring, and mostly in April, when the sausages become musty, and acquire a soft consistence in the interior. They have also a peculiarly nauseous and rather putrid taste, and are very acid to test-paper. If eaten in this condition, they

produce dangerous effects in from twelve to twenty-four hours—the first symptoms being pain in the stomach, with vomiting and diarrhoea, and dryness of the nose and mouth ; then comes a feeling of profound depression, with coldness of the limbs, weakness and irregularity of the pulse, and frequent fainting. Fatal cases end with convulsions and oppressed breathing between the third and eighth day. The precise cause of these effects is still a mystery ; some have thought that rancid fatty acids are produced during the decomposition of the meat ; others that in the process of drying and smoking acrid pyrogenous acids have been developed ; others, that during the decay of the sausages a poisonous organic alkaloid is generated. Liebig is of opinion that the effects are due to an animal ferment, which produces in the blood, by catalysis, a state of putridity analogous to its own, and that the molecular movements of the putrefactive change in the decaying meat are thus communicated to the living organism. M. Vanden Corput, who is one of the most recent investigators of the subject, attributes the morbid action of such meat to the presence of a minute fungus, of the nature of a *Sarcina*, which he calls *Sarcina botulina*. This view is confirmed by the fact that there is always a peculiar mouldiness of the sausages ; and the poisonous property is generally observed in April, when these cryptogamic organisms are most freely developed.

Similar effects have occasionally been produced by other kinds of animal food—as veal, bacon, ham, salt-beef, salt-fish, cheese, &c., and the food has usually been in a decayed and mouldy condition. It would be tedious if I were to detail or even to enumerate the cases recorded by medico-legal writers ; but I may, perhaps, refer to a few of them. In 1839, there was a popular *fête* at Zürich, and about 600 persons partook of a repast of cold roast veal and ham. In a few hours most of them were suffering from pain in the stomach, with vomiting and diarrhoea ; and before a week had elapsed, nearly all of them were seriously ill in bed. They complained of shivering, giddiness, headache, and burning fever. In a few cases there was delirium ; and when they terminated fatally, there was extreme prostration of the vital powers. Careful enquiry was instituted into the matter, and the only discoverable cause of the

mischievous was incipient putrefaction and slight mouldiness of the meat. Dr. Geiseler relates an instance where a family of eight persons were made ill by musty bacon; and M. Ollivier has given an account of six persons who were poisoned by mutton in a state of modified decay—four of whom died from it within eight days. In Russia, where it is the practice to eat largely of salt-fish in a raw condition, it is not at all uncommon to witness the dangerous effects of it when it has become mouldy or putrid; and, in fact, it is within the experience of every one who is concerned in medico-legal enquiries that serious symptoms are frequently traced to the use of food in a modified condition of decay. This is especially so with bad cheese, the effects of which on the constitution have been so severe that official investigations have been called for, as at Schwerin (1823), Minden (1825), Hameln (1826), Greifswald (1827), Frankfurt (1828), and elsewhere; and they have been the subjects of interesting essays by Hennemann, Hünefeld, Westrumb, and others. At first the effects were attributed to the copper vessels used in the dairies, and therefore the Austrian, Würtemberg, and other States prohibited the use of that metal for such purposes; but the subsequent enquiries of Hünefeld, Sertürner, and other chemists, established the fact that no metallic poison was discoverable in the cheese. In the police report, which was published in Frankfurt, in January 1828, informing the public of numerous cases of poisoning in that city from spoiled cheese, it was declared that no poisonous principle could be detected by chemical reagents. I have myself seen the most terrible consequences from the use of such cheese, and have failed to discover anything unusual in the acidity or other chemical reactions of the cheese. Hünefeld says it is commonly of a yellowish-red colour, and is soft and tough, with harder and darker lumps interspersed throughout it, and it has a disagreeable taste, and an acid reaction. The symptoms which it produces are very much like those of sausage poisoning—namely, irritation of the stomach and bowels, with great prostration of the vital powers. These effects have been witnessed not only in Germany, where the cheese is generally rancid and bad, but also in this country, and particularly among the small hill-farms of Cheshire, where the

limited extent of the dairies obliges the farmer to keep the curd for several days before a sufficient quantity of it is accumulated to make a large cheese.

As regards vegetable foods, they are not so liable to decay or even to parasitic infection as animal foods; for the *Acori* or *mites* of flour and sugar, or even the *weevils* of biscuit, are harmless. The most important infection of grain is the fungoid disease of it called *ergot*, which is the *Mutterkorn* or *Roggenmutter* of the Germans, and as it chiefly infests the rye, it is named, from its appearance, *spurred rye*; but it also attacks barley, oats, wheat, maize, rice, and most of the grasses. It always appears as a black grain, of a larger size than usual, and it is mostly found in plants which grow upon moist clay soils, in damp situations, especially in the neighbourhood of forests. The district of Sologne, in France, between the rivers Loire and Cher, was once notoriously infested with the disease, and the Abbé Fessier, who was deputed in 1777 to investigate the causes of the extraordinary prevalence of ergot in that district, attributed it to the poorness and wetness of the land, and to the dampness of the air from the numerous forest. In bad seasons, as much as a third or a fourth of the crop was infected with ergot, and even in good seasons it constituted about two per cent. of it. The disease in the grain is due to the growth of a peculiar fungus, which the late Mr. Quekett named *Ergotetia abortifaciens*; and the effects of it on the human body are very serious. It acts chiefly on the nervous system, causing giddiness, dimness of sight, loss of feeling, twitching of the limbs, and death by convulsions; or it produces a creeping sensation over the surface of the body, with coldness of the extremities, followed by insensibility and gangrene. These effects are no doubt referred to by Ligebert, in his *History of Gaul and France*, when he says that the year 1089 was a pestilent year, especially in the western parts of Lorraine, for many persons became putrid in consequence of their inward parts being consumed by St. Anthony's fire. Their limbs were rotten, and became black like coal, and they either perished miserably or, being deprived of their putrid hands and feet, were reserved for a more miserable life. Bayle, too, in his account of this sickness, says that the bread was of a deep violet colour. The like effects have been

observed in other parts of the continent, as in Silesia, Prussia, Bohemia, Saxony, Holstein, Denmark, Switzerland, Lombardy, and Sweden, where the creeping sickness, as it is called, has attacked whole districts of the country, sparing neither old nor young.

The remedy for the disease is in the hands of the miller, who should separate the ergotised from the healthy grains. Fortunately we have a ready test for its presence, not merely in the microscopic appearances of the flour, but in the circumstance that, as it is the lightest of all the constituents of flour, it will float upon a mixture of one part of chloroform and six of alcohol, and will appear as a scum of dark brown particles.

Another source of danger is the presence of poisonous grasses in the flour. The most important of these is darnel (*Lolium temulentum*), which the careless or slovenly farmer will sometimes permit to overrun his fields, and the seeds becoming mixed with the corn, are ground into flour by the equally careless miller. The effect of the seeds on man is a species of intoxication, with headache, giddiness, somnolency, delirium, convulsions, paralysis, and even death. Occasionally it excites vomiting, with irritation of the alimentary canal, and then its effects are not so serious. Many instances are recorded of the poisonous action of such flour. Christison, for example, tells us that a few years ago almost all the inmates of the poor-house at Sheffield, to the number of eighty, were attacked with analogous symptoms, after breakfasting on oatmeal porridge, and it was supposed that the effects were caused by the presence of darnel in the oatmeal. A similar accident is mentioned by Perleb, as having occurred in the house of correction at Freiburg, and still more recently the same effects were produced on seventy-four persons at the workhouse of Beninghausen. Dr. Taylor states, on the authority of Dr. Kingsley, of Roscrea, that in the month of January 1854 several families, including about 30 persons, suffered severely from the effects of bread containing the flour of darnel seeds. Those who partook of the bread staggered about as if they were intoxicated, and although they all recovered, yet they experienced a good deal of distress from giddiness, coldness of the limbs, and great prostration of vital power.

Unripe grain, as well as grain affected with the *rust*, and *mouldy flour* and *mouldy bread*, have also produced disturbance of the human system. M. Bovier attributed the epidemic of dysentery which occurred in the department of the Oise, in the autumn of 1793, to the use of *unripe grain*; and corn affected with *brown* or *black rust* is thought by many to be unwholesome. *Mouldy flour* or *mouldy bread* is certainly injurious, for several instances are on record where not only men, but horses, have been poisoned by mouldy bread; and M. Payen has given a graphic account of the distressing effects of the mouldy ammunition bread supplied to the troops who were encamped near Paris, in 1843; the mould on that occasion was a yellow fungus, the *Oidium aurantiacum*, but at other times it has been of a green colour, from *Penicillium glaucum*.

Mouldy food of every description is dangerous to use, and considering to what an extent the *spores* or *sporidia* of poisonous fungi are floating in the atmosphere, it is surprising that they do not more frequently taint our food and cause disorder of the system; for air washed with distilled water will always yield abundance of these germs, which are ready at any moment to spring into activity when they come into contact with a proper nidus for their growth. A remedy for these hidden sources of danger is good and effective cooking.

CHAPTER VII.

ADULTERATION OF FOOD AND DRUGS.

8. HE SHALL, WHEN AND AS DIRECTED BY THE SANITARY AUTHORITY, PROCURE AND SUBMIT SAMPLES OF FOOD OR DRINK, AND DRUGS, SUSPECTED TO BE ADULTERATED, TO BE ANALYSED BY THE ANALYST APPOINTED UNDER THE ADULTERATION OF FOOD ACT, 1872, AND UPON RECEIVING A CERTIFICATE STATING THAT THE ARTICLES OF FOOD OR DRINK, OR DRUGS, ARE ADULTERATED, CAUSE A COMPLAINT TO BE MADE, AND TAKE THE OTHER PROCEEDINGS PRESCRIBED BY THAT ACT.

It does not appear that any responsibility rests upon the inspector to initiate enquiries into the subject of adulteration of foods, but rather that he is to be moved by the sanitary authority, and to act as their agent. It is not, therefore, desirable to describe the adulterations to which the several foods are liable, and we may be content to refer enquirers to our work on Foods—one of the International Scientific Series—and to the remarks made by Dr. Letheby at the conclusion of his lectures recently referred to.

At the same time, the inspector will do a public service if he should bring adulterations to the knowledge of the

sanitary authority, and impress upon the public the desirability of making use of the public analyst who has been appointed in every county to make analyses of foods of doubtful purity.

The legal provisions are not entirely satisfactory, and the disposition on the part of the public to act upon them is exceedingly small; but it is desirable that the inspector should inform himself as to the scope of the whole Act here referred to.

THE ADULTERATION OF FOOD, DRUGS, ETC. ACT, 1872.

(35 & 36 Vict. c. 74.)

Penalty on Persons Adultering Articles of Food, or Drink, or Drugs.

Section 1.—Every person who shall wilfully admix, and every person who shall order any other person or persons to admix, with any article of food or drink any injurious or poisonous ingredient or material to adulterate the same for sale, and every person who shall wilfully admix, and every person who shall order any other person or persons to admix, any ingredient or material with any drug to adulterate the same for sale, shall for the first offence forfeit and pay a penalty not exceeding fifty pounds, together with the costs attending such conviction, and for the second offence shall be guilty of a misdemeanour, and be imprisoned for a period not exceeding six calendar months, with hard labour.

Penalty on Persons Selling Articles of Food, or Drink, or Drugs, which they know to have been Adulterated.

Section 2.—Every person who shall sell any article of food or drink with which, to the knowledge of such person, any ingredient or material injurious to the health of persons eating or drinking such article has been mixed, and every person who shall sell as unadulterated any article of food or drink, or any drug which is adulterated, shall for every

such offence, on a summary conviction of the same before two justices of the peace at petty sessions in England, or before two justices of the peace in the justices of the peace court, or before the sheriff substitute of the county, or before any magistrate acting under any general or local police Act in Scotland, or before justices at petty sessions or a divisional justice in Ireland, forfeit and pay a penalty not exceeding twenty pounds, together with such costs attending such conviction as to the said justices, sheriff substitute, magistrate, or divisional justice shall seem reasonable; and if any person so convicted shall afterwards commit the like offence, such justices, sheriff substitute, magistrate, or divisional justice shall cause such offender's name, place of abode, and offence to be published, at the expense of such offender, in such newspaper or in such other manner as to the said justices shall seem desirable.

Vendor to declare Mixture at Time of Sale.

Section 3.—Any person who shall sell any article of food or drink or any drug, knowing the same to have been mixed with any other substance with intent fraudulently to increase its weight or bulk, and who shall not declare such admixture to any purchaser thereof before delivering the same, and no other, shall be deemed to have sold an adulterated article of food, or drink, or drug, as the case may be, under this Act.

Pharmacy Act, 1868, and 23 & 24 Vict. c. 84, incorporated with this Act.—Proviso, 33 & 34 Vict. c. 26.

Section 4.—The Pharmacy Act, 1868, and the Act, 23rd and 24th Victoria, chapter 84, "for Preventing the Adulteration of Articles of Food and Drink," shall be deemed to be incorporated in this Act: Provided always that in the application of this Act to Ireland the Act passed in the session of Parliament held in the 33rd and 34th year of the reign of Her present Majesty, chapter 26, intituled "An Act to Regulate the Sale of Poisons in Ireland," shall be deemed to be incorporated in this Act instead of the Pharmacy Act, 1868.

Appointment of Analysts.

Section 5.—In the City of London and the liberties thereof the Commissioners of Sewers of the City of London and the liberties thereof, and in all other parts of the Metropolis the vestries and district boards acting in execution of the Act for the Better Local Management of the Metropolis, in England the court of quarter sessions of every county, and the town council of every borough having a separate court of quarter sessions, or having under any general or local Act of Parliament or otherwise a separate police establishment, in Ireland the grand jury of every county, county of a city, and county of a town, and town council of every borough, and in Scotland the commissioners of supply at their ordinary meetings for counties, and the commissioners or boards of police, or, where there are no such commissioners or boards, the town councils for boroughs, within their several jurisdictions, may, and when required so to do by the Local Government Board in England, or by one of Her Majesty's principal Secretaries of State in Scotland, or by the Lord Lieutenant or other chief governor or governors in Ireland, shall, for their respective city, districts, counties, or boroughs, appoint and remove one or more persons possessing competent medical, chemical, and microscopical knowledge as analysts of all articles of food, drink, and drugs purchased within the said city, metropolitan districts, counties, or boroughs, and shall pay to such analysts such salary or allowances as they may think fit; but such appointments and removals shall at all times be subject in England to the approval of the Local Government Board, in Scotland of one of Her Majesty's principal Secretaries of State, and in Ireland of the Lord Lieutenant or other chief governor or governors.

Inspectors of Nuisances, &c. may submit Articles to be Analysed.

Section 6.—The inspector of nuisances, or the inspector of weights and measures, or the inspector of markets, one or all of them, as the local authority appointing them shall think fit to determine, in every district, county, city, or borough, shall procure and submit samples of articles of

food or drink and drugs suspected to be adulterated to be analysed by the analysts appointed under this Act, and shall, upon receiving a certificate stating that the articles of food or drink or drugs are adulterated, cause a complaint of an offence against this Act by the party selling or adulterating such articles of food or drink or drugs to be made before a justice of the peace, and thereupon such justice shall issue a summons requiring the seller or the adulterator to appear before two justices of the peace at petty sessions in England, or before two justices of the peace in the justice of the peace court, or before the sheriff substitute of the county, or before any magistrate acting under any general or local police Act in Scotland, or before justices of petty sessions or divisional justices in Ireland, to answer such complaint, and such summons shall be served by delivering the same, or a true copy thereof, upon the premises where such samples were obtained or sold, and the expense of such prosecutions, if not ordered to be paid by the party complained against, shall be deemed part of the expense of executing this Act.

Analysts to make Reports quarterly to Local Authorities.

Section 7.—The analysts appointed under this Act shall report quarterly to the local authorities appointing them the number of articles of food, drink, or drugs analysed by them under this Act during the foregoing quarter, and shall specify the nature and kind of adulterations detected in such articles of food, drink, and drugs, and all such reports shall be read at the meetings of the local authorities appointing such analysts.

Proof of Identity of Articles submitted to Analysts.

Section 8.—On the hearing by the justices, sheriff substitute, magistrate, or divisional justice of any complaint under this Act in any district, county, city, or borough wherein analysts shall have been appointed under this Act, the purchaser, or inspector of nuisances, or the inspector of weights and measures, or the inspector of markets, as the case may be, shall prove to the satisfaction of such justices, sheriff substitute, magistrate, or divisional justice that the article of food or drink or drugs alleged to be adulterated was

delivered to the analysts in the same condition as regards its purity or impurity as it was when received from the seller.

Purchaser of Articles of Food, &c. may require same to be Analysed.

Section 9.—Any purchaser of any article of food or drink or drugs in any district, county, city, or borough where there is any analyst appointed under this Act shall be entitled, on payment to the inspector or inspectors appointed under this Act of a sum not less than two shillings and sixpence nor more than ten shillings and sixpence, which shall be accounted for to the local authority appointing such inspector or inspectors, to have any such article analysed by any analyst who may be appointed for such district, county, city, or borough, and to receive from such analyst a certificate of the result of his analysis, specifying whether, in his opinion, such article is adulterated, and also whether, if it be an article of food or drink, it is so adulterated as to be injurious to the health of persons eating or drinking the same, and such certificate, duly signed by such analyst, shall, in the absence of any evidence before the court to the contrary, be sufficient evidence of the matters therein certified, and the sum so directed to be paid for such certificate shall be deemed part of the costs.

Articles of Food, &c. ordered for Analysis to be received, and Samples retained by Inspectors.

Section 10.—All articles of food, drink, or drugs to be analysed by the analysts appointed under this Act shall be received by the inspectors appointed by the local authorities, and from all such articles of food, drink, or drugs samples shall be taken and sealed in the presence of the analysts by the inspectors, to be retained by them and produced in case the justices, sheriff substitute, magistrate, or divisional justice shall order other analyses to be made.

As to Expenses of Executing Act.

Section 11.—The expense of executing this Act shall be borne, in the City of London and the liberties thereof, out of the consolidated rates raised by the Commissioners of

Sewers of the City of London and the liberties thereof, and in the rest of the Metropolis out of any rates or funds applicable to the purposes of the Act for the Better Local Management of the Metropolis, and in counties out of the county rate, or out of the grand jury cess in Ireland, and in boroughs out of the borough fund, and in Scotland out of the police money in counties and boroughs respectively.

Proceedings by Indictment, &c. not to be affected.

Section 12.—Nothing in this Act contained shall be held to affect the power of proceeding by indictment, or to take away any other remedy against any offender under this Act.

CHAPTER VIII.

SUPERINTENDENCE OF SANITARY
WORKS.

13. HE SHALL, IF DIRECTED BY THE SANITARY AUTHORITY TO DO SO, SUPERINTEND AND SEE TO THE DUE EXECUTION OF ALL WORKS WHICH MAY BE UNDERTAKEN UNDER THEIR DIRECTION FOR THE SUPPRESSION OR REMOVAL OF NUISANCES WITHIN THE DISTRICT.

THIS direction seems to anticipate a desire on the part of the sanitary authority to appoint as their inspector of nuisances one who has some technical knowledge of works, and particularly as to making drains and roads, and the result has justified this expectation. The advertisements which have appeared have varied very much both as to the qualifications required and the salary to be allowed, so that some authorities have been content to refer in general terms to the requirements of the Local Government Board, and to offer 80*l.* a year to cover all expenses, whilst many have stipulated that the candidates shall be in the building trade, and have a competent knowledge of material and labour. The following, issued by the borough of Shrewsbury, is interesting :—

WANTED, an Inspector of Nuisances under the above Acts. Applications, stating age and present occupation, accompanied by copies of testimonials, to be sent to me as under, on or before the 31st May instant. The Officer appointed will be required to devote the whole of his time to the discharge of his duties. The salary will be £250 per annum, payable quarterly. A copy of the duties, as defined by the Council, and all information, can be obtained at my office.

A limited number of candidates will be selected for attendance on the day of election, and will be required to forward, on request, *a certificate, signed by a Medical Practitioner, of being in good bodily health ; and also a small plan and estimate of drainage or other works, as a specimen of their capabilities.*

This appears to be a very desirable qualification, and, if properly used, will conduce to effective and economical expenditure of money on sanitary works, but care must be taken lest the officer remain a builder and do not become an inspector of nuisances in its full meaning. If the works be large and numerous, it is clear that the whole time of an officer might be properly expended on them, but not that of the inspector of nuisances, lest other and more important duties of his office be neglected. It is very probable that a conflict of duties will be set up which may not be easily reconciled, and should the authority obtain an efficient builder, they may deem it economical to utilise his services in that which will clearly save money rather than in other duties the necessity of which may not seem so apparent to them. The officer, moreover, may be influenced by his own predilections, for if he is acquainted with constructive operations and takes interest in them, he may prefer to superintend them rather than to perform other duties which may be less familiar or agreeable to him.

It will require watchfulness to prevent neglect of one duty by inordinate attention to another; but, in any doubt, the builder should sink into the inspector.

Further, sanitary works demand knowledge which is not necessarily possessed in the requisite degree by an ordinary builder, and it will not be easy for sanitary authorities to obtain an official on whom they may implicitly rely. The planning of any large system of drainage or water supply cannot properly be left with such an officer, but must be confided to well-known sanitary engineers, and the responsibility of carrying out such works must rest with proper contractors. Yet there will be many small works and matters of detail in which an inspector with technical knowledge may properly advise the authority as well as superintend the work.

The question of the necessity for such works on a large scale will moreover be referred to the medical officer of health, who will be the sanitary adviser of the authorities; and it is desirable that the inspector of nuisances should not assume this function, and thus place himself in competition with, if not in antagonism to, his superior officer. Even in matters of less magnitude he will do well to take the opinion of the medical officer, and, whilst fairly assuming a superior knowledge of building operations, should refer to him on sanitary and scientific questions.

But however well qualified for the superintendence of sanitary works, he will find it necessary to keep up his knowledge by reading and observation, for the science is rapidly progressing, and apparatus of improved character is constantly appearing. He must not look to either the central or local authority for instruction, yet it is just possible

that from time to time suggestions may be offered in the future, as they have been in the past, by the Local Government Act Office, embodying the experience of distinguished engineers connected therewith. Some of these will be cited further on, and, being from the pen of Mr. Rawlinson, cannot fail to command respect and do good service.

With a view to aid the inspector in the discharge of this part of his duty, I have obtained drawings of some of the chief kinds of apparatus which he will require, from the best sources, viz. Mr. Latham, Messrs. Doulton, Mr. Finch, High Holborn; Mr. G. Jennings, Stangate; Mr. Stidder, Little Guildford Street, and others, and shall devote this chapter to a description of them. They are all drawn to scale, and may be relied upon. In some instances the price might have been added, but as it varies from time to time, the quotations could not be implicitly accepted. It matters but little as to the order in which the several subjects are treated, but in the selection of subjects it seemed desirable to limit them chiefly, but not exclusively, to those of out-door work.

SECTION I.

CLOSETS AND URINALS.

Water-closets are now usually made wholly or partially of earthenware, and the former are to be preferred on the grounds of economy, cleanliness, and efficiency. Some include both the trap and the pan in one piece, whilst others have them separate, and the former may have an air-tight opening through which an examination of the trap may be made when required.

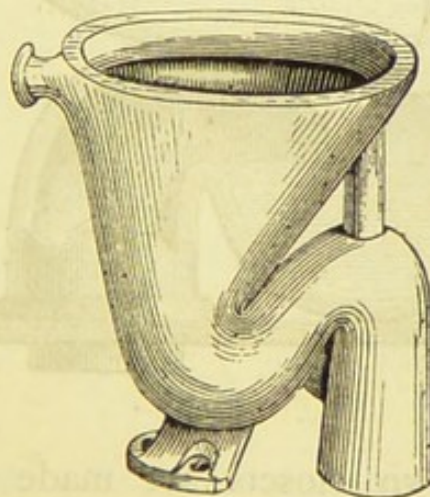
Figs. 1 and 2 represent cheap earthenware closets, which are sufficient for cottage purposes, whilst Fig. 3 represents the air-tight opening just referred to.

Fig. 1.



Fig. 2.

CLOSET IN ONE PIECE,
with flushing rim.



The pan and trap of these closets may be obtained alone or with the flushing rim, and with or without the valve and iron or brass cup and handle.

Fig. 3.

TRAP, WITH REGISTERED AIR-TIGHT OPENING.

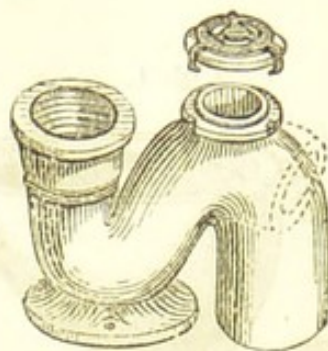
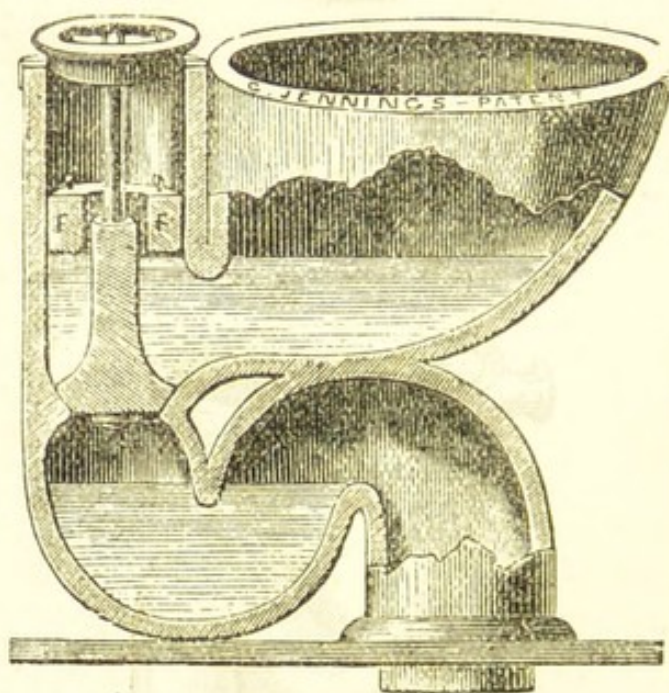


Fig. 4.

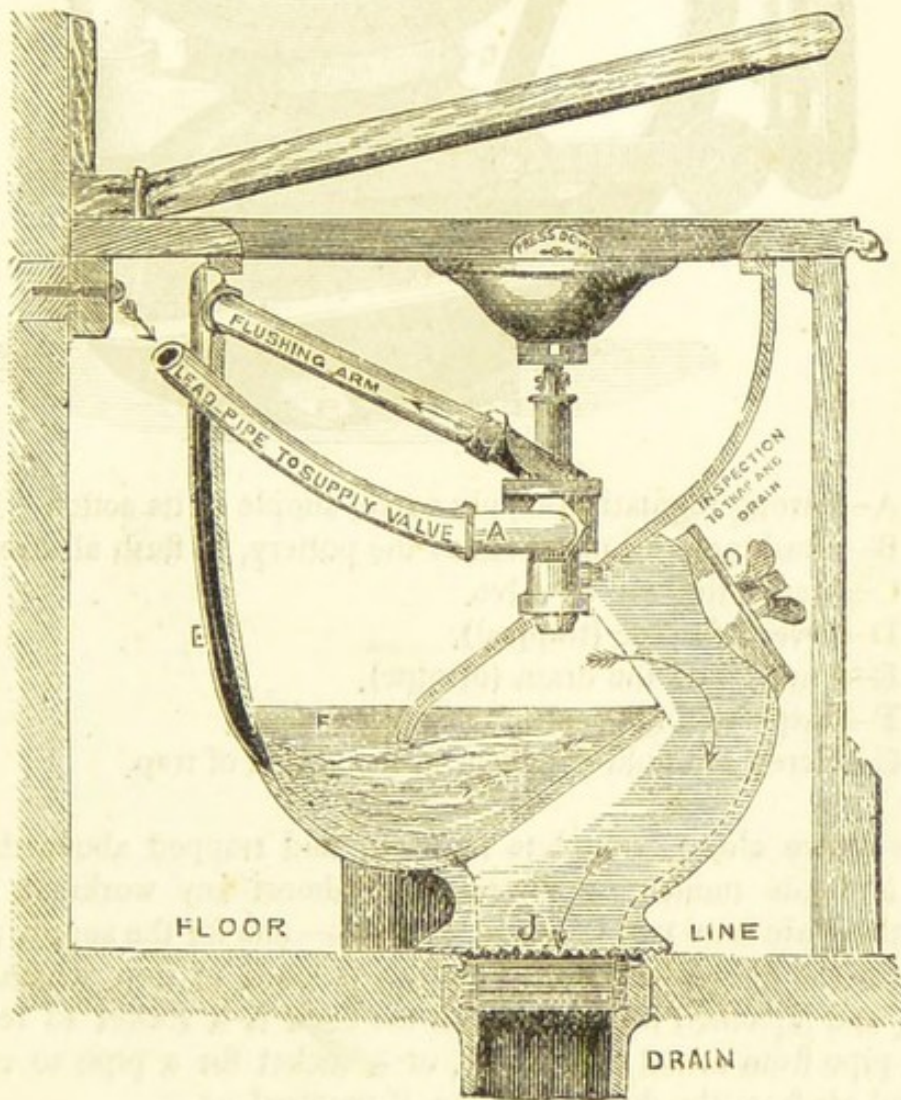
Front.



These well-known closets are made of one piece of earthenware, and fitted with a very simple and useful valve (F) for the regulation of the supply of water, as shown in Fig. 4. They are in general use.

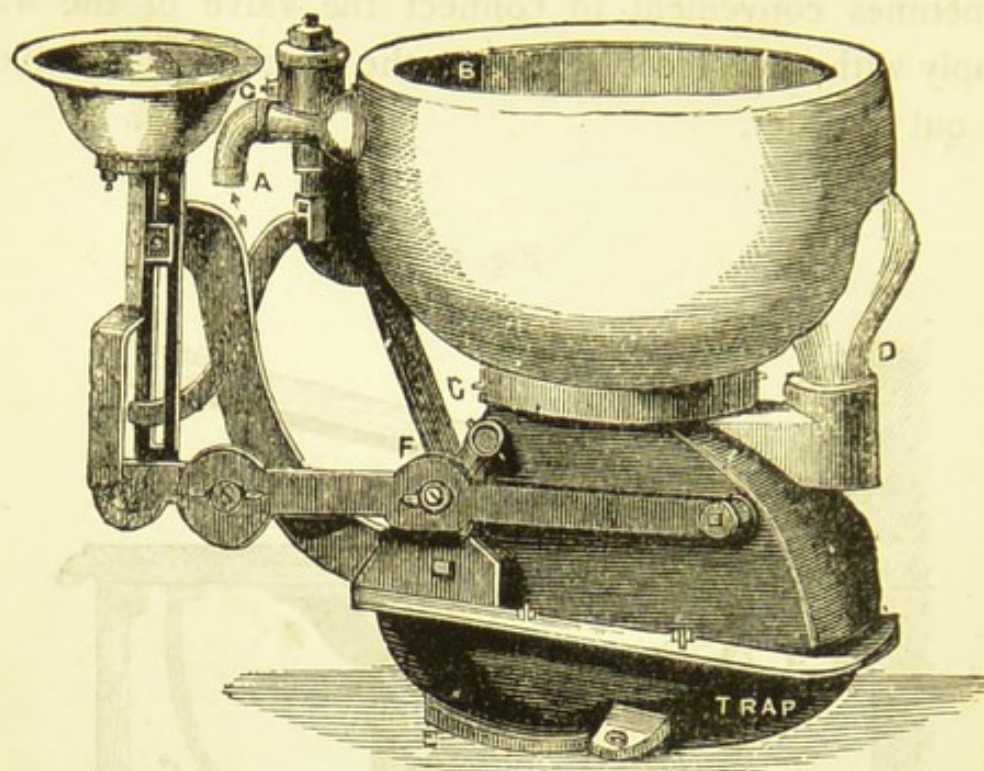
Figs. 5 and 6 represent closets of other patterns. It is sometimes convenient to connect the valve of the water supply with the closet seat, but the machinery is liable to get out of order.

Fig. 5.



These closets are made in one piece of strong Staffordshire ware, GLAZED INSIDE AND OUT, and trapped above the floor line, ready for fixing. No other trap is required. When the supply pipe is soldered to the valve A, and the putty joint made at the bottom of trap, J, the closet is ready for work.

Fig. 6.



- A—Strong regulating supply valve, simple in its action.
- B—Flushing pan, made out of the pottery, to flush all over.
- C—Regulating tap to valve.
- D—Overflow pipe (trapped).
- E—Outlet into the drain (or pipe).
- F—Inspection door into the trap and drain.
- G—Screws to hold the basin in the socket of trap.

The above closet, complete in itself, and trapped above the floor line, is made immensely strong, and almost any workman can fix it, as there are only two joints to be made—one for the supply and the other for the discharge pipe. The trap is made of iron, which is very strong and japanned inside; and on the back is a socket to receive a waste pipe from urinal or lavatory, or a socket for a pipe to carry off the foul air from the down soil pipe, if required.

Urinals are now generally made of earthenware, and those devised by Mr. Jennings have the great advantage of a lip to prevent the dripping of the urine upon the floor, but some consist of a slate trough, and are far less cleanly.

It is desirable that pottery pans should be selected and placed in an angle, or with a flat back against a wall. These, either singly or in combination, are prepared by all sanitary engineers, and scarcely need description, but the following have been selected.

Fig. 7 shows the angle urinal with self-acting arrangement and lip.

Fig. 8 represents an ordinary flushing urinal.

Fig. 7.

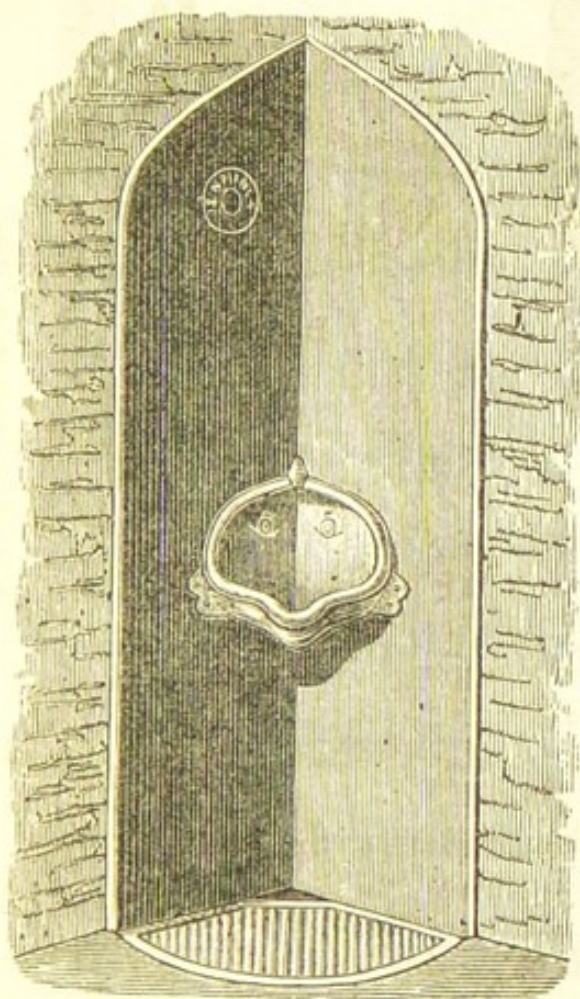
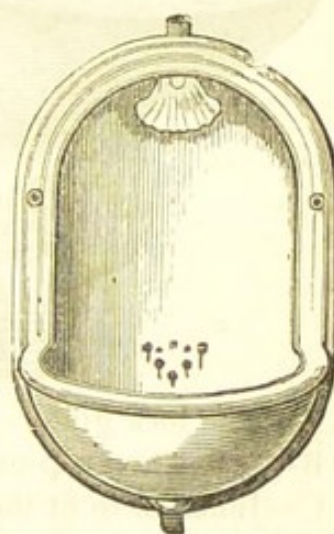


Fig. 8.

FLUSHING URINAL.



20 inches high, 11½ inches wide.

Figs. 9 and 10 show urinals trapped with the patent lock grate and Antill's trap at the bottom. The urinal and trap are of one piece of strong glazed earthenware.

Fig. 9.

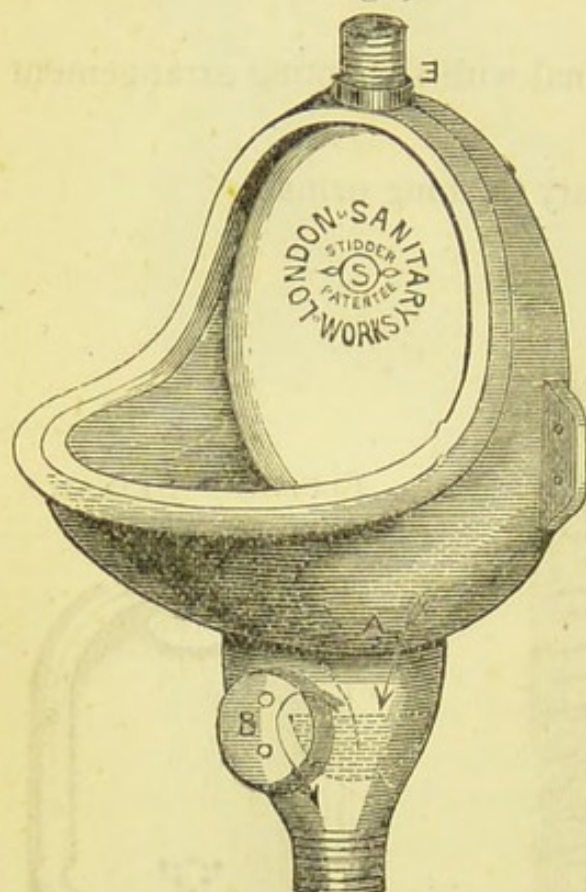
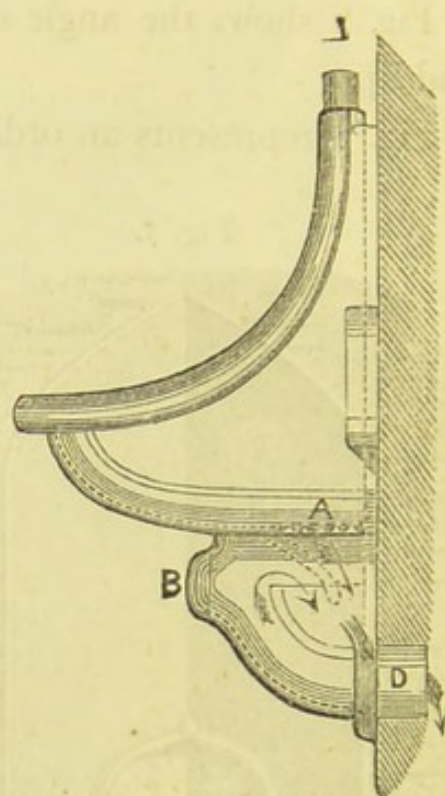


Fig. 10.



Outlet to go through the slates.

- A—The lock grate.
- B—Inspection cap on the front side of trap.
- C—Junction to fit the *earthenware pipes No. 4*.
- D—Back outlet to pass through the slates, to save the cost of lead bends.
- E—Inlet junction for flushing out the whole of the inside of urinal.

CATCH-PIT.

An eminent surgeon in Birmingham has devised an ingenious arrangement by which the urine is separated from the fæces and the solid part allowed to remain and accumulate until the box is full. Fig. 11 shows one view of this apparatus,

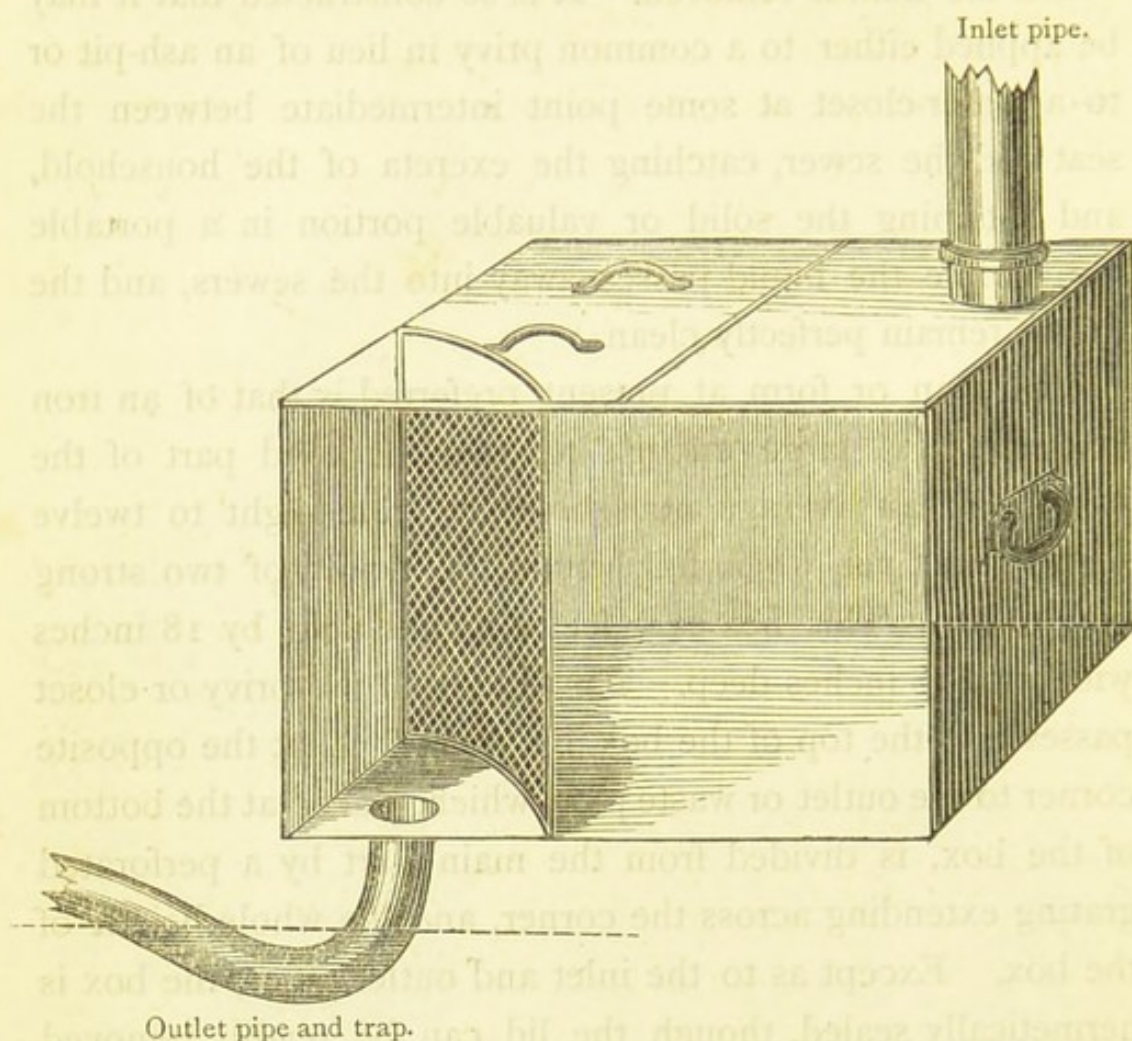
and particularly the grating, chamber-pipe, and trap through which the fluid is removed. It is so constructed that it may be applied either to a common privy in lieu of an ash-pit or to a water-closet at some point intermediate between the seat and the sewer, catching the excreta of the household, and retaining the solid or valuable portion in a portable form, while the liquid passes away into the sewers, and the drains remain perfectly clean.

The plan or form at present preferred is that of an iron box which is large enough to hold the solid part of the excreta of an average household for from eight to twelve months, and yet, when full, within the power of two strong men to lift. This box is 2 feet 4 inches long, by 18 inches wide, and 18 inches deep. The pipe from the privy or closet passes into the top of the box, by preference, at the opposite corner to the outlet or waste pipe, which, placed at the bottom of the box, is divided from the main part by a perforated grating extending across the corner, and the whole height of the box. Except as to the inlet and outlet pipes, the box is hermetically sealed, though the lid can be readily removed when it is desirable to empty it. The connection of the inlet and outlet pipes to the box can also readily be separated and re-made without the assistance of a plumber.

A full box can be removed and an empty one put in its place in five or ten minutes, and this, if necessary, may be done in the day-time, without any annoyance to the household, neighbours, or passers-by. The removed box, full as it is of most valuable manure—in fact, a human guano—may now be carted away, and its contents reduced, by a liberal admixture of fresh loam or water, to a strength suitable to the crop or soil to be fed with it.

Fig. II.

CHESSHIRE'S CATCH-PIT, OR INTERCEPTING TANK.



N.B.—In this sketch one side of the tank is taken out to show the position of the grating.

SIZE NO. I FOR WATER-CLOSETS.

—
28 inches long.
18 inches deep.
18 inches wide.

SIZE NO. I FOR THE DRY SYSTEM OUT-DOOR PRIVIES.

—
28 inches long.
18 inches deep.
18 inches wide.

FOR WATER CLOSETS.

1.—The interceptor may be fixed either above or below ground, but it must be placed in a cool situation and be carefully protected from the sun.

2.—The interceptor must have a slight fall towards the outlet. The joints should be made either with clay, putty, or india-rubber.

3.—A syphon pipe must be placed in the drain beyond the interceptor.

4.—Before the lid is fixed on with putty, a layer of *coarse* cinders, 4 inches deep, should be laid on the bottom of the inside of the interceptor.

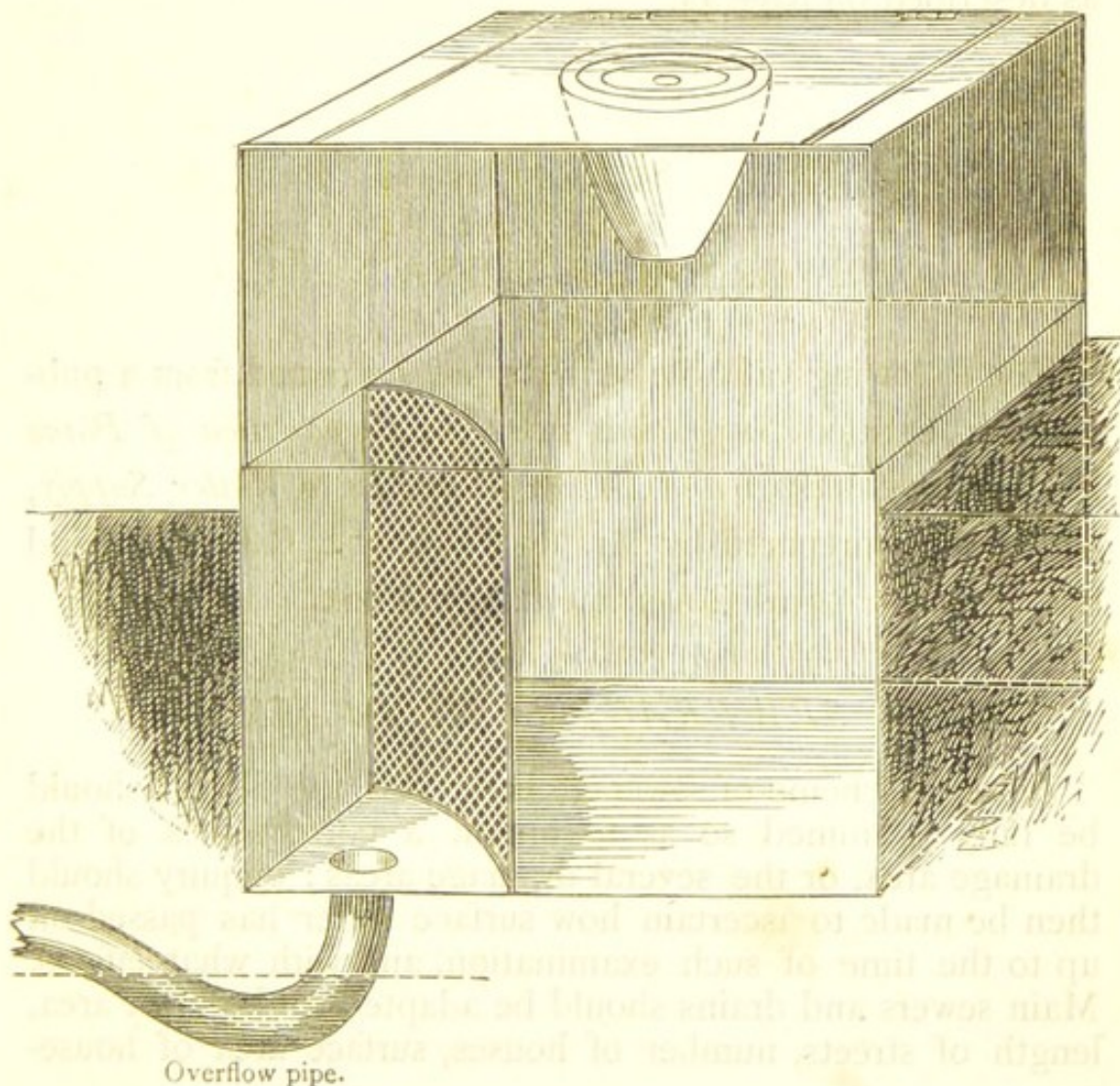
5.—When the interceptor requires emptying, some finely powdered cinder dust should be added to the excreta to absorb the moisture; when emptied, the strainer should be well cleaned, and fresh coarse cinders used.

The same apparatus is also constructed to act as an earth closet, as shown in Fig. 12.

Fig. 12.

SANITARY DRY CLOSET WITH INTERCEPTOR, COMPLETE.

The urine is allowed to flow into the drain, or into a second receptacle, as a common barrel. The dry closet interceptor may be used either with or without earth.



FOR DRY PRIVIES.

- 1.—The interceptor should be fixed, if possible, at least 2 feet below the level of the privy seat, and with a slight fall to the outlet.
- 2.—The privy seat must be made movable to admit of the interceptor being emptied.
- 3.—This interceptor is intended for out-door privies only ; it should be placed in a cool situation and be protected from the sun.
- 4.—The joint should be made with clay or putty, and should be fixed, and the interceptor should be emptied without being removed.
- 5.—In hot weather dry earth or finely powdered cinder dust may be occasionally added to the excreta to prevent decomposition.

Moule's dry earth-closets are too well known to need an illustration, but for out-door use it suffices to make a box as described on page 44.

SECTION II.

SEWERAGE AND DRAINAGE.

The following valuable remarks are extracted from a publication, entitled *Suggestions as to the Preparation of Plans as to Main Sewerage and Drainage, and as to Water Supply*, which were prepared by Mr. R. Rawlinson, C.E., C.B., and issued by the Local Government Act Office.

MAIN SEWERAGE AND DRAINAGE.

Before a scheme of sewerage is devised, the district should be fully examined so as to obtain a correct idea of the drainage area, or the several drainage areas ; enquiry should then be made to ascertain how surface water has passed off up to the time of such examination, and with what effects. Main sewers and drains should be adapted to the town area, length of streets, number of houses, surface area of house-

yards and roofs, number of street-gullies, and volume of water supply.

Sewers and drains, in wet subsoil, should be made to act as land drains.

The following rules are general. Each surveyor must, however, use his own judgment, and make the best arrangements possible, having regard to the circumstances of each special area, and the materials at command.

1. Natural streams should not be arched over to form main sewers.
2. Valley lines and natural streams may be improved, so as to remove more readily surface water and extreme falls of rain.
3. Main sewers need not be of capacity to contain flood-water of the area drained; such flood-water may be passed over the surface, in most cases, without causing injury.
4. Main sewers should be laid out in straight lines and true gradients, from point to point, with side entrances, or with manholes and flushing and ventilating arrangements at each principal change of line and gradient. All manholes should be brought up to the surface of the road or street to allow of inspection, and should be finished with a cover easily removable.
5. Duplicate systems of sewers are not required. Drains to natural streams in valley lines for storm waters may be retained, and may be improved, or, if necessary, enlarged.
6. Earthenware pipes make good sewers and drains up to their capacity. Pipes must be truly laid, and securely jointed. In ordinary ground they may be jointed with clay. In sandy ground, special means must be used to prevent sand washing in at the joints. House drains should, in all cases, be laid in a water-tight trench. If the subsoil is porous, the trench should be lined with clay-puddle. Special care should be taken to prevent any contamination of wells, by sewage from main sewer or from house drain, the water from which wells is to be used for domestic purposes.

7. Brick sewers ought to be formed with bricks moulded to the radii.
8. Brick sewers should, in all cases, be set in "hydraulic mortar," or in cement. In no case should any sewer be formed with bricks set dry, to be subsequently grouted.
9. Main sewers may have flood-water overflows, wherever practicable, to prevent such sewers being choked during thunderstorms or heavy rains.
10. Sewers should not join at right angles. Tributary sewers should deliver sewage in the direction of the mainflow.
11. Sewers and drains, at junctions and curves, should have extra fall to compensate for friction.
12. Sewers of unequal sectional diameters should not join with level inverts, but the lesser or tributary sewer should have a fall into the main, at least equal to the difference in the sectional diameter.
13. Earthenware pipes of equal diameters should not be laid as branches or tributaries, that is, 9-inch leading into 9-inch, or 6-inch into 6-inch, but a lesser pipe should be joined on to the greater, as 12-inch to 15-inch, 9-inch to 12-inch, 6-inch to 9-inch, and so on.
14. House drains should not pass direct from sewers to the inside of houses, but all drains should end at an outside wall. House-drains, sink-pipes, and soil-pipes should have ample means of external ventilation.
15. Sinks and water-closets should be against external walls, so that the refuse-water, or soil, may be discharged into a drain outside the main wall. Downspouts may be used for ventilation, care being taken that the head of such spout is not near a window. Water-closets fixed within houses, and having no means of direct day-light and external air ventilation, are liable to become nuisances, and may be injurious to health.
16. Inlets to all pipe drains should be properly protected.
17. Side junctions should be provided in all new sewers and drains. The position should be sketched,

and indicated by figures in a book or on a plan. Side junctions not used at once should be carefully closed for subsequent use.

18. A record should be kept by the surveyor of the character of the subsoil opened out in each street as it is being sewered or drained.
19. Sewers and drains should be set out true in line and in gradient. All the material used should be sound, and the workmanship should be carefully attended to.
20. "Sight-rails" should be put up in each street before the ground is opened out, showing the centre line of each sewer and depth to the invert.
21. Sewers having steep gradients should have full means for ventilation at the highest points.
22. Tall chimneys may be used, with advantage, for sewer and drain ventilation, if the owners will allow a connection to be made.
23. Sewer out-let works should be simple in form, cheap in construction, and so arranged as to remove all solids, sediment, and flocculent matter from the sewage. Some drawings of works of this character will be found at the end of these Minutes.

GENERAL REMARKS.

In executing town sewers and drains danger may be anticipated from several conditions; as where a street or place is narrow, with buildings on both sides, and where the trench is deep; where the substrata is clay or marl, made ground, loose earth, bog and silt, quicksand, or any combination of such strata.

Quicksand is most difficult to deal with, and, as a rule, such ground should only be opened in short lengths; this ground may require to be close-timbered, and in such case, stable litter and ashes will be found useful to pack behind and betwixt the "polling" boards.

Sound-looking clay or marl may require careful timbering to prevent heavy breakings from the sides of the trench. When such ground "sets" heavily, the sewer, if of bricks,

may be seriously injured ; if of earthenware pipes, it may be ruined by cracking or by crushing and distorting the line of sewer or drain-pipes.

As a rule all sewer and drain-trenches in towns should be carefully timbered, and such timbering must either be left in or be most carefully removed as the trench is filled.

The houses and buildings in narrow streets may require to be propped and stayed ; if so, such props and stays ought not to be removed until the sewer or drain has been completed, and the ground become perfectly consolidated.

In many cases it will be cheaper, because safer, to leave timbering in deep trenches, and where there is special danger the trench may be filled with concrete.

A foreman in charge of sewer-works is expected to be on the watch to see that men execute the works safely. The local surveyor must see that timber sufficient in quantity and in quality is supplied to secure all open trenches, and the buildings on either side.

Where ground is known to be specially dangerous, all available precautions must be taken to prevent accidents.

It is of the utmost importance to impress upon local surveyors the necessity of care in setting out main-sewerage works and house-drains with accuracy, in choosing sound materials, and in properly superintending the works during their progress. House-drains should be so arranged as to be capable of removing all water, soil, and fluid refuse from yards, roofs, and interiors of houses to the sewers, without any risk of gaseous contamination to such houses.

Street sewers should be capable of conveying all sewage to some common outlet, without retaining sediment in them. All sewers and drains should have arrangements for full ventilation, at such points and in such manner as not to cause any nuisance. Charcoal (as proposed by Dr. John Stenhouse) may be used to filter and disinfect sewage gases, at manholes, and other ventilators.

If the fluid sewage can be applied to land for agricultural uses, means should be provided for effecting this purpose.

Water-closets should have a day-light window (not a "borrowed light"), and fixed means of ventilation, which can neither be seen nor tampered with. Permanent openings, equal to a slit 12 inches in length and 1 inch wide,

should be provided. The cover, or lid of the seat, should be made to close and leave the valve handle free, so that the contents of the closet may be discharged with the lid closed down. At all times when a water-closet is not in use the lid or cover should be closed.

Manholes should have movable covers at the surface of the ground. There should be a side chamber for ventilation, "step irons" to give access to the invert, and a groove to allow of a flushing board being inserted at will for flushing purposes. The side chamber should be arranged for a charcoal screen or filter.

Fig. 13 exhibits a system of ventilation of sewers which has been successfully brought into use. The figure shows the usual manhole and shaft with movable iron cover, made to prevent the passage of sewer air. Across the shaft are laid two or more movable charcoal filtering-screens, through which the sewer-gas, disinfected by the charcoal, passes into a side ventilating chamber and thence through one or more open gratings into the street. The chamber is intended to receive any solid matter falling in from the street, which can be removed, when necessary, by a slide at the lower end of the chamber. In a hilly town the system of sewerage should not be so connected as to permit an accumulation of sewer gases in the higher parts of the district. In such cases, the main-sewer should be divided by steps, or falls, with a flap-valve at the discharging end of the sewer, as shown in Fig. 13, to compel the gases to pass through the ventilating shaft, rather than to be allowed to traverse the entire line of sewer from the lowest levels to the summit levels.

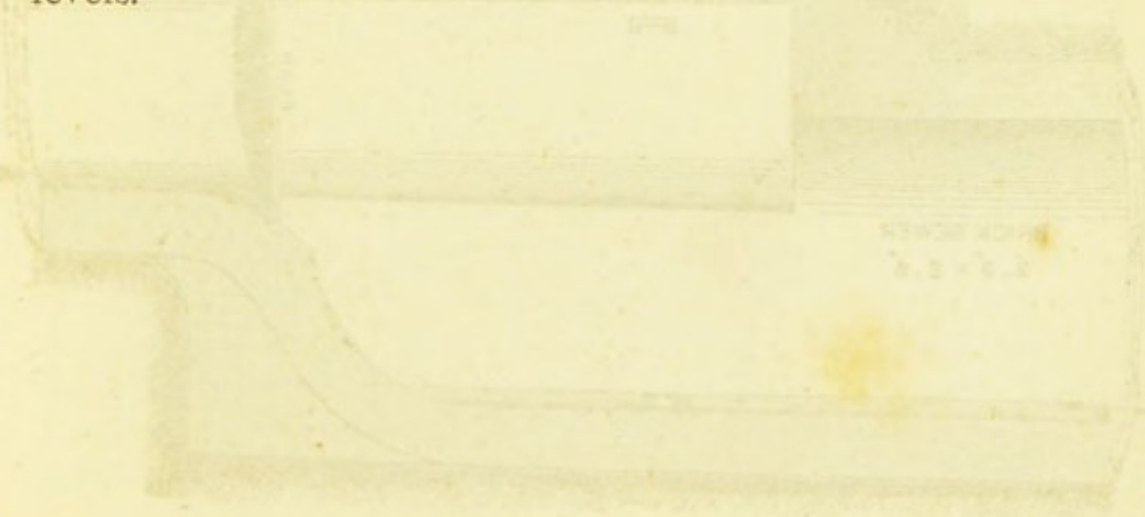
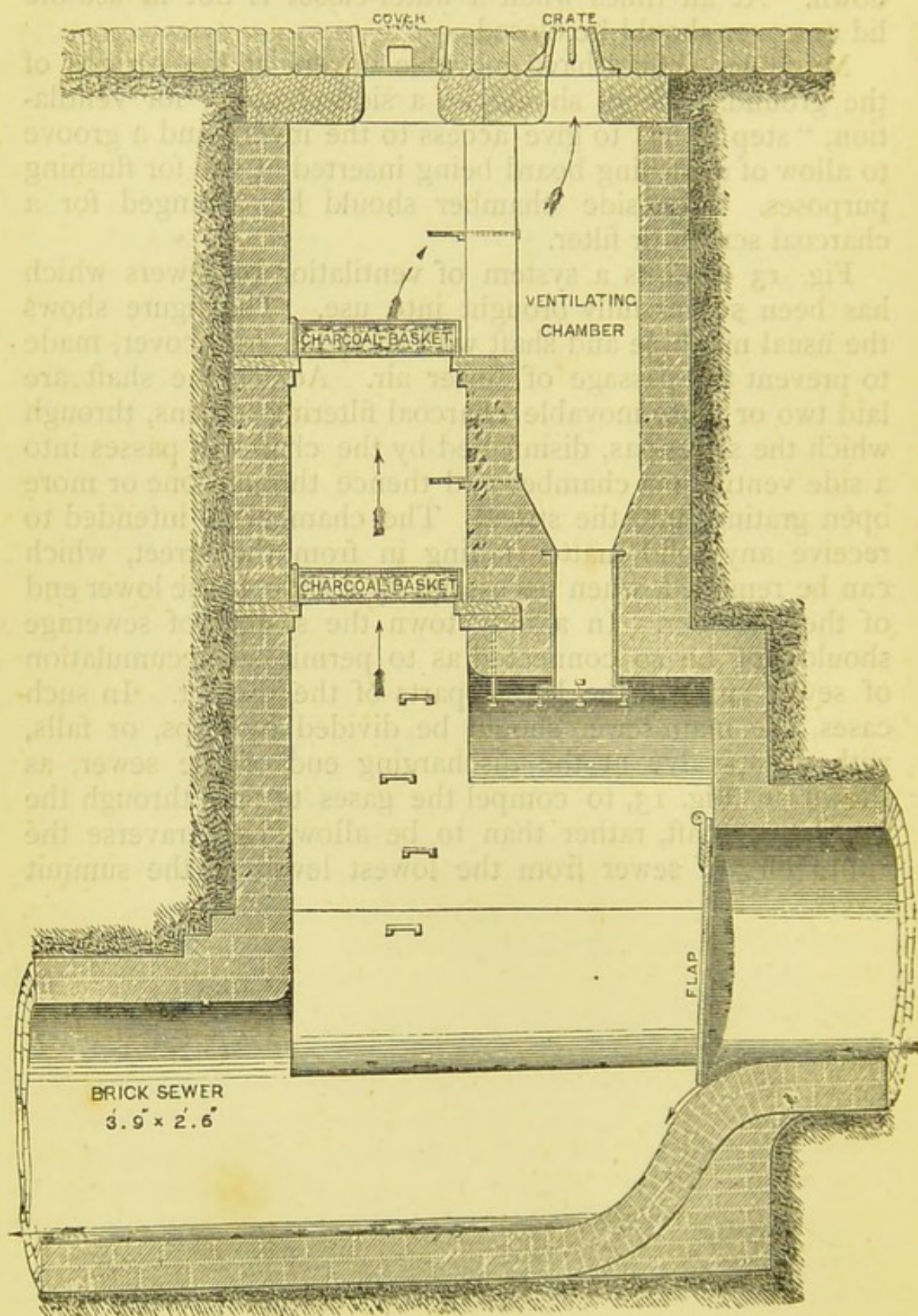


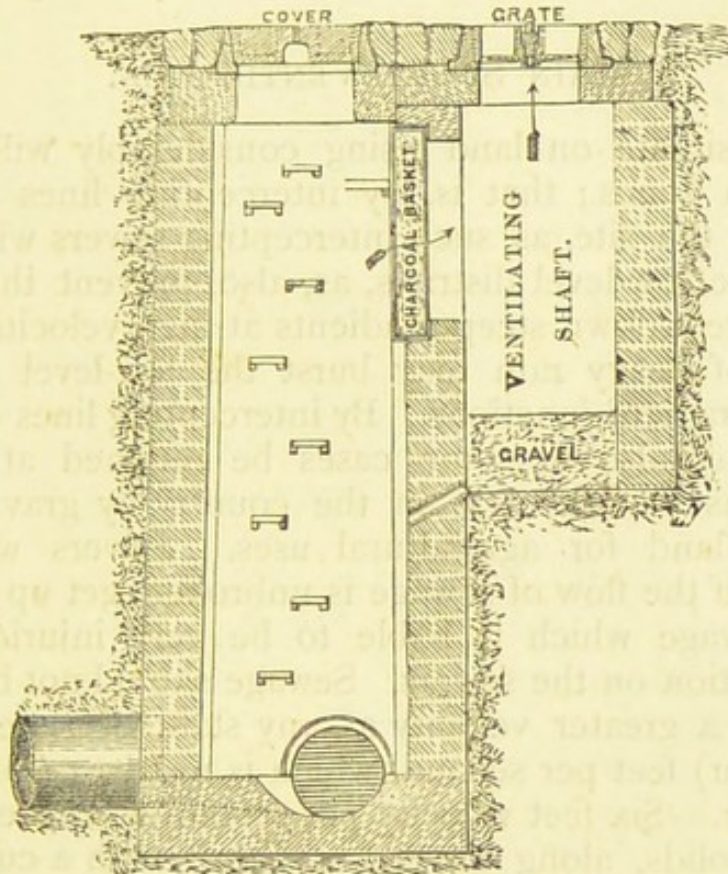
Fig. 13.

MANHOLE, TUMBLING BAY, AND DOUBLE VENTILATING
ARRANGEMENT.

The usual method of ventilating pipe drains is shown in Fig. 14, where the charcoal screen is placed vertically between the manhole and the ventilating shaft.

Fig. 14.

MANHOLE AND VENTILATING SHAFT.



Earthenware pipes of 4 inches in diameter are sufficient for water-closets and sinks; these may join drains of 6 inches, the 6 inches joining 9 inches, 12 inches, and 15 inches, and these forming a tributary main, or passing to a main sewer.

It is frequently necessary to carry the outlet of a sewer to a river having a low summer level and a high or flood level. To prevent nuisance arising from the sewage running over the surface at low water, a plan such as that adopted at Windsor Castle has been found to answer. An iron pipe was fixed at the bottom of the sewer with a slight dam in front of the junction. This simple arrangement insured the discharge of all the ordinary sewage below the summer low-water level, while the brick sewer above gave free passage

to the storm water, and the flap-valve and manhole ventilation to prevent the wind driving any sewage gases backwards toward the Castle.

A sewer, 4 feet high and 3 feet wide, might be required for the removal of storm water; while an iron pipe, 12 inches in diameter, would remove all the ordinary sewage.

MAIN SEWER VENTILATION.

Towns situate on land rising considerably will best be sewered in zones; that is, by intercepting lines of sewers contouring the site, as such intercepting sewers will prevent gorging the low-level districts, as, also, prevent the rush of sewage direct down steep gradients at high velocities, which in times of heavy rain may burst the low-level sewers at the steep gradient junctions. By intercepting lines of sewers, sewage may also in some cases be retained at such an elevation as to deliver it in the country by gravity, on to and over land for agricultural uses. Sewers with steep gradients, if the flow of sewage is unbroken, get up a velocity in the sewage which is liable to be very injurious in its wearing action on the sewers. Sewage should not be allowed to acquire a greater velocity at any state or time of more than 4 (four) feet per second, which is nearly 3 (three) miles in the hour. Six feet velocity per second will take any grit, or other solids, along the sewer invert with a cutting and disintegrating action rapidly destructive to the material of the sewer.

Main sewers are underground conduits for sewage to flow down, and if they are not fully ventilated at regular intervals along the crown by fixed openings communicating with the external air, they become flues up which sewage gases will rise and pass through the drains to the connected houses.

Sewers formed along steep gradients therefore require to have more care bestowed on the means for ventilation than other sewers laid along flat districts, to prevent dangerous accumulations of sewage gases in the upper districts of towns. Sewers rising from lower and flatter districts should therefore have manhole or "*side entrance*," tumbling-bay, and double ventilating arrangements. This form of tumbling-

bay should be repeated on the steep gradient at intervals of not less than 300 yards.

Ordinary main sewer ventilation should be provided for on all sewers at intervals not greater than *one hundred yards*, or not fewer than 18 fixed openings for ventilation should exist on each mile of main sewer.

The upper or "*dead ends*" of all sewers and drains should have means provided for full ventilation continued beyond the junction of the last house drain.

Provision should be made for the use of charcoal screens on all manholes. Charcoal will not, however, be required in all cases, and should only be exceptionally used, as it retards ventilation.

Steam-boiler or other furnaces and tall chimneys may be used for sewer ventilation where the owners of factories and of steam engines will permit of such use, but the ordinary means for sewer ventilation must not on this account be dispensed with, as the ventilating effect of a furnace or tall chimney will be limited to a comparatively short length of the sewer, by the number of openings into the main sewers, such as house drains, street gulleys, &c.

Separate costly tall shafts or furnaces for main sewer and house drain ventilation are not required, and should not be provided, because such works cannot be of use in proportion to their cost. Sewers cannot be ventilated as tunnels and coal mines are in which close airways have to be provided and also kept under control.

Sewers liable to be affected by the rise of tides or land floods, as on the sea-shore, or on a river, must be so arranged that any backing of the sewage shall not injuriously affect the sewers and drains within the town. The lower portion of any system of sewers below the level of high water of the sea, or land floods of an inland river, must therefore be cut off from the upper portions, and must be so abundantly ventilated that any sewage gases may be forced out at points specially provided for the purpose, and not be driven inwards and up the steeper sewers of the town through the drains and into the houses.

The ends of all sewers and drains at the lowest outlets must be so protected that the wind cannot blow in and force any sewage gases back to the streets and houses.

Flap-valves, or other contrivance, may be provided to cover and protect outlet ends of sewers and drains, and so prevent the wind blowing in.

Means for full and permanent ventilation of town sewers and house drains are required to prevent stagnation or concentration of sewage gases within sewers and drains, and with numerous openings from the sewers to the external air, as described, there will be unceasing motion and interchange betwixt the outer air and the inner sewer air which will bring about and maintain extreme dilution and dispersion of any sewage gas so soon as generated. It has been found by experiment that in unventilated sewers the gas concentrates and so becomes deadly,* whilst in fully ventilated sewers the sewer air is purer than that of stables, or even than in a public room when occupied. The air from well ventilated sewers is not offensive to the sense of smell. If, however, sewer air at any sewer ventilator, or at any other point, should be offensive, additional means for ventilation on this sewer or at this point are required and should, as soon as possible, be supplied. Trapping should not be resorted to in such case.

If cesspools are required for any purposes, they should be made watertight, and be placed as far from wells and dwelling-houses as possible, and should be abundantly ventilated.

Dust-bins should also be fully ventilated.

Ventilation cannot be fully accomplished through single tubes or openings. There should never be less than two passages, or any tube or pipe must be divided by a diaphragm.

Where charcoal is used in sewer ventilation, it must be understood to retard motion, and provision should be made to meet this. Charcoal trays, or boxes, for sewer ventilation should never have less than 1,000 square inches of surface exposed for the passage of sewage gas to each 50 square inches of free opening to the outer air. The meshes of a charcoal tray may be about $\frac{1}{8}$ of an inch. The charcoal (wood) may be about the size of coffee beans, clean sifted, and placed in a layer of two or three inches. Charcoal

* Men have lost their lives by entering unventilated sewers on many occasions in London, as also in other places.

in a dry state acts best ; but its disinfecting property is only diminished by damp, it is not entirely destroyed. The length of the intervals betwixt the renewals of the charcoal will depend upon the dryness of the situation where the material is placed, and the volume and strength of the gas to be acted upon. In some cases two or more charcoal trays may be used apart, one above the other, so that the gas to be acted upon may have to permeate and pass through the whole of the trays. The charcoal may require in some places to be renewed at intervals of six months.

For detached houses, villa residences, or larger establishments, drains should never end at the house to be drained, but should be continued beyond and above to some higher point or ventilating shaft where means for full and permanent ventilation can be provided so as effectively to relieve the house from any chance of sewage gas contamination.

Drains should never traverse the basement of any house, but should be external ; if, however, there are drains within a basement, and crossing it, such drains should be absolutely air-and-water-tight within such basement and have full means for permanent ventilation provided outside at both sides of the basement. Pipes of earthenware may be bedded in concrete ; in some cases pipes of cast-iron may be used within house basements.

All drains should lie their full diameters below the surface of the subsoil of any basement, and have a fall of not less than 1 in 60 towards the sewer. The full half-diameter of the sewer (at least) should be below the junction of the house drain.

Wherever a trap is placed on a sewer or drain, there should means for sewer and drain ventilation be placed also. Traps are only safe and useful in conjunction with full and permanent means for sewer ventilation.

It has been suggested that sewer and drain ventilation will so taint the atmosphere within and over a town as to cause houses at a lower level to pollute those situate at higher levels. This result need not be feared, as, with the abundant means for ventilation suggested the air within the sewers will be comparatively pure, so pure in fact that the most delicate test will be required to find the presence

of sewage gas at the immediate outlet of any ventilator, and out of the ventilator further dilution and dispersion will dissipate every trace of taint and danger.

FLUSHING SEWERS AND DRAINS.

On a system of sewers every manhole should be a flushing-chamber, so managed as to be charged with water for flushing purposes. There should also be a flushing-chamber at the head of each sewer and drain. Where there is a public supply of water, the flushing-chambers may be filled from the mains; where there is no such public supply, they may be filled by water-cart. Flushing a sewer means accumulating water sufficient to pass down and along the sewer below with a rush when suddenly liberated, which water shall loosen and carry away all sediment. Leaving house-traps open, and propping the handles of water-closets will not flush drains and sewers, but will only waste water. It is possible to injure sewers by overflushing them, and it is therefore the duty of a local surveyor to understand this, and to avoid it.

With sewers in right lines, and even gradients, from manhole to manhole (as directed to be made), the surveyor can first float a light cord from one manhole to the other below, then draw along a stronger rope to which scrubbers may be attached to cleanse effectually such sewers as have very little fall, and are consequently liable to accumulate deposit.

An ordinary amount of subsoil water may be admitted into the sewers with advantage, as the regular flow will tend to prevent any silty deposit, and the dilution will tend to lessen the putridity of the sewage. Sewers formed in and along a naturally dry subsoil are liable to accumulate deposit by allowing the fluids to filter into the subsoil. The trench should therefore be made water-tight before the invert of the sewer is laid in it.

Springs of water, if of considerable volume, may require to be removed from a sewer trench independently of the sewer, to prevent this surplus water usurping the place of sewage.

Springs of water, and the water from canals, reservoirs, rivers, and streams, may occasionally be so near as to be easily made available for purposes of sewer-flushing. Where

this is the case, it will be of great advantage to the local surveyor to arrange for such flushing power being made available.

Sewers and drains perform good service when they permanently lower the subsoil water within a town or near houses, and if this draining of the subsoil lays adjoining springs, wells, and pumps dry, no action at law will lay against the local authority. There is no private ownership in underground water which is capable of being removed by sewerage and draining.

INVERT AND JUNCTION BLOCKS.

The patent invert and junction blocks are adapted to the construction of brick sewers, as shown in Figs. 15, 16, and 17.

Fig. 15.



Fig. 16.

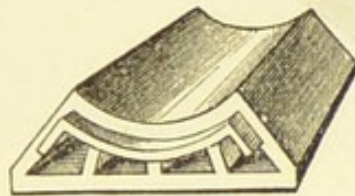
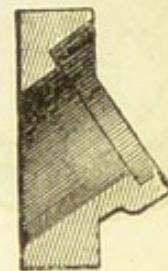


Fig. 17.



The invert blocks form a glazed, even, and imperishable surface for the bottom of brick sewers, and a sure foundation for the structure. They may also be had with the patent lip.

The junction blocks make the connection between pipe drains and brick sewers perfect and secure. Each block is formed to correspond in thickness, and with the internal figure of the brick sewer.

POTTERY CONDUITS.

Conduits of very large as well as of small dimensions are made of well burnt clay and glazed by many potters, and are exceedingly clean and strong. The following figures represent a ready means of constructing channels for sewerage, irrigation, and similar purposes.

Fig. 18. (Perspective view.)

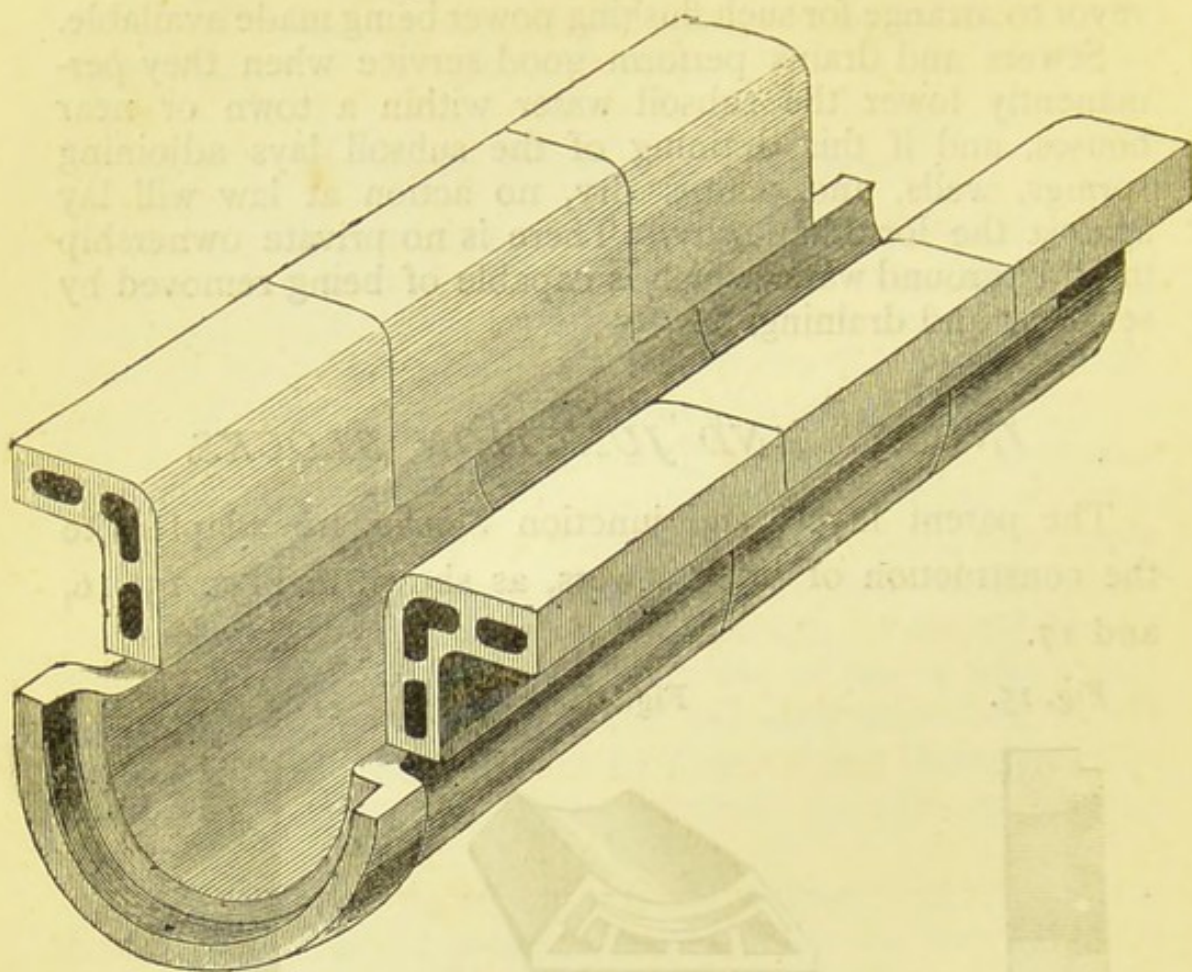


Fig. 19. (Section.)

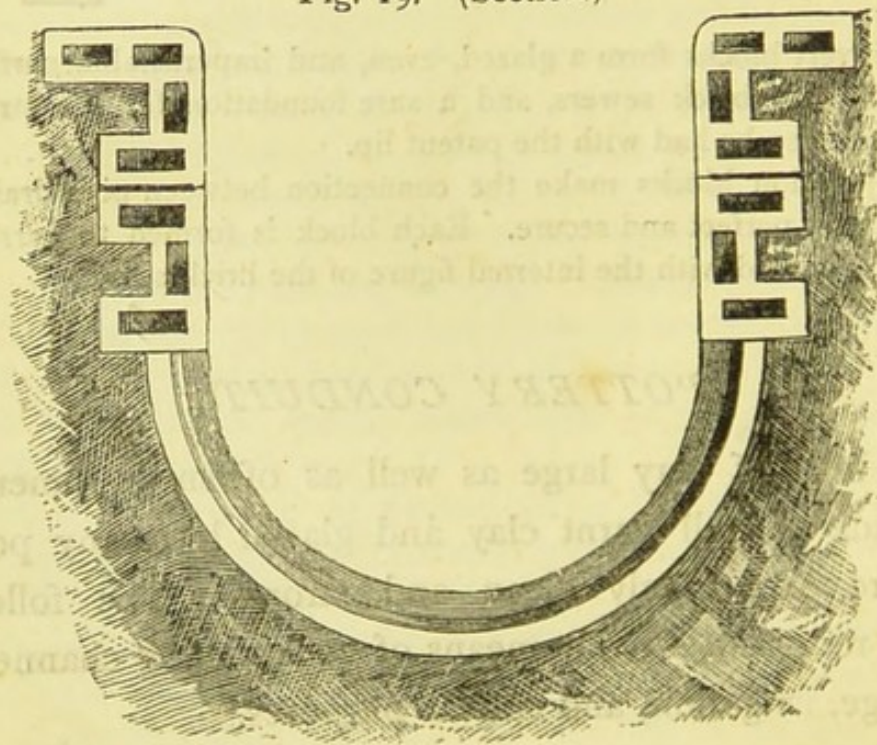
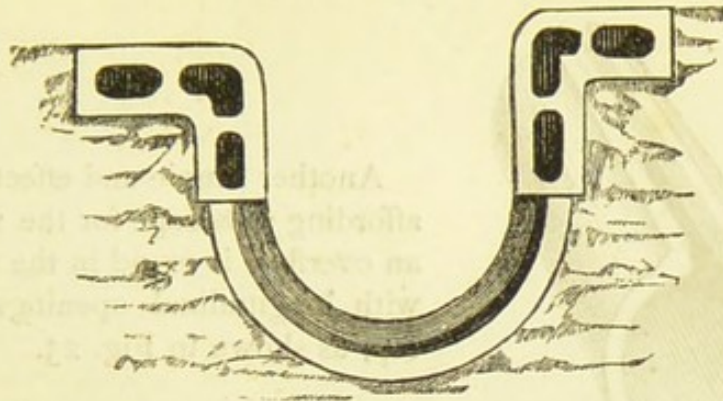
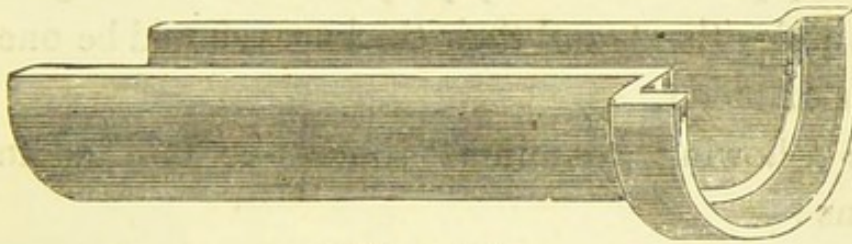


Fig. 20. (Section.)



These main distributing carriers are made from 9 inches up to 30 inches in width, and their capacity may be increased by the use of an intermediate tile to raise the coping as in Fig. 19. If considered necessary, these tiles may be supported and held together by a backing of concrete.

Fig. 21.



With sockets.

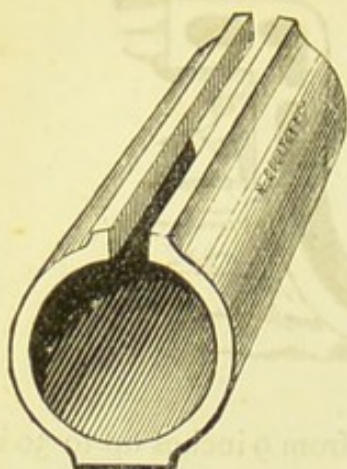
Fig. 22.



Without sockets.

These channels may be had either with or without sockets, as shown above. A further improvement is attained by the use of moulded copings of the same material, which, placed upon invert of the different sizes, form enlarged conduits suitable, in their varying dimensions, for all circumstances. The flange or projection at the top of the coping is so made that, when required, one side may be fixed lower than the other, so that the overflow passes from such lower side only, the other flange forming a clean and readily available foot-path for the attendant.

Fig. 23.



Another simple and effective mode of affording a passage for the sewage with an overflow is found in the use of pipes with longitudinal openings along the top, as shown in Fig. 23.

DRAIN PIPES.

Drain pipes for sanitary purposes should be glazed both within and without, and their thickness should be one-twelfth of their diameter.

The following conditions should be inserted in specifications :—

All pipes shall be truly cylindrical, and the spigot end of every pipe shall fit into the socket, leaving only the thickness of joint specified, which thickness of joint is the maximum size. The spigot end of each pipe shall be finished with a projecting fillet which shall fit into the socket, leaving not more than $\frac{1}{16}$ of an inch clearance all round the pipe. Any special pipes that may be required shall be truly shaped, and care shall be exercised to see that they joint properly with the straight pipes. The sectional area of every pipe shall be truly concentric, and any pipe in which the thickness of metal varies in any one place more than a fourth of the specified thickness shall be rejected.

The following figures represent the system of drain pipes arranged by Mr. Jennings, with the pipe, inverts, half-sockets, and junctions necessary for that purpose, and the mode of laying them down.

Fig. 24.

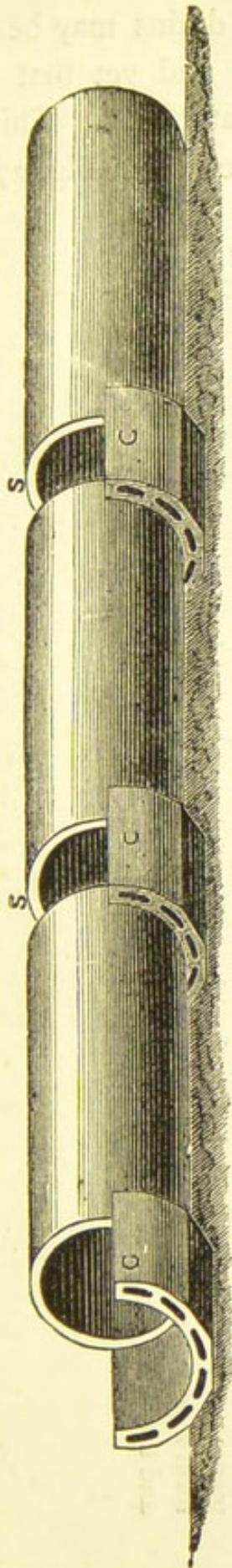


Fig. 24 shows a line of pipes laid and waiting inspection, the openings S S enabling those interested to see if the pipes are correctly laid and jointed. The correctness of the fall may also be practically and easily proved by pouring water into any of the openings. If all is found correct, the introduction of the short piece (Fig. 25) in the openings S S (Fig. 24) completes the line of drain. The half-sockets being previously luted with soft clay renders the upper portion of the joint perfectly sound.

Fig. 25.

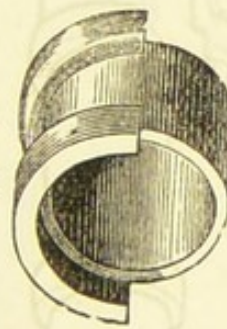
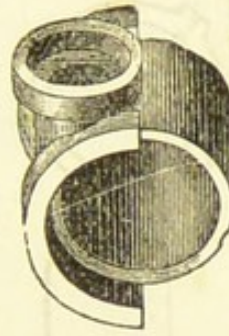


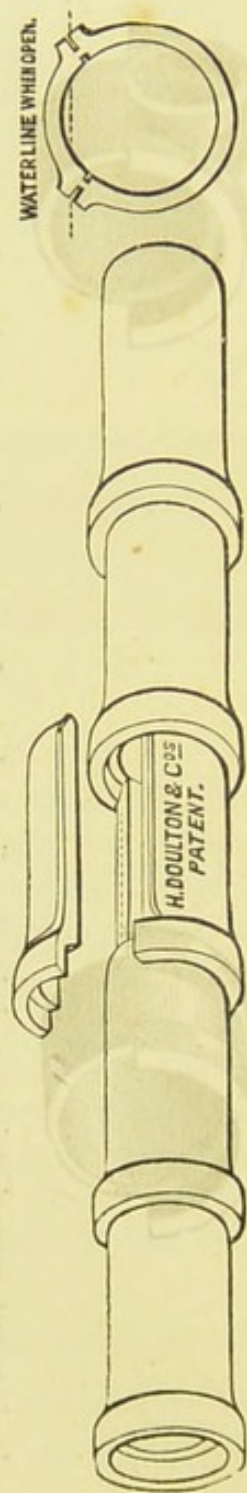
Fig. 26.



In laying out new districts, and in the formation of new roads, streets, &c., the drainage may be laid complete without the introduction of ordinary junctions. When house is added to house, and it is desired to effect a junction with a finished line of pipes, the workman has only to raise one of the plain short pieces (Fig. 25), and substitute for it a similar short piece having a junction on it of the required size (Fig. 26), which, by reversing, is applicable to either side of the street, and again completes the line of street drain.

It is very desirable that the inside of drains may be inspected without breaking the drain pipe, and yet that the opening into the pipe shall be air- and water-tight. This is effected by patent opercular or lidded pipes, as in Fig. 27.

Fig. 27.



The intention of these pipes is to afford those who desire it an opportunity of examining and cleansing them, and, unlike all other contrivances for this object, the entire length of pipe may be thrown open without any accompanying disadvantage.

The thickness and strength of the pipes are increased by two ribs running lengthways, through which a partial division is effected in the process of manufacture, both internally and externally, leaving sufficient material to preserve strength and soundness. The pipes are thus fired in one piece, and perfect accuracy of form is secured. By the insertion of a chisel at the ends, the upper pieces may, at any time, be detached without the slightest risk, and afterwards replaced, so as to form a perfect and accurately fitting cover; or the lids can be removed when the pipes are laid, and the drain tested as to its fall and the accuracy of the joints before they are replaced.

Drain pipes, bends, junctions, and syphon traps, are made in every variety by numerous manufacturers.

Fig. 28.

STRAIGHT TUBES, WITH SOCKET JOINTS.



Half-socket pipes, to be used exclusively or at intervals with whole sockets, are also made.

Pipes of 21-inch, 24-inch, and 30-inch bore, in 2-foot 6-inch or 3-foot lengths.

BENDS.

Fig. 29.

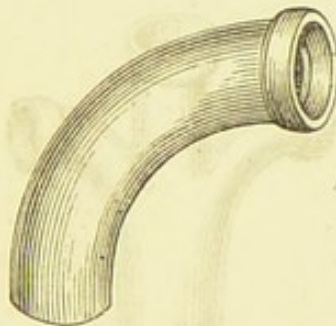
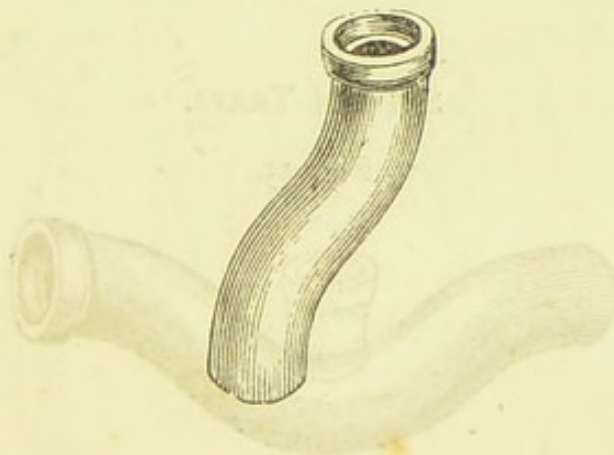


Fig. 30.



SINGLE JUNCTIONS.

Fig. 31.

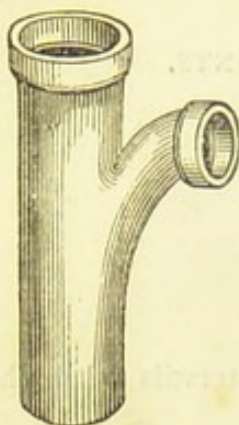


Fig. 32.

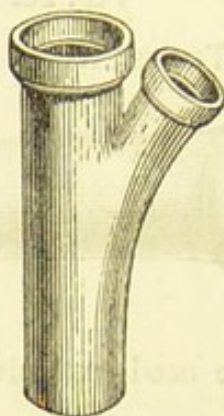
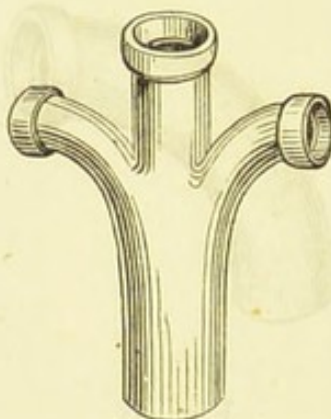
Fig. 33.
Taper pipe.

Fig. 34.

DOUBLE JUNCTIONS.



SYPHON TRAPS.

Fig. 35.



Fig. 36.



Fig. 37.



GULLIES AND TRAPS.

When gullies are built of bricks, the following block traps will be useful.

Fig. 38.

PATENT BLOCK TRAP for building in brick gullies. The 6-inch size ordinarily used.

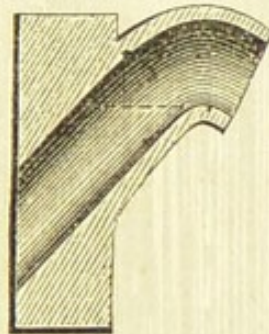
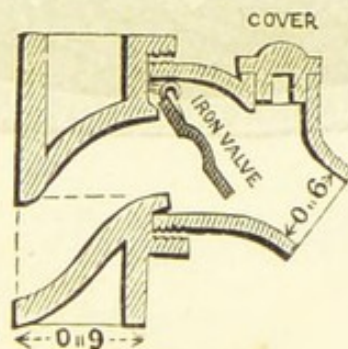


Fig. 39.

BLOCK TRAP for building in brick gullies, with combined valve and syphon trap and inspection hole, fitted with cover.



Figures 40 and 41 represent Jennings' patent gully traps.

Fig. 40.

GULLY TRAPS, with outside iron cases and strong grates.

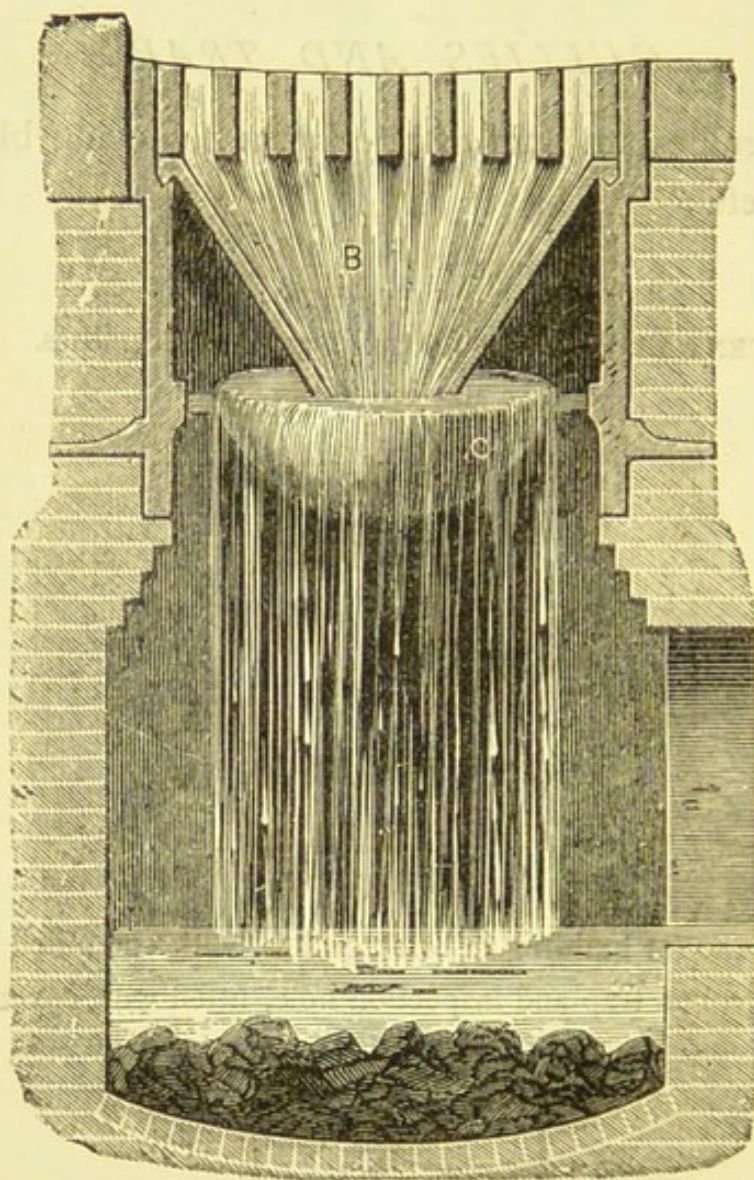
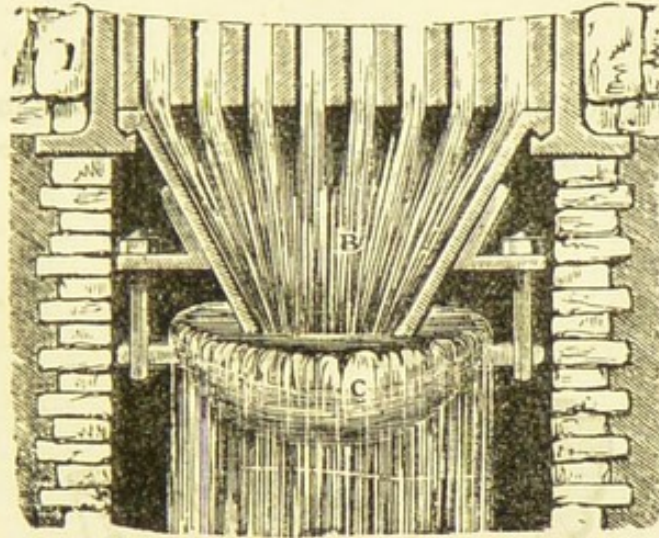


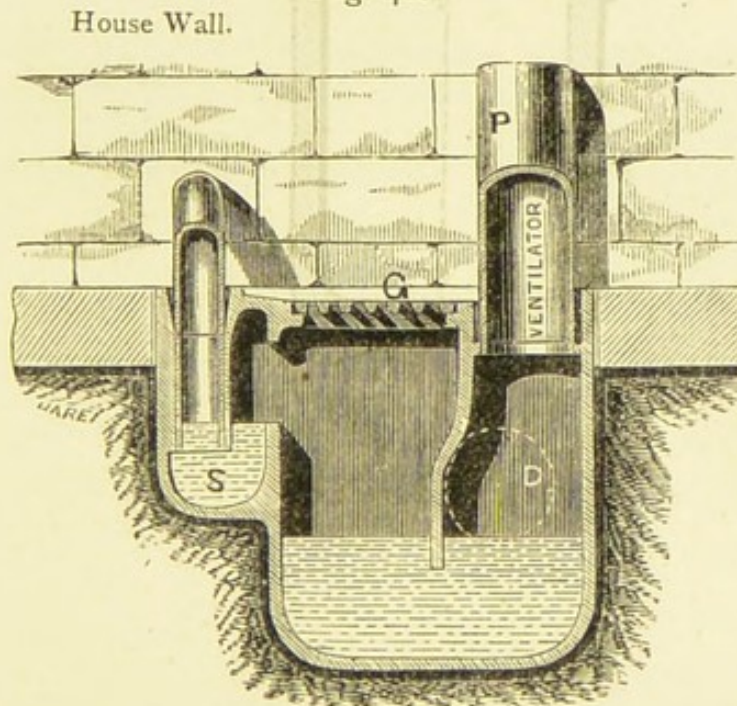
Fig. 41.

SKELETON GULLY TRAPS, with strong grates and frames to rest on stone or brickwork as shown.



Mansergh's patent house, sink, yard, and ventilating trap is also manufactured by Jennings, and is shown in Fig. 42.

Fig. 42.



Section A B.

Stoneware gullies have the advantage over brickwork in that there are fewer joints through which leakage may take place, and there are many varieties, as shown in the following illustrations.

GULLIES, suitable for main roads and streets, are made in one piece of extra strength, 18 inches diameter, and 4 feet deep.

Fig. 43.

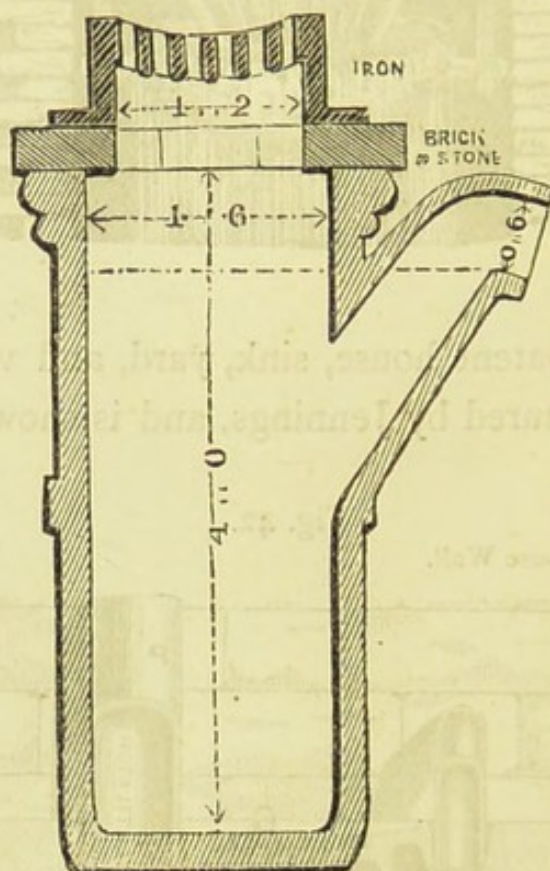


Fig. 44.

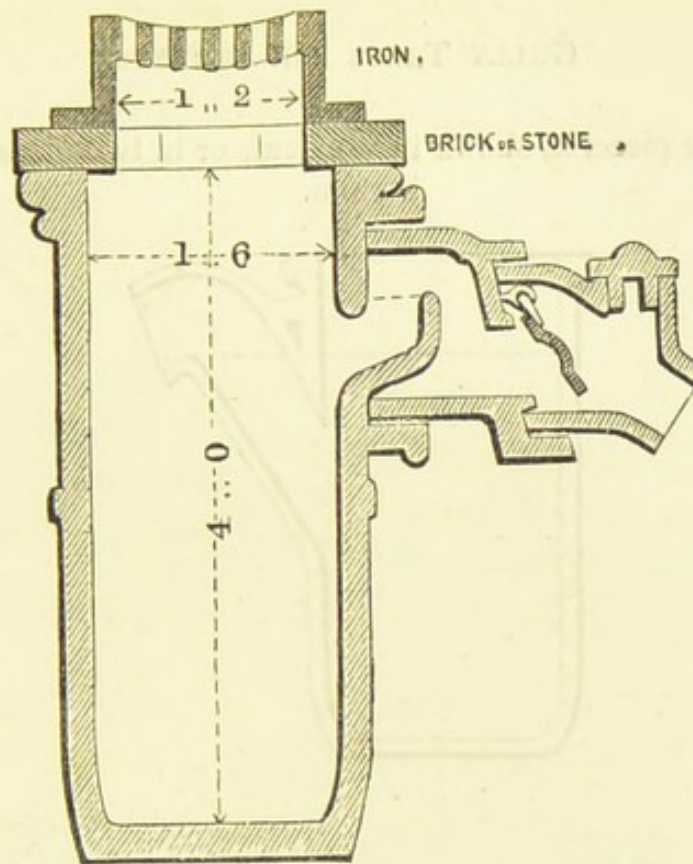


Fig. 43 has the ordinary syphon trap.

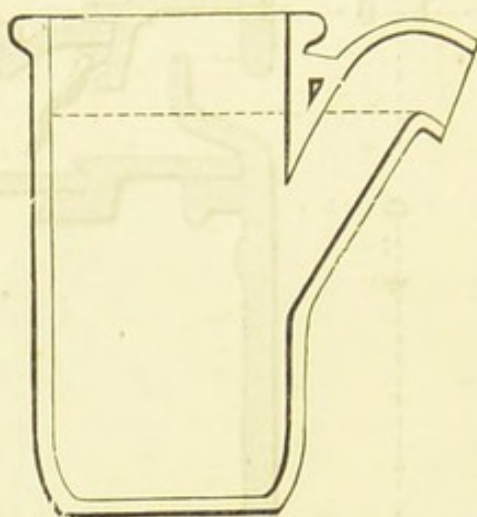
Fig. 44 has a valve trap in combination with the ordinary syphon trap, thus giving double security in preventing the exhalation of noxious gases.

The woodcuts show the best mode of fixing brick or stone top and iron grating.

Fig. 45.

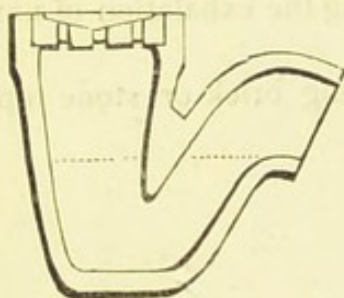
GULLY TRAPS FOR STREETS.

Made in one piece, as shown in woodcut, or in two pieces with loose bottom.



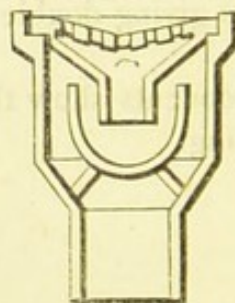
YARD GULLIES.

Fig. 46.



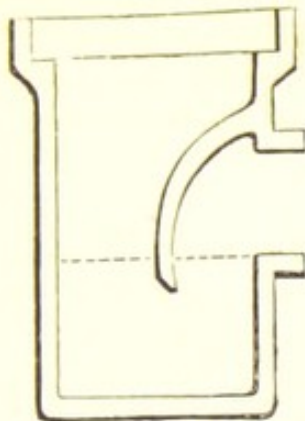
8 inches square at top,
4-inch outlet.

Fig. 47.



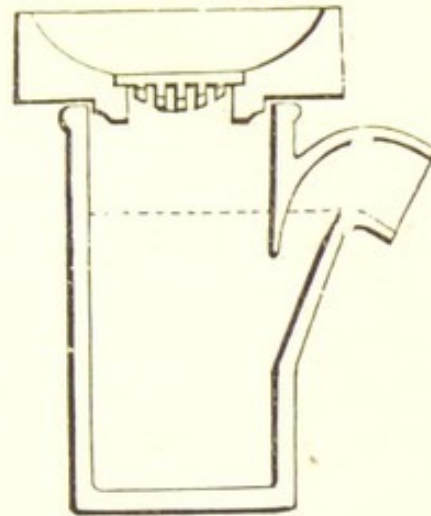
8 inches square at top,
4-inch outlet.

Fig. 48.



4-inch outlet,
8½ inches square inside.
Iron grating, extra.

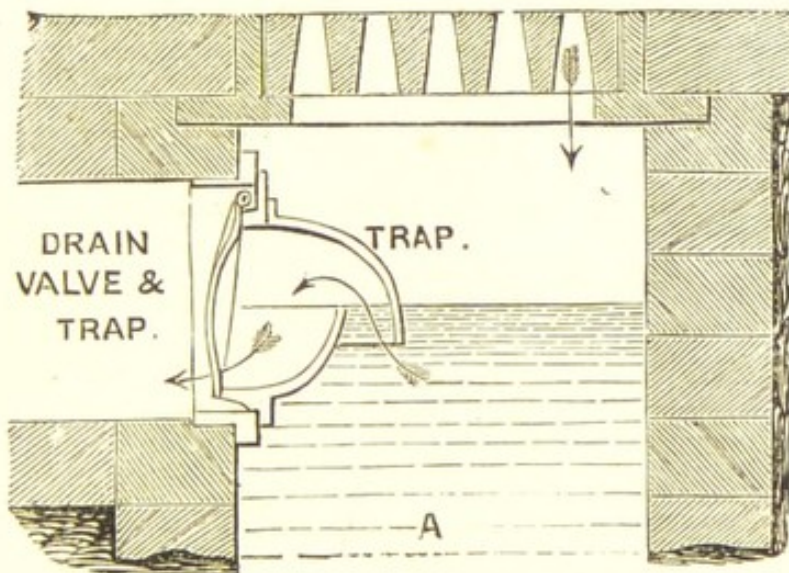
Fig. 49.



9-inch diameter, 4-inch outlet.
Dish cover with iron grating, extra.

Fig. 50.

STREET GULLY.



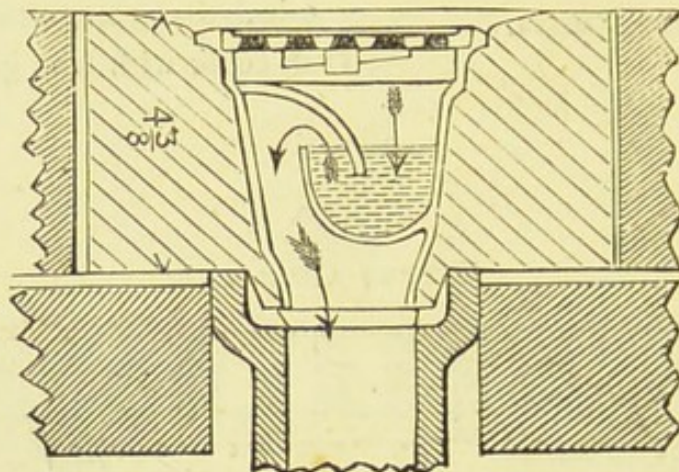
This trap is so arranged that it can be bolted against the face of the wall in the gully pit, A, in any position opposite the outlet drain. It consists of a cast-iron facing plate, to which is attached a hood, under which is also placed an inverted hood. At the drain side is also placed a flap valve opening into the drain. When in action, the drainage water passes beneath the edge of the outer hood and over the edge of

the inverted hood, so forming a water stench trap, and thence through the valve into the drain. This valve is a provision against DRY WEATHER, when there might not be water enough left in the gully to act as a stench trap, in which case a valve becomes necessary to prevent the return of smells or the passage of vermin. Manufactured by Finch.

Antill's patent trap is shown in Figs. 51, 52, and 53.

Fig. 51.

ANTILL'S PATENT TRAP, WITH POTTERY BLOCK, FOR LAUNDRY OR SCULLERY DRAINS.



Pottery blocks made for any size traps.

Fig. 52.

SCULLERY SINK AND TRAP.

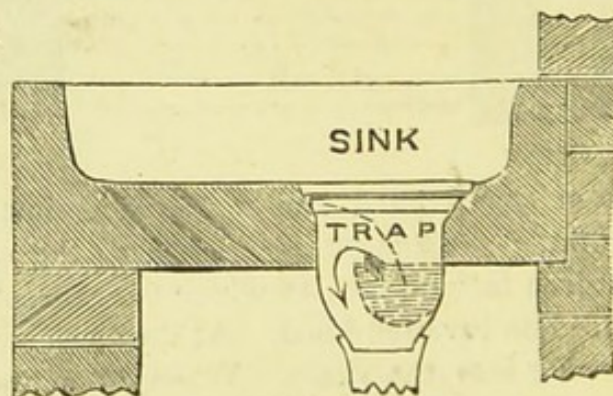
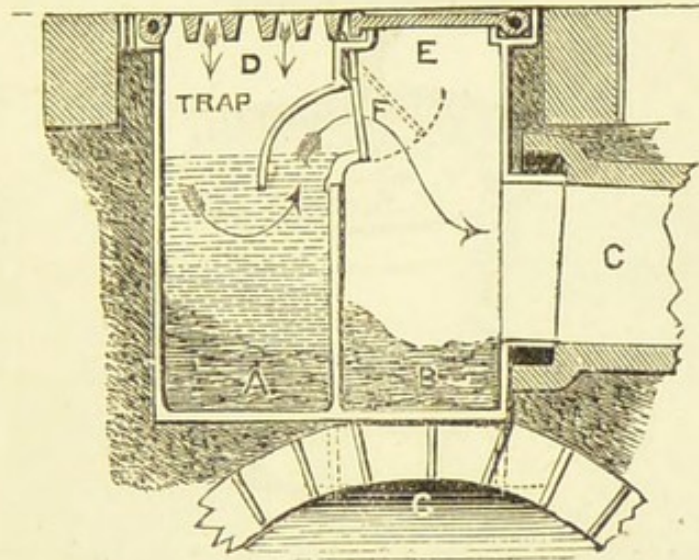


Fig. 53.

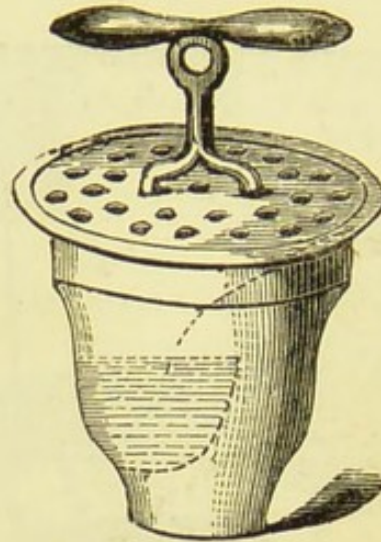
STABLE OR YARD TRAP.



First, it has a well, marked A, under the grating, to receive gravel or other refuse matter washed down the grating, which in ordinary traps lodges in and stops up the drains; 2nd, it is fitted with a valve, marked F, which opens to allow the drain water to pass through, but closes by its own weight and so prevents the return of smell, should there be no water passing to fill the trap during dry weather; 3rd, there is a second well, marked B, into which any excess of sediment lodges before entering the drain pipe C; 4th, there is a cover, E, to this second well, which closes down air-tight by a luted joint, yet can be instantly raised, if necessary, to remove or examine the valve or the drain; 5th, if placed over a main shore, as marked G, the bottom of the second pit, B, is left open, that direct communication may be obtained, if necessary, to clean it. Pipe C is then done away with.

Fig. 54 represents Antill's trap with Stidder's lock grate and key, and Figs. 55 and 56 valve traps.

Fig. 54.



It is complete in itself, and is a trap whether the lock grating be on or off; they are made from pure pig lead, and are perfectly smooth inside; can be easily cleaned out, and an effectual preventive to articles passing into the drain; can be soldered to a lead pipe, or fixed where glazed pipes are used.

VALVE TRAPS.

Stoneware with ground surface, and galvanised iron flaps, fitted with gun metal eyes.

Fig. 55.

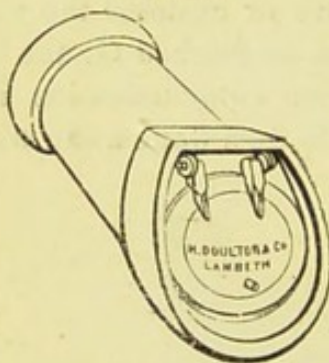


Fig. 56.



4-inch, 6-inch, 9-inch, 12-inch, 15-inch, 18-inch bore.

The patent stoneware sluice valves are amongst the most efficient contrivances hitherto introduced for stopping,

diverting, and regulating the flow and distribution of the sewage.

Fig. 57.

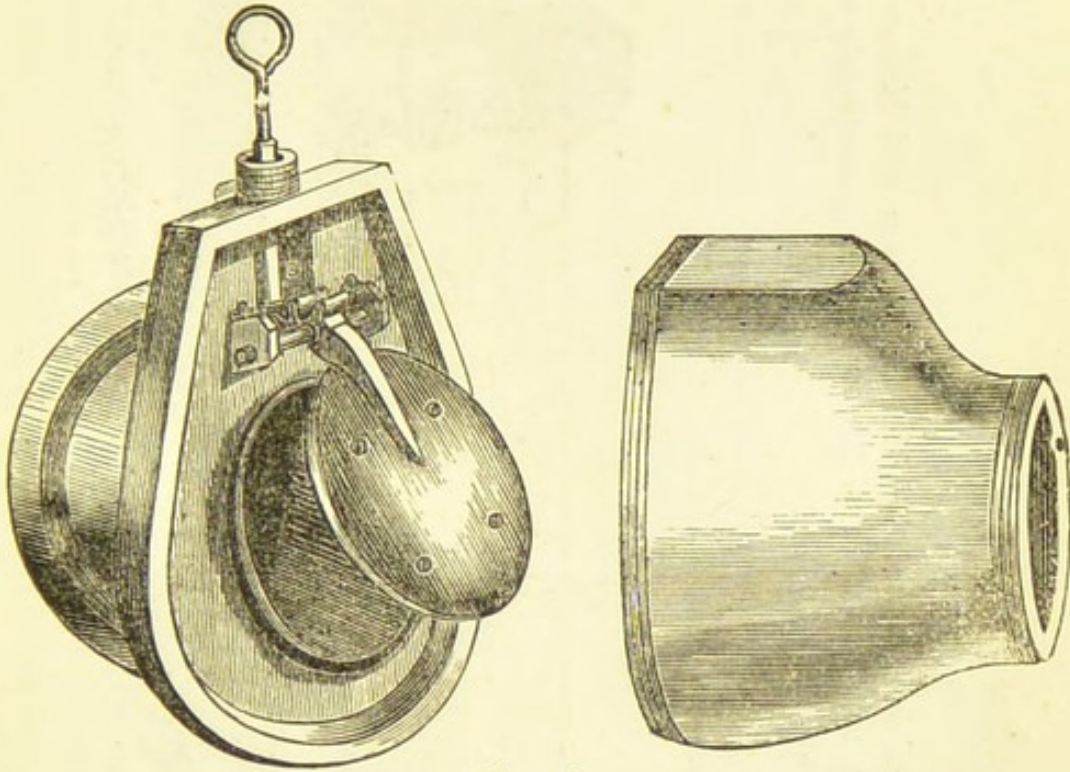
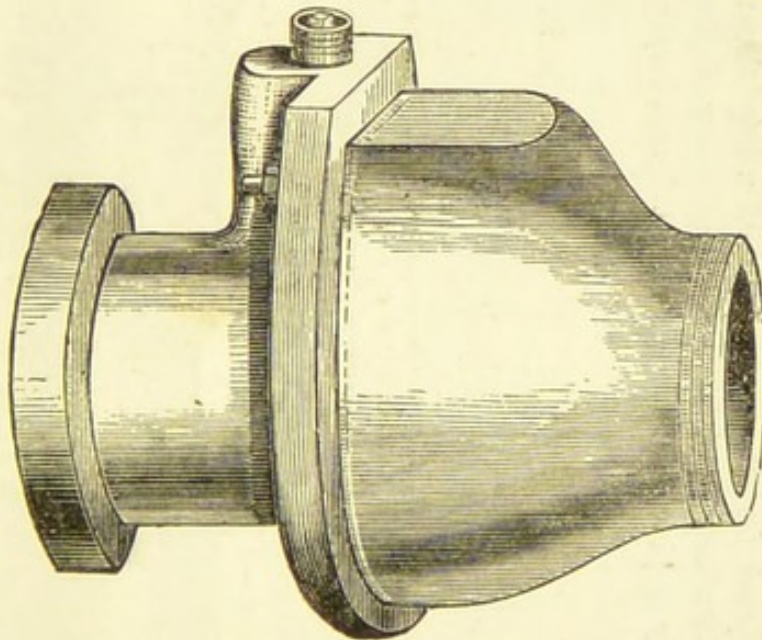


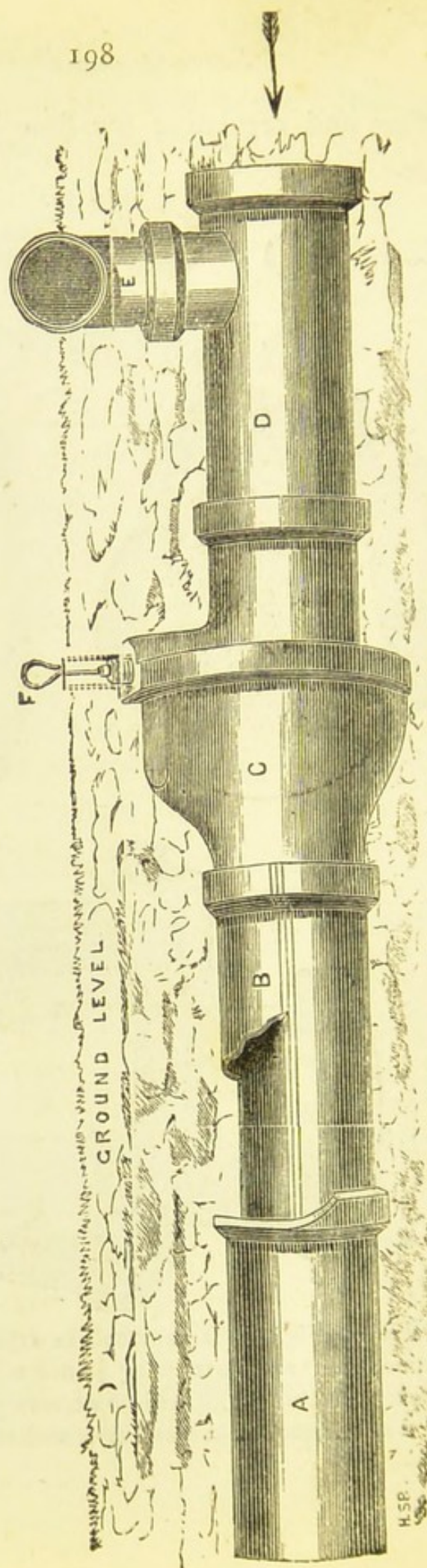
Fig. 58



The valve, as Fig. 57, is sketched in separate portions to show its construction, the two parts being joined with cement, as in Fig. 58. In specifying these valves, it will be necessary to state whether a socket is required at one end, as in small sizes sockets are sometimes dispensed with.

Figs. 59 and 60 show a mode of using these valves adopted by Messrs. Lawson and Mansergh at the Leavesden, Caterham, and Lincolnshire County Asylums, so as to allow of the mains being completely buried and out of the way of ploughs and other agricultural implements.

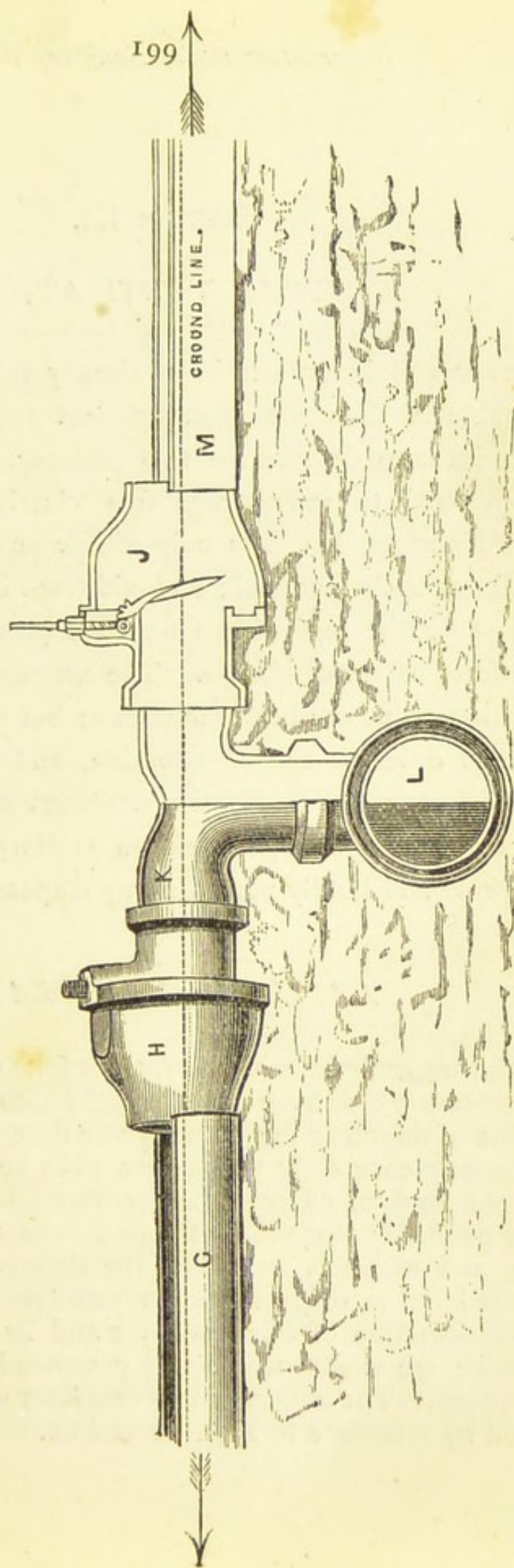
Fig. 59.
Side Elevation of Main.



By closing the valve C on the main D L, the sewage is made to rise through the pipe E K and discharge itself right or left as may be desired, into the distributing carriers through the valves H or J. F is the key (passed through a short length of pipe to keep out dirt) for opening and closing the main valve C. B is an opercular pipe, by means of which access to the valve is readily obtained. G and M are distributing carriers.

Fig. 60.

Half Elevation and Section showing Distributing Valves.



SECTION III.

SEWER VENTILATION.

Sewer ventilation has been already referred to, but it is desirable to show the most efficient apparatus which has been hitherto devised for that purpose. The application of charcoal to sewers was first clearly pointed out by Dr. Stenhouse, but it is only of late years that it has been at all generally adopted; and although it is of great value, it must not be regarded as a perfect protection against the ill effects of sewer effluvia. The arrangements for the application of it have been numerous; but that of Mr. Baldwin Latham deserves special attention, and is rapidly gaining public favour. The following drawings and description are extracted from a large work on sanitary subjects now in the press and kindly placed at my disposal.

LATHAM'S VENTILATOR.

The imperfections in the various forms of charcoal sewer ventilators which have been brought into operation was the means of directing the author's attention to the subject, and in consequence early in the year 1869 he introduced an improved form of charcoal sewer ventilator which has been very generally adopted by the first sanitary engineers of the day, and which is free from the defects which have been pointed out in respect to other ventilators. The simplicity of construction of this ventilator and its economy in maintenance are points which will commend it to the reader's attention. The action of this ventilator will be better understood by reference to Figs. 61 and 62.

Fig. 61.

VENTILATOR.

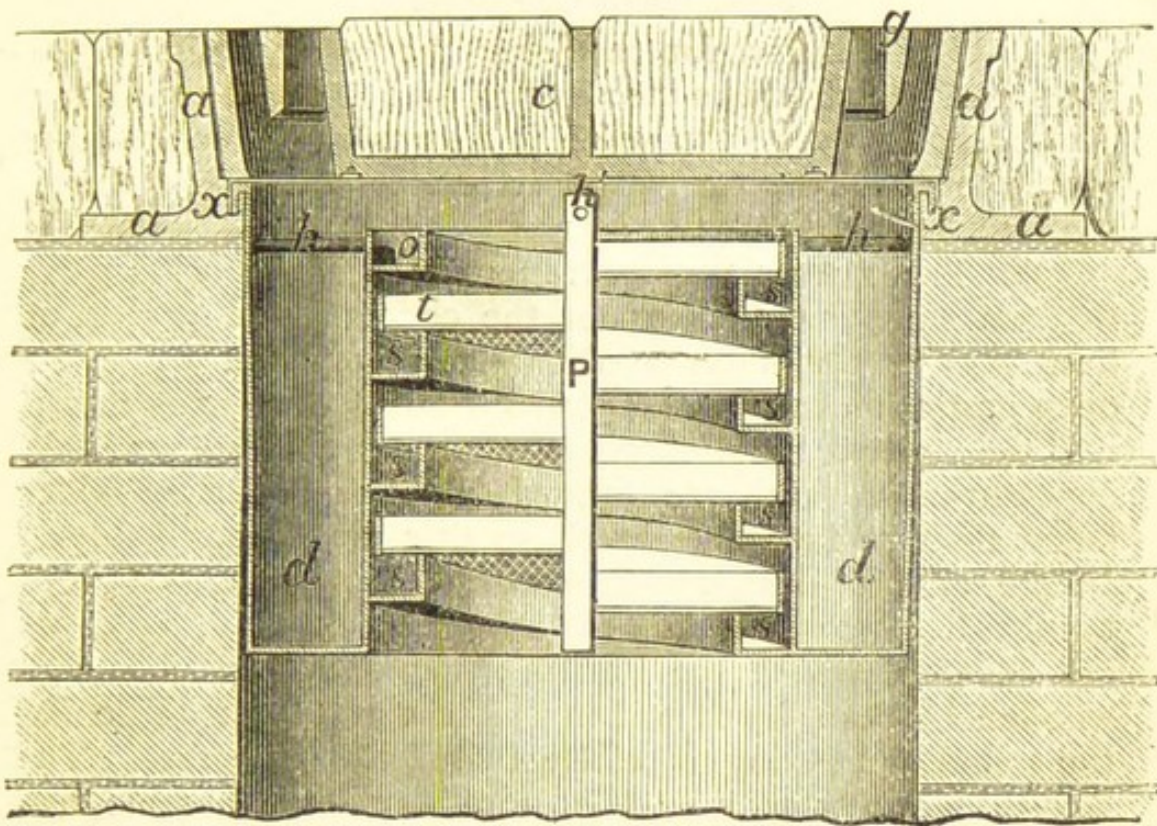
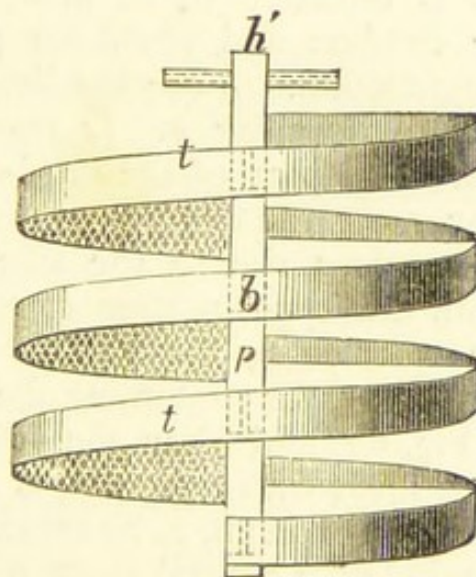


Fig. 62.

SPIRAL TRAY.



The larger sizes combine in themselves manhole-cover, lamphole, and ventilator, while the smaller sizes fulfil the

two last offices. Each of the large ventilators consists of four parts :—

Description of Ventilator.

1st. The frame *a*, for receiving the cover, and on the bottom of which hangs the dirt-box and charcoal ventilator. These frames may be made either circular or square ; the square form is best for paved streets or for square shafts, the circular for macadamised roads.

2nd. The cover *c*, the centre part of which is solid, so as to form an efficient cover for the charcoal and protect it from rain or the water used in street watering. *g* is the open grating in the cover by which air escapes or is drawn into the sewers. The openings of this grating are arranged concentrically, and are formed with the aperture wider below than at the street level, so that mud is not likely to adhere, or if it does, is soon removed and falls directly into the dirt-box immediately below the grating. Fig. 63 shows the cover, which in the illustration is shown filled in with wooden blocks (placed endways of the grain) for deadening the sound and giving an efficient foothold for horses. The covers, however, may be filled with any other suitable material, such as stone, concrete, or asphalte.

3rd. The dirt-box, *d*, hangs in a groove *x*, made in the lower part of the frame, *a*. The dirt-box is circular in plan, and the groove *x* is intended to be filled with fine sand. The weight of the dirt-box and ventilator pressing into the sand forms a gas-tight joint. *h* are handles attached to the dirt-box for raising or lowering it. *s* represents an open spiral trough which forms part of the dirt-box, and which is used for conveying away the overflow water from the dirt-box to the sewer. *o* is a slot in the side of the dirt-box, communicating with the upper portion of the spiral trough, through which the water enters the trough.

4th. The spiral trays, *t*, for containing the charcoal. The tray is shown in Fig. 62, and when the ventilator is in use, the tray, after being filled with charcoal, is screwed into the ventilator over the spiral trough, *s*, by means of the handle, *h*. Each tray consists of a central shaft, *p*, which is square, and out of every face project arms of T-iron, as shown by the dotted lines at *b*, Fig. 62. These arms are attached at

the extremities by a strip of iron coiled spirally, and the bottom of the trays is filled in with network. The arms divide the whole tray into so many compartments for retaining the charcoal, which in consequence is kept in position, or otherwise it might have a tendency to slide down to the bottom of the tray. The trays are usually galvanised, to protect them from the action of the sewer air.

Advantages.

To recapitulate the advantages of this ventilator: 1st. That, should the charcoal concrete, in the tray, or if its pores are stopped with dust, no impediment is offered to ventilation, as there exists a free communication between the sewer and the external atmosphere. 2nd. That the charcoal is completely protected from rain or water entering the ventilator or leaking through the joints of the cover, consequently it will retain its efficiency for a long period. 3rd. That the passage provided for the overflow water from the dirt-box is not dependent upon traps or any other uncertain device needing assistance to maintain it in perfect working order. 4th. The escaping vapours are all brought in contact with the charcoal, it being impossible for any to escape by the sides of the tray or in any other way.

Action.

The action of the ventilator may be explained as follows. The spiral tray having been filled with charcoal broken the size of filbert-nuts and screwed into the dirt-box, and the cover being placed in position, any mud or dust passing through the open grating will fall directly into the dirt-box. Any water entering at the grating would first fill the dirt-box, but when it had risen as high as the slot *o*, communicating with the upper portion of the spiral trough, it would overflow by this channel, passing under the trays of charcoal to the sewer.

Arrangement of Charcoal.

The gases ascending from the sewer in obedience to well-known laws have always a constant tendency to ascend, and as the charcoal of the spiral tray is laid at an angle

slightly diverging from the horizontal, the gases impinge upon the charcoal at every point of their ascent, as will be seen by reference to Fig. 63, which shows the angle at which the charcoal trays are placed; the arrows show the direction of the gases upon the trays of charcoal. Any gases ascending by the spiral trough for conveying away the overflow water are brought into contact with the charcoal just the same as if they ascended by any other part of the apparatus.

Trays not required to fit tightly.

In this ventilator, if the trays do not fit tightly at the side of the chamber, no escape of gas will arise, as the trough for conveying away the overflow water projects into the ventilator, and any gas escaping by the side of the tray will be thrown against the projecting trough above, and so into the mass of charcoal.

Advantages of Circular Passage.

The circular form of the passage through the ventilator, moreover, causes the gases to move by a series of deflections, all of which tend to bring it more intimately in contact with the charcoal, and the trays all being perforated there is nothing to interfere with the ready absorption of the gas by the charcoal. It has already been mentioned that the larger sizes of these ventilators combine a manhole-cover, lamphole, and ventilator, for by removing the cover and withdrawing the charcoal it forms a lamphole; by further withdrawing the dirt-box it becomes a manhole.

Advantages of Movable Parts.

The arrangement of having each part separately movable has its advantages, as the charcoal and dirt cannot get mixed. The dirt-box can be speedily and easily emptied by removing and capsizing it. The apparatus is easily fixed, and is economical in cost, as a much smaller amount of brickwork is required when it is used in connection with a manhole than is required in some other forms of sewer ventilator. The quantity used in the author's spiral ventilator, Fig. 61, when combined with a 20-inch manhole-cover, is 6 lbs.

Cost of Charcoal Ventilators at Croydon.

The cost of maintaining the efficiency of a system of charcoal ventilators may be arrived at from actual experience at Croydon, where there were, in the year ending the 25th March 1872, 562 public charcoal ventilators of various kinds at work, and which were maintained in a high state of efficiency by having the charcoal renewed every month. The cost of these ventilators, including labour, new charcoal, fuel used in reburning the old charcoal, &c., was 4s. 1½d. per ventilator per annum, or the whole system would have been covered by a rate of one-tenth of a penny in the pound, levied over the whole district.

Reburning the Charcoal.

The charcoal is renewed at Croydon by being reburnt in a set of iron retorts, atmospheric air being excluded during the process. The escaping vapours are led away from the retorts by small pipes inserted in the end of each retort. After red heat has been maintained for a short time, the fires are allowed to die out and the whole apparatus to cool before the charcoal is withdrawn from the retorts.

Fig. 63 represents a ventilator which may be placed at the head of a drain and below the ground level. The lid is kept tight by a sand-trap, from which a passage is provided to the spiral trough for conveying away to the sewer any water which may leak through the lid, and any condensed vapour descending the ventilating pipe also flows away by the spiral trough to the sewer.

Ventilation for Confined Places.

This form of ventilator should be used for the ventilation of sewers in courts, alleys, or confined places, for if from mischance the charcoal is neglected, the sewer gas would ascend by the ventilating pipe, and be diffused in the atmosphere without causing any serious injury or annoyance.

VENTILATORS.

Fig. 63.

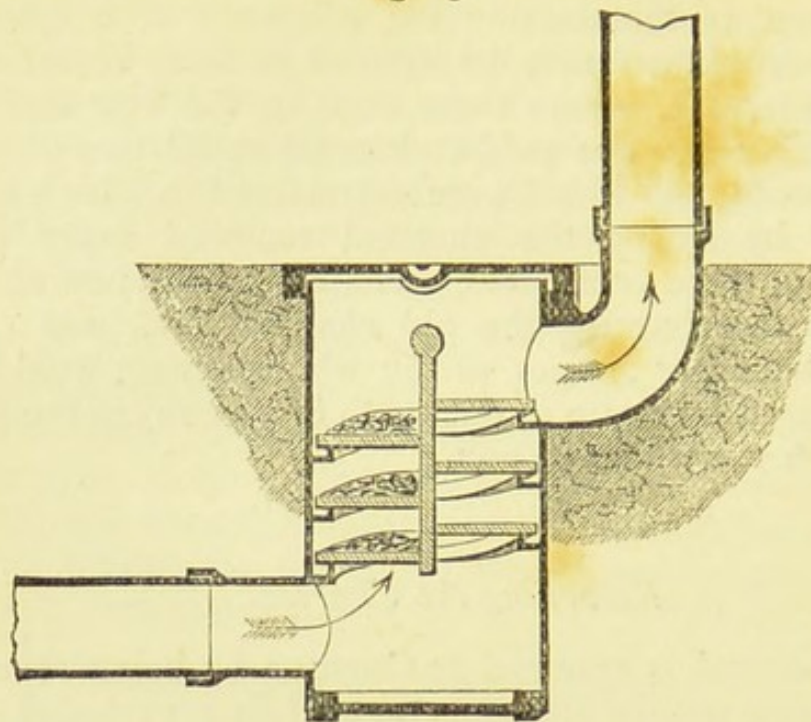
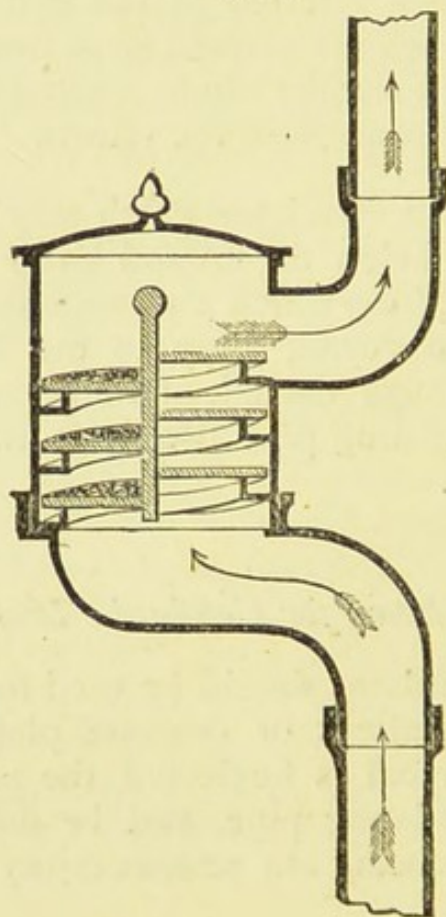


Fig. 64.



Charcoal Ventilator applied above Ground Level.

In Fig. 64 is represented another form of this ventilator, which may be fixed at any intermediate point between the ground line and the top of the ventilating pipe. If this form of apparatus is fixed near a window or other opening, it may be conveniently got at, and the charcoal renewed from time to time as required.

Fig 65.

VENTILATOR.

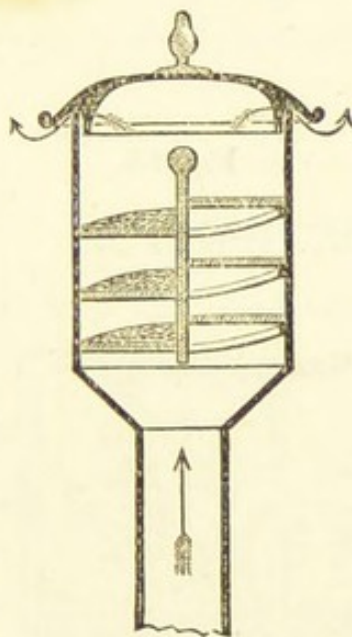
*Charcoal Ventilation for Top of Pipe.*

Fig. 65 represents another form of the same description of spiral ventilator, which is applicable to the summit of a pipe. The arrangement of this ventilator is such that the projecting worm in the interior of the apparatus prevents any gas passing by the side of the tray and so escaping contact with the charcoal.

MANSERGH'S EXTERNAL HOUSE-PROTECTING DRAIN TRAP.

Fig. 66.

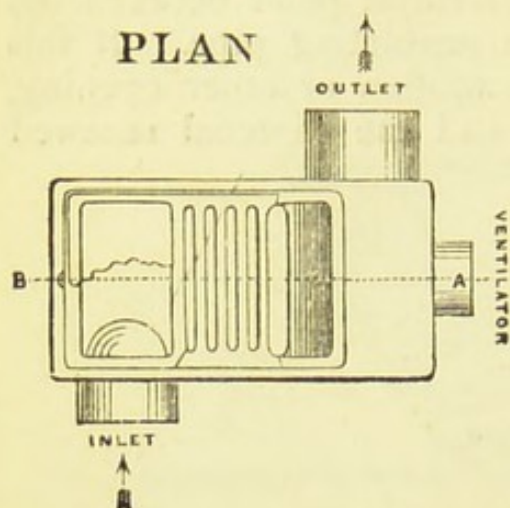


Fig. 67.

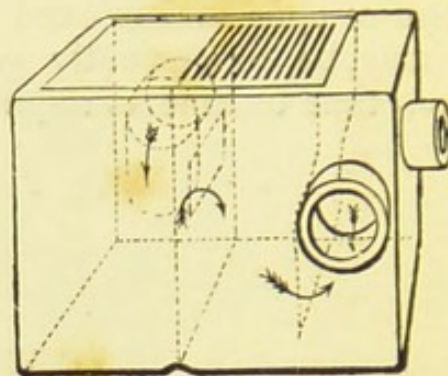
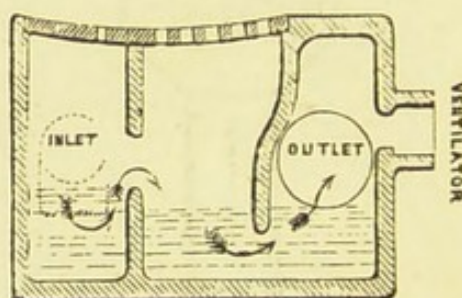


Fig. 68.

SECTION .A .B



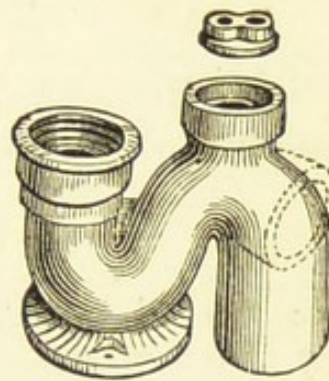
This trap is intended to prevent the ingress of sewer gas into the house through waste and overflow pipes, from cisterns, baths, lavatories, sinks, &c., and is always to be placed outside the house. The open grating admits of its serving as a yard gully, and, by attaching a ventilating pipe to the opening indicated on the woodcut, the entrance of sewer gas into the house is rendered impossible. The trap may also be used without the ventilator if necessary.

IMPROVED VENTILATING CLOSET TRAPS.

Fig. 69.



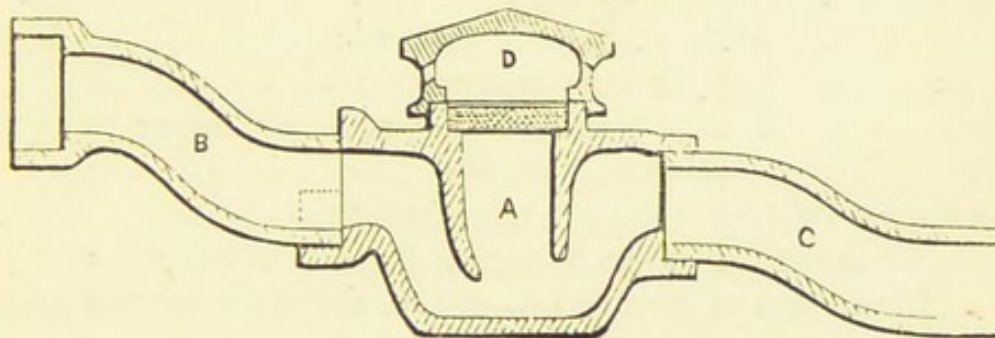
Fig. 70.



Two small pipes tapped into the nozzles of the ventilating cap, and carried through an external wall, will secure perfect and continuous ventilation.

Fig. 71.

COMBINED VENTILATING AND DEODORISING DRAIN TRAP.



SECTION IV.

WATER SUPPLY.

The following are the suggestions offered by the Local Government Act Office on the subject of water supply :

WATER SUPPLY.

The general principles of water supply may be stated briefly as follows :—

1. To select the purest available source after careful analysis.
2. To filter the water, if necessary, in order to free it from suspended matter and from dissolved organic matter.
3. To store it in covered tanks, and to raise it a sufficient height for distribution by gravitation.

Applying these principles, water may be obtained—

From rivers and streams ;

- „ natural springs ;
- „ wells artificially formed ;
- „ impounding reservoirs ;
- „ a combination of two or more of the sources named ;

And may be conveyed for distribution—

- By means of open conduits (before filtration) ;
- By means of covered conduits, always *after filtration* ;
- By means of cast-iron pipes under pressure.

Where a district is to be supplied with water, all other things being equal, the softest and purest water should be adopted.

A water supply may be gravitating ; or the water may be pumped by steam-power. The relative economy of one or the other form of works will depend on details of cost and quality of water. As a rule, gravitating works require the largest capital. The annual working expenses of a pumping scheme may, however, be greatest.

Reservoirs, for service distribution, should be covered.

If filters are used, the water should not be exposed in open reservoirs and tanks after filtration.

Cast-iron pipes, properly varnished, should be used for street-mains. It is not advisable to use mains less in internal diameter than three inches.

Lead should not be used, either in service-pipes or in cisterns. Wrought-iron tubes with screw-joints may be used for house-service. All house-taps should have screw-joints, and be of the description known as "*screw-down*," so as to admit of easy repairs.

In jointing and fixing wrought-iron service-pipes care should be taken to insert double screw-joints at convenient points, to allow of the removal of a length of pipe for alteration and repairs.

Wrought-iron service-pipes are cheaper, stronger, and more easily fitted than service-pipes of lead. Certain sorts of made ground, in towns, act rapidly and injuriously on both lead and iron pipes—furnace-ashes, waste-gas, and chemical refuse, old building refuse containing lime and other such material. Pipes should not be laid in such material without a lining of sand or puddle or other special protection.

Earthenware pipes may be used for water-conduits, provided the joints are not placed under pressure.

Aqueducts of iron will, probably, be cheaper than masonry or brick-work constructions.

Water may be brought in by gravity, that is, water obtained at a distance may be found at such an elevation above the district to be supplied as to allow of its flowing through conduits or pipes to the tanks or cisterns from which it is to be distributed. A fall of five feet per mile is sufficient for a conduit two feet diameter. Conduits of larger diameters may have less fall, down to six inches per mile, as on the New River, London.

Well-water will vary in purity according to the nature and the soluble matters contained in the ground from which the well derives its supply.

Shallow wells are always liable to pollution from vegetable matter, or even from animal matter in the surface soil. Deep wells only, *i.e.* wells of a sufficient depth to afford water of

the requisite purity, should be sunk; and the surface-soil water should be cut off from the deep water by casing the well above.

Salt rock is found in the new red sandstone formation. There is risk in deep sinking from this cause; but good water is frequently found in the new red sandstone.

A spring is the lowest point or lip of an underground reservoir of water in the stratification. A well sunk in such strata will most probably furnish, besides the volume of the spring, an additional supply of water.

Natural springs may be utilised by storing the water in a reservoir which will contain the flow of one entire day, or longer period.

Such reservoirs should be walled with masonry, and may be covered in to protect the water from contamination.

Springs of water at a distance may be conducted in channels contouring the intervening distance.

The fall for a conduit may vary according to circumstances. The fall should not be less than one in 10,000 nor greater than one in 300, unless cast-iron pipe conduits are used.

In forming an earthenware pipe-conduit great care must be taken to make the trench water-tight, and then to lay and joint the pipes so as to secure that the conduit shall be sound and water-tight through its whole length, to prevent leakage into the subsoil, and to obviate the risk of impure water from the subsoil entering the pipe.

In forming a conduit the pipes should be laid in straight lines, from point to point. There should be means of inspection and ventilation at all curves. The radius of all curves should be ten times the diameter of the conduit. There should be means of ventilation and of inspection in each quarter mile. There should be means of washing out at all convenient points.

Valley lines may be crossed by means of cast-iron syphon-pipes, that is, a pipe may be laid across a valley to conduct the water under pressure.

All valley or syphon lines should have double the fall in their length of the ordinary conduit.

There should be means provided to wash out and cleanse such syphon-pipe or pipes.

Cast-iron pipes should be coated inside and out with black varnish.

Turned and bored joints are cheapest.

Wrought-iron pipes with screw joints may be used up to $1\frac{1}{2}$ inch diameter.

Cast and wrought iron alone should be used for elevated tanks and cisterns, not lead.

Tanks to store rain water may be of masonry. They should either be arched over or be roofed so as to protect the water from the direct action of the sun and from fouling.

The ground excavated for the formation of a tank should be made perfectly water-tight. The bottom may be covered with clay-puddle and the side-walls be backed or lined with clay-puddle. The thickness of the puddle should not be less than 12 inches.

If the site selected for a tank is sand, gravel, or opened jointed rock, great care must be taken to give the puddle a full and even bearing over the whole surface area; open joints in rock must be cleaned out and then be filled up with concrete. In gravel large stones must be removed and the entire surface brought to a level, smooth, and even plain. Clay-puddle will only resist the pressure of water when it rests solidly on an even bed, so as to prevent the water forcing holes through it, which will be the case if there is a rough uneven surface and open spaces beneath.

Tanks require to have an inlet-pipe, an outlet or supply pipe, a wash-out or cleansing and an overflow pipe. These latter, the cleansing and overflow, may be joined.

The main tank or tanks should have valve-wells so arranged as to enable the system of supply to be carried on independently of the main tank.

By this arrangement the supply of water will flow direct to the inlet-well, and may be passed on through this well to the main tank; the supply may be obtained from the outlet-well by opening the valve in the main tank and the valve in the supply-well. By closing the valves communicating with the main tank in both wells, and opening the valve on the end of the connecting pipe in the inlet-well and the valve on the supply-pipe in the outlet-well, the supply of water may go on independently of the main tank. The overflow must be formed at the inlet-well to be connected

with the wash-out. There must be manhole openings in the covering arches, and end windows in each bay.

Elevated tanks for immediate or daily supply of water should be of cast iron or of wrought iron. Cast iron requires more care and practical skill in construction, but will last longer than wrought iron.

In arranging cast-iron tanks of large dimensions care must be taken to support the bottom and stay the sides by wrought-iron tie-rods in the best manner.

Cast-iron or wrought-iron tanks should be arranged so that the supply of water may be carried on in a small corner compartment, to allow of the main tank being repaired, cleaned, and occasionally painted or varnished.

At the junctions of cast and wrought iron, wrought iron will waste more rapidly than cast iron; and junctions of bolts and tie-rods may give way if not repaired in time. Cleaning and painting should be regularly done once a year.

If a wrought-iron tie-rod supports weight at both ends, the strain at either end must not exceed three tons for each square inch of cross-sectional area of the best iron rods.

Iron tanks should not be exposed to the direct action of the sun, but should be enclosed or clothed. An enclosure of boards with felt beneath will form a good protection. Water, especially for drinking, must be kept cool.

The sketch is not complicated by showing the details of tank-plates or tie-rods, but is intended only to show the proposed mode of arranging a small inner tank, within which all the operations of supply may be carried on independently of the larger tank. This will be found to be of the utmost importance in use. The small tank will be connected with the larger tank by means of a pipe having a valve on it.

In arranging a main pipe from pumps, the pipes should have sectional capacity sufficient to allow of the velocity in such main pipe not exceeding two feet per second, as friction increases in proportion to the velocity, as is shown by the law governing the delivery of water from pipes under pressure.

Where a river flows through a valley over porous strata, sinking a well or wells in the strata within the influence of the river filtration is a cheap and ready method of obtaining river-water naturally filtered. The water supplied

to Windsor Castle is obtained from wells sunk in the alluvial valley of the river Thames (gravel), and is pumped by water-wheels and steam power up to a reservoir above the level of the castle. Wells so situated must be carried above the level of extreme floods.

If a single well on a river bank does not produce sufficient water, or if the subsoil is clay impervious to water, then trenches may be excavated parallel to the river or stream, in which trenches perforated earthenware pipes may be laid, leading to a well or wells. The trenches above such pipes should be filled in with fine assorted gravel, charcoal, and sand, so as to form a filtering medium within reach of the dry weather flow of such stream or river. These trenches should not be less than six feet deep to the top of the pipes.

Any overflow or waste-water pipe from a service reservoir or tank should deliver the water at an open end into a channel, sewer, or drain, so as to prevent gases rising back through such overflow or waste-water pipe to the water in the reservoir or tank, a result very apt to follow if the pipe is directly connected with the sewer or drain.

Water readily absorbs foul gases, and may become poisonous by such means. The possibility of such contamination taking place must therefore be prevented.

Waterworks conduits should be laid at such depth and be so covered with earth as to prevent the water becoming heated unduly by the rays of the sun, or being injuriously affected by frost in winter.

Brick and masonry tanks, if arched, may be covered in with sand or fine earth to the depth of 18 inches, which will preserve the water cool.

All covered reservoirs and tanks should be ventilated.

All supply-pipes should be arranged in such manner as to allow of easy inspection and subsequent repairs. Stop-taps should be placed betwixt the main and the building in all cases, so as to allow of isolation of any line of service-pipe for repairs.

All house service-tanks and service-pipes should be fixed in such manner that the rooms shall not be flooded in case of leakage or overflow.

Ready means of access to all tanks and cisterns should be provided to allow of inspection, cleansing, or repairs.

Up-bends should not be formed on lines of main pipes or on service-pipes. If up-bends are inevitable, air-valves should be provided to let out the air at such bends.

Bends should not be formed at right angles on pipes, but the pipe should be brought round in a curve.

All mortar used in waterworks should be capable of setting under water.

Portland or Roman cement may be used.

The following regulations have been made under the Metropolis Water Act, 1871, by the Board of Trade, and are applicable to the Metropolis :—

REGULATIONS MADE UNDER THE METROPOLIS WATER ACT, 1871.

Place of Communication-Pipe.

1. No "communication-pipe" for the conveyance of water from the waterworks of the company into any premises shall hereafter be laid until after the point or place at which such "communication-pipe" is proposed to be brought into such premises shall have had the approval of the company.

Weight of Lead Pipes.

2. No lead pipe shall hereafter be laid or fixed in or about any premises for the conveyance of or in connection with the water supplied by the company (except when and as otherwise authorised by these regulations, or by the company) unless the same shall be of equal thickness throughout, and of at least the weight following, that is to say :—

Internal Diameter of Pipe in Inches.	Weight of Pipe in lbs. per Lineal Yard.
inch diameter.	5 lbs. per lineal yard.
" "	6 " "
" "	7½ " "
" "	9 " "
1 " "	12 " "
1¼ " "	16 " "

Interior Pipes.

3. Every pipe hereafter laid or fixed in the interior of any dwelling-house for the conveyance of, or in connection with, the water of the company, must, unless with the consent of the company, if in contact with the ground, be of lead, but may otherwise be of lead, copper, or wrought iron, at the option of the consumer.

Not more than One Communication-Pipe to each House.

4. No house shall, unless with the permission of the company in writing, be hereafter fitted with more than one "communication-pipe."

Every House, with certain exceptions, to have its own Communication-Pipe.

5. Every house supplied with water by the company (except in cases of stand pipes) shall have its own separate "communication-pipe": Provided that, as far as is consistent with the special Acts of the company, in the case of a group or block of houses the water-rates of which are paid by one owner, the said owner may, at his option, have one sufficient "communication-pipe" for such group or block.

No House to have Connection with Fittings of Adjoining House.

6. No house supplied with water by the company shall have any connection with the pipes or other fittings of any other premises, except in the case of groups or blocks of houses, referred to in the preceding regulation.

Connection to be by Ferrule or Stopcock.

7. The connection of every "communication-pipe" with any pipe of the company shall hereafter be made by means of a sound and suitable brass screwed ferrule or stop-cock with union, and such ferrule or stop-cock shall be so made as to have a clear area of waterway equal to that of a half-inch pipe. The connection of every "communication-pipe" with the pipes of the company shall be made by the

company's workmen, and the company shall be paid in advance the reasonable costs and charges of and incident to the making of such connection.

Material and Joints of External Pipes.

8. Every "communication-pipe" and every pipe external to the house and through the external walls thereof, hereafter respectively laid or fixed, in connection with the water of the company, shall be of lead, and every joint thereof shall be of the kind called a "plumbing" or "wiped" joint.

No Pipe to be laid through Drains, &c.

9. No pipe shall be used for the conveyance of, or in connection with, water supplied by the company, which is laid or fixed through, in, or into any drain, ash-pit, sink, or manure-hole, or through, in, or into any place where the water conveyed through such pipe may be liable to become fouled, except where such drain, ash-pit, sink, or manure-hole, or other such place, shall be in the unavoidable course of such pipe, and then in every such case such pipe shall be passed through an exterior cast-iron pipe or jacket of sufficient length and strength, and of such construction as to afford due protection to the water-pipe.

Depth of Pipes under Ground.

10. Every pipe hereafter laid for the conveyance of, or in connection with, water supplied by the company shall, when laid in open ground, be laid at least two feet six inches below the surface, and shall in every exposed situation be properly protected against the effects of frost.

No Connection with Rain Water Receptacle.

11. No pipe for the conveyance of, or in connection with, water supplied by the company shall communicate with any cistern, butt, or other receptacle used or intended to be used for rain-water.

Stop-valve.

12. Every "communication-pipe" for the conveyance of water to be supplied by the company into any premises

shall have at or near its point of entrance into such premises, and, if desired by the consumer, within such premises, a sound and suitable stop-valve of the screw-down kind, with an area of waterway not less than that of a half-inch pipe, and not greater than that of the "communication-pipe," the size of the valve within these limits being at the option of the consumer.

If placed in the ground, such "stop-valve" shall be protected by a proper cover and "guard-box."

Character of Cisterns and Ball-taps.

13. Every cistern used in connection with the water supplied by the company shall be made and at all times maintained water-tight, and be properly covered and placed in such a position that it may be inspected and cleansed. Every such existing cistern, if not already provided with an efficient "ball-tap," and every such future cistern shall be provided with a sound and suitable "ball-tap" of the valve kind for the inlet of water.

Waste Pipes to be removed or converted into Warning Pipes.

14. No overflow or waste-pipe other than a "warning-pipe" shall be attached to any cistern supplied with water by the company, and every such overflow or waste-pipe existing at the time when these regulations come into operation shall be removed, or at the option of the consumer shall be converted into an efficient "warning-pipe," within two calendar months next after the company shall have given to the occupier of or left at the premises in which such cistern is situate a notice in writing requiring such alteration to be made.

Arrangement of Warning Pipes.

15. Every "warning-pipe" shall be placed in such a situation as will admit of the discharge of the water from such "warning-pipe" being readily ascertained by the officers of the company. And the position of such "warning-pipe" shall not be changed without previous notice to and approval by the company.

Buried Cisterns prohibited.

16. No cistern buried or excavated in the ground shall be used for the storage or reception of water supplied by the company, unless the use of such cistern shall be allowed in writing by the company.

Butts prohibited.

17. No wooden receptacle without a proper metallic lining shall be hereafter brought into use for the storage of any water supplied by the company.

Ordinary Draw Tap.

18. No draw-tap shall in future be fixed unless the same shall be sound and suitable and of the "screw-down" kind.

Draw Taps in connection with Stand Pipes.

19. Every draw-tap in connection with any "stand-pipe" or other apparatus outside any dwelling-house in a court or other public place, to supply any group or number of such dwelling-houses, shall be sound and suitable and of the "waste-preventer" kind, and be protected as far as possible from injury by frost, theft, or mischief.

Boilers, Water-closets, and Urinals to have Cisterns.

20. Every boiler, urinal, and water-closet, in which water supplied by the company is used (other than water-closets in which hand flushing is employed), shall, within three months after these regulations come into operation, be served only through a cistern or service-box and without a stool-cock, and there shall be no direct communication from the pipes of the company to any boiler, urinal, or water-closet.

Water-closet Apparatus.

21. Every watercloset-cistern or watercloset service-box hereafter fitted or fixed in which water supplied by the company is to be used shall have an efficient waste-preventing apparatus, so constructed as not to be capable of discharging more than two gallons of water at each flush.

Urinal Cistern Apparatus.

22. Every urinal-cistern in which water supplied by the company is used other than public urinal-cisterns, or cisterns having attached to them a self-closing apparatus, shall have an efficient "waste-preventing" apparatus, so constructed as not to be capable of discharging more than one gallon of water at each flush.

Water-closet Down-pipes.

23. Every "down-pipe" hereafter fixed for the discharge of water into the pan or basin of any water-closet shall have an internal diameter of not less than one inch and a quarter, and, if of lead, shall weigh not less than nine pounds to every lineal yard.

Pipes supplying Water-closet to communicate with Cistern only.

24. No pipe by which water is supplied by the company to any water-closet shall communicate with any part of such watercloset, or with any apparatus connected therewith, except the service-cistern thereof.

Bath to be without Overflow Pipe.

25. No bath supplied with water by the company shall have any overflow waste pipe, except it be so arranged as to act as a "warning-pipe."

Bath Apparatus.

26. In every bath hereafter fitted or fixed the outlet shall be distinct from, and unconnected with, the inlet or inlets; and the inlet or inlets must be placed so that the orifice or orifices shall be above the highest water level of the bath. The outlet of every such bath shall be provided with a perfectly water-tight plug, valve, or cock.

Alteration of Fittings.

27. No alteration shall be made in any fittings in connection with the supply of water by the company without two days' previous notice in writing to the company.

Waterway of Fittings.

28. Except with the written consent of the consumer, no cock, ferrule, joint, union, valve, or other fitting, in the course of any "communication-pipe," shall have a waterway of less area than that of the "communication-pipe," so that the waterway from the water in the district-pipe or other supply-pipe of the company up to and through the stop-valve prescribed by Regulation No. 12 shall not in any part be of less area than that of the "communication-pipe" itself, which pipe shall not be of less than a half-inch bore in all its course.

Weight of Lead Pipes having Open Ends.

29. All lead "warning-pipes" and other lead pipes of which the ends are open, so that such pipes cannot remain charged with water, may be of the following minimum weights, that is to say:—

$\frac{1}{2}$ -inch (internal diameter)	. . .	3 lbs. per yard.
$\frac{3}{4}$ -inch do.	. . .	5 lbs. „
1-inch do.	. . .	7 lbs. „

Definition of Communication-Pipe.

30. In these Regulations the term "communication-pipe" shall mean the pipe which extends from the district pipe or other supply-pipe of the company up to the "stop-valve" prescribed in the Regulation No. 12.

Penalties.

31. Every person who shall wilfully violate, refuse, or neglect to comply with, or shall wilfully do or cause to be done any act, matter, or thing, in contravention of these Regulations, or any part thereof, shall, for every such offence, be liable to a penalty in a sum not exceeding 5*l*.

Authorised Officer may act for Company.

32. Where under the foregoing Regulations any act is required or authorised to be done by the company, the same may be done on behalf of the company by an authorised officer or servant of the company, and where under such Regulations any notice is required to be given by the com-

pany, the same shall be sufficiently authenticated if it be signed by an authorised officer or servant of the company.

Existing Fittings.

33. All existing fittings, which shall be sound and efficient, and are not required to be removed or altered under these Regulations, shall be deemed to be prescribed fittings under the Metropolis Water Act, 1871.

SECTION V.

WATER SUPPLY FITTINGS.

STIDDER'S TAPS.

Fig. 72.

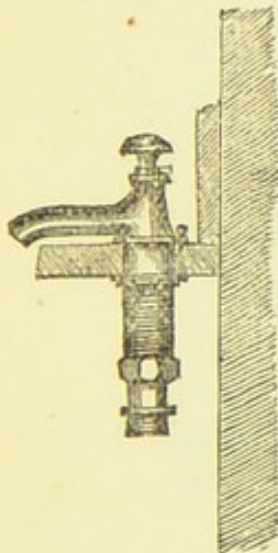


Fig. 73.

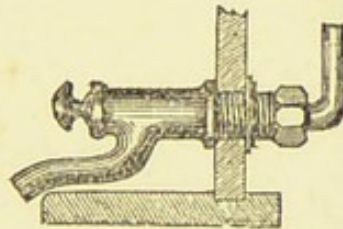


Fig. 74.

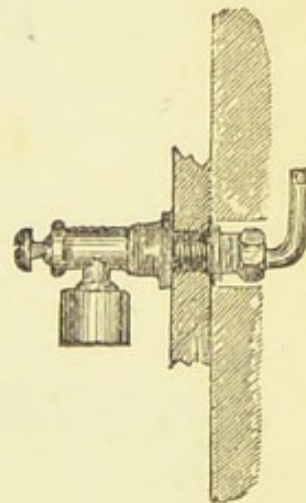


Fig. 75.



Patent high-pressure lavatory and urinal valves, with connections, will work under the highest pressures; each one tested to 300 lbs. on the square inch.

THE BALL VALVE.

Fig. 76.

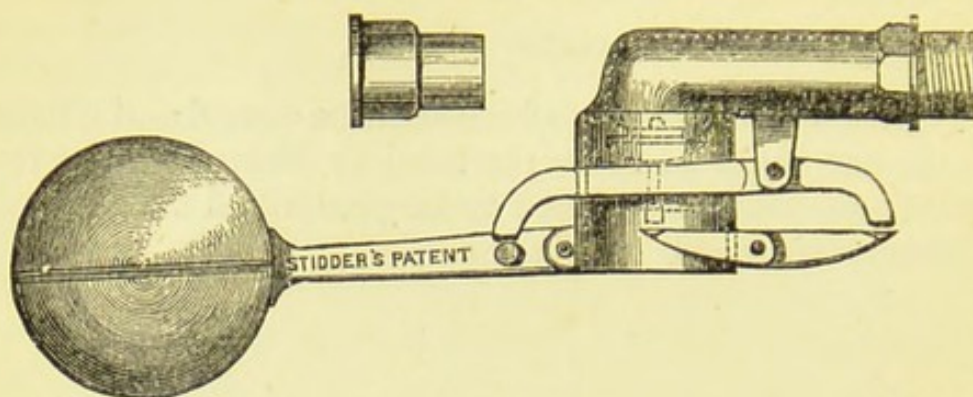


Fig. 77.

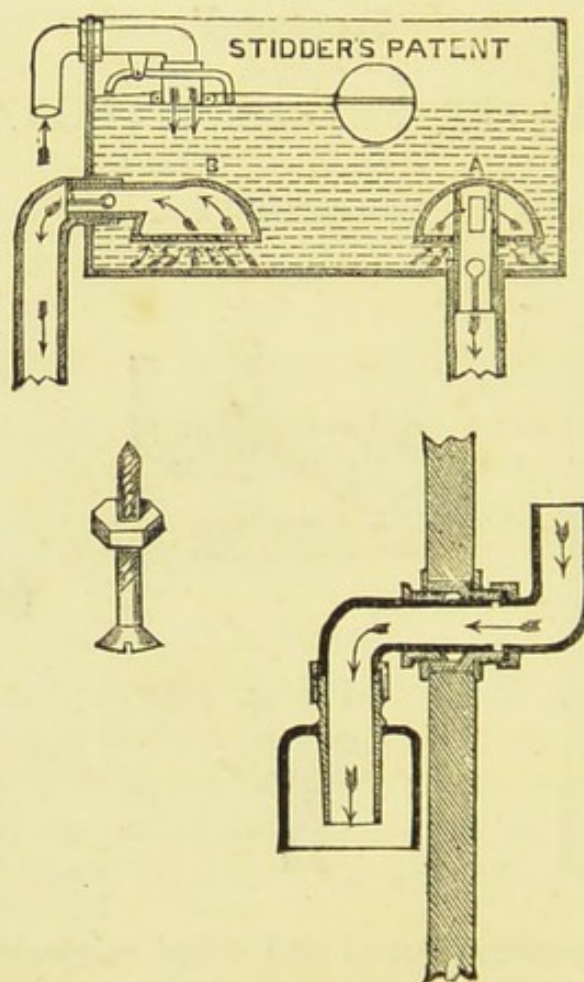


Fig. 77 shows a cistern fitted with the patent treble compound lever ball valve, and dirt strainer. The water flows up underneath, and through fine copper gauze; any dirt that may fall through the water lodges on the outside of the dome, instead of passing through the

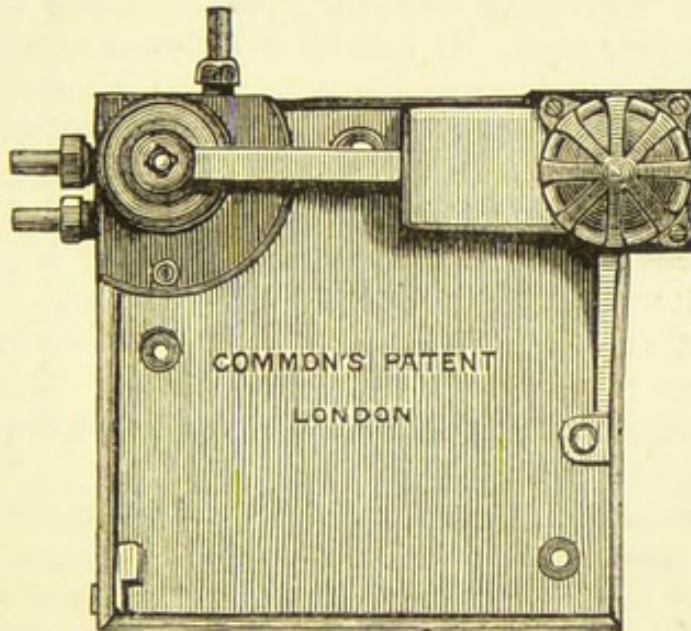
perforation, as in the ordinary strainers perforated on the top. They are easily fixed by merely pushing the tube into the mouth of the pipes, as seen in illustration.

- A—For fixing to side pipes.
B—For fixing to down pipes.

COMMON'S PATENT AUTOMATIC APPARATUS, FOR THE PROTECTION
OF WATER PIPES FROM THE ACTION OF FROST.

Fig. 78.

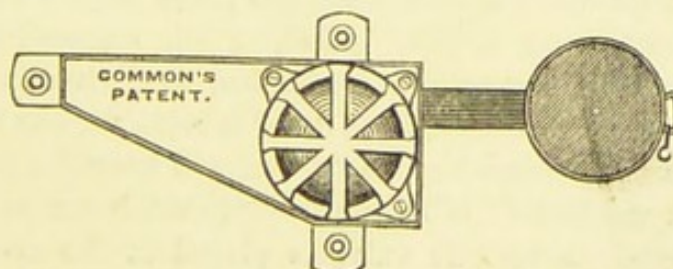
A.



B.



C.



This apparatus is designed to prevent the bursting of pipes in winter by emptying them or by allowing a fine stream of water to pass through them as is most convenient only when the frost is sufficiently severe to endanger them.

The action in the various apparatus described here is caused by the motion produced by the freezing and expansion of a small body of water contained in a properly formed hermetically closed thin copper vessel. The motion thus produced is adapted to the present purpose in various ways. This paper describes three forms of apparatus suitable for ordinary use, lettered A, B, and C.

The apparatus marked A is adapted for the protection of houses supplied on the constant service system (where the use of waste-preventing cisterns does away with all pipes containing dead water, excepting the supply pipe). It consists of a three-way cock or valve, worked by a weighted lever in connection with a copper vessel as described. When the frost is sufficiently severe, the lever drops and shuts off the water from main, at the same time allowing the dead water to escape from pipe in house. If the lever be lifted up during the frost for a temporary supply, it will drop on being left, but if the frost has gone, it will remain up ready for the next frost. The valve is so constructed that no waste can take place, as the water does not escape from pipe till after it is shut off from main. This apparatus is fixed at the entrance of pipe from main into house, instead of the cock usually placed there.

The apparatus marked B consists of a small valve, in connection with a copper vessel as described, and is placed through a wall with the copper vessel outside, and the valve inside, the house; the valve being connected by the end union to the lowest part of the pipe or pipes, and a small waste pipe taken from the side-union to the nearest convenient point.

In times of frost this valve is opened, and allows a fine stream of water to pass through the pipe, thus causing a motion of the water, which is sufficient to prevent the pipes freezing in nearly every case of frost and the consequent inconvenience of no water, and to prevent in all cases the bursting of the pipes; when the thaw comes, the stream of water is shut off without any attention; the action in *both* cases being perfectly *automatic*, a great point, as all practical men know. This apparatus is suitable for country houses, &c., where a little waste of water is of no consequence. Where water is valuable, one of the C apparatus will not only prevent any waste, but will keep the pipe empty.

The apparatus marked C is a simple weighted lever, in connection with a copper vessel; a spindle valve is placed in the cistern on the

pipe, and held up by the lever, which, when the frost is sufficiently severe, drops and closes the pipe, one of the B apparatus at bottom of pipe emptying it at or about the same time; to obtain a supply of water, the lever is lifted up by a cord or otherwise, remaining up or not, as the frost is or is not gone.

Any plumber can fix these apparatus, as it requires no special knowledge beyond the directions on each.

FINCH'S FILTERS.

SLATE OR WOOD CISTERN WITH FILTERS COMBINED.

Fig. 79.

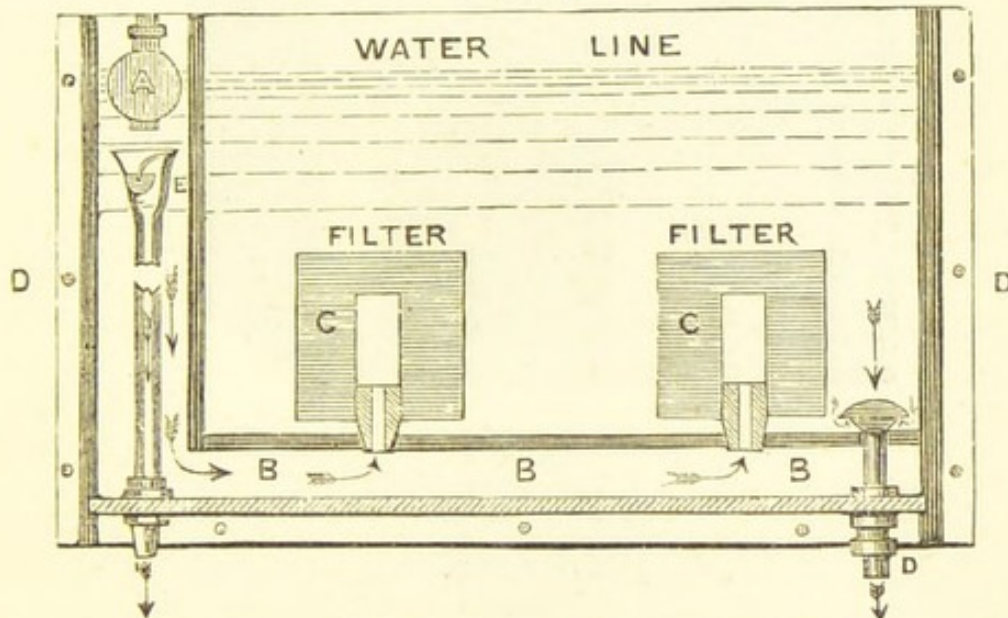


Fig. 79 represents a water filter which is adapted to either private or public buildings, large or small. In designing this filter, the objects kept in view have been :—

1st.—To be able to work the filter for a long time without the necessity of cleaning.

2nd.—When cleaning is necessary, to be able to effect it without breaking pipe joints, injuring tanks, delay of time, and much expense.

The arrangement consists of an *exterior* casing or tank—made generally of slate—marked D D, enclosing an inner partition, which extends across one end and over the bottom of tank at a distance of 3 or 4 inches from the exterior casing. This vacant space, marked B B B, extending all over the bottom, forms a receptacle for any mud precipitating from the water, first entering the tank, previous to its passage up through the carbon filter blocks C C, which are dispersed at suitable distances asunder over the upper surface of the interior casing.

The following is an illustration of the cistern filter of the London and General Water Purifying Company.

Fig. 80.
CISTERN FILTER.
Section.

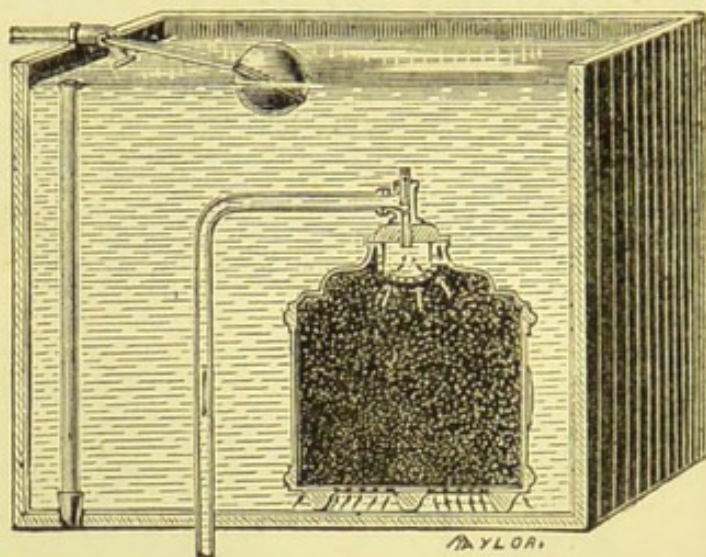
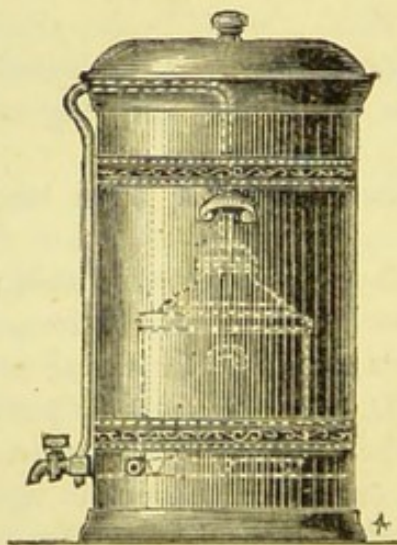


Fig. 81.
JAR FILTER.



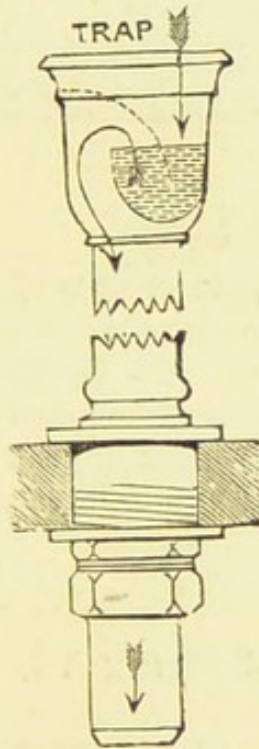
- | | | |
|-------|----------------|--------------------------|
| No. 0 | Cistern Filter | in 4-gallon jar. |
| No. 1 | „ | fitted in 7-gallon jar. |
| No. 2 | „ | fitted in 11-gallon jar. |

There should not be any connection between a cistern supplying a water-closet and a pipe from which water is taken for drinking, neither should the overflow pipe be directly connected with the sewer.

The following apparatus will afford good protection.

Fig. 82.

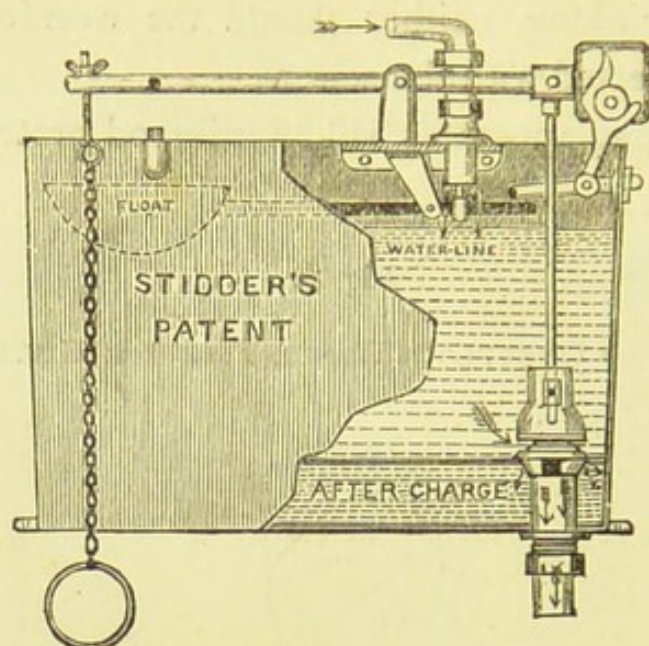
TRAPPED OVERFLOW WASTE PIPE FOR CISTERNS.



All tanks in houses should be furnished with a trapped overflow pipe, to preserve health by preventing the ascent of poisonous gases up the pipes from the drains or water-closets beneath, which always impart a bad flavour to the water, and so create disease. They are of various sizes, with the plug, washer, and brass union, with tinned ends ready for soldering to the lead waste pipe.

Fig. 83.

WATER WASTE PRESERVER.



By pulling the chain only the quantity of water in the top chamber can be discharged, and in no case can the valves be fastened up so as to waste the company's water. The thumb-screw, on the end of lever, is for adjusting the closet wires without loss of time in taking down the seats, or cutting the wires, and making good the same. The regulating-screw will adjust the wires in two or three minutes.

SECTION VI.

VENTILATING AND BONDING BRICKS.

We have now arrived at the concluding section of our chapter on sanitary apparatus, and as we have to illustrate materials which may be obtained in almost every part of the kingdom, it will suffice to notice those of well known makers only. It does not seem necessary to illustrate the different kinds of iron air bricks and iron ventilators, as those of Arnott and Sheringham, as they may be seen at almost every ironmonger's.

VENTILATING AND BONDING BRICKS, DAMP COURSE, AND
AIR BRICKS.

Fig. 84.

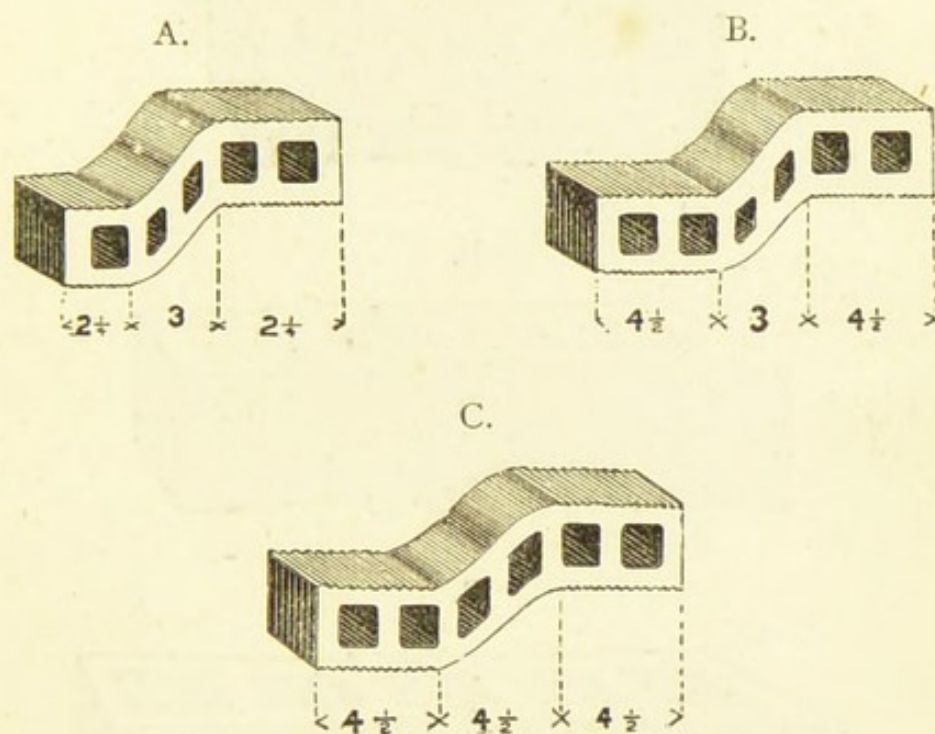


Fig. 85.

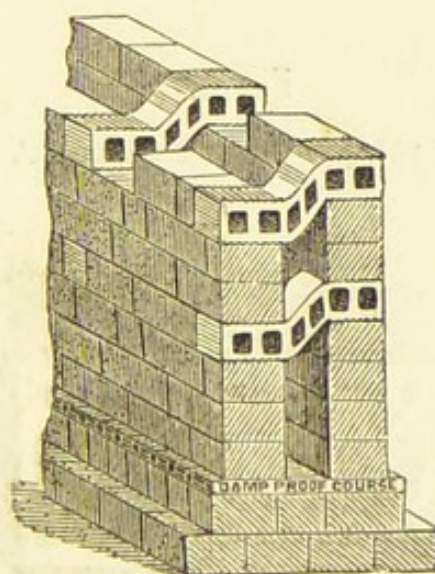
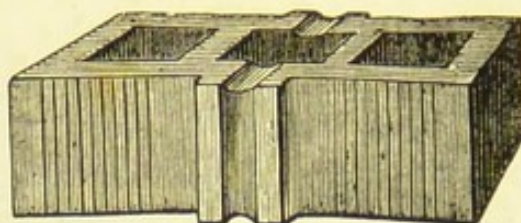


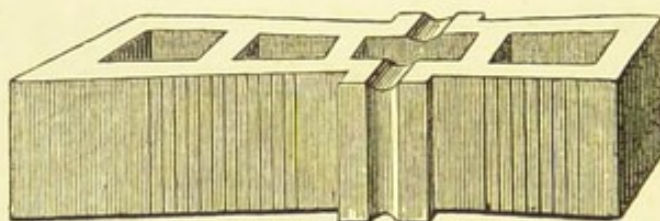
Fig. 86 (A, B, and C) represents patent bonding bricks of different sizes.

Fig. 86.

A.



B.



C.

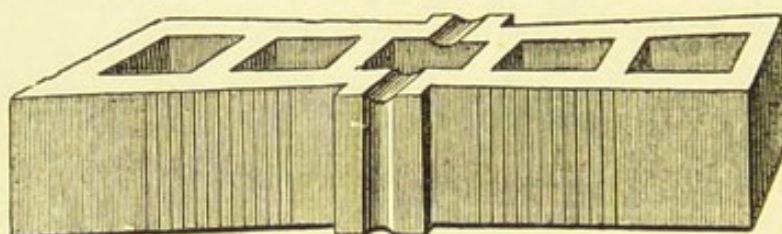
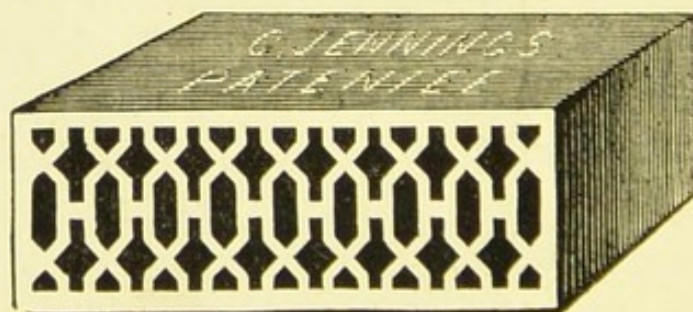


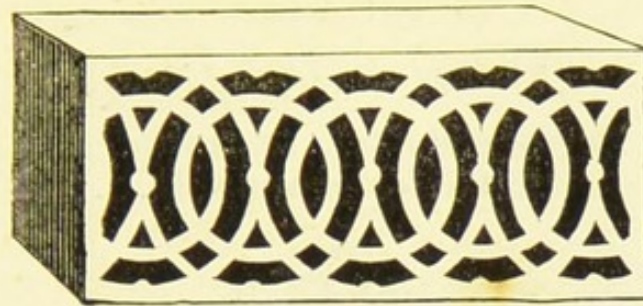
Fig. 87.

STONE WARE AND TERRA COTTA AIR BRICKS.

A.



B.



14 inches by 6 inches on face.
9 inches by $4\frac{1}{2}$ inches on face.

Fig. 88.

AIR BRICKS, IN STONEWARE OR TERRA COTTA.



9×3

9×6

9×9

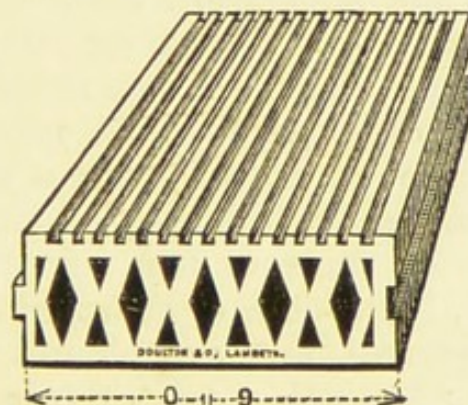
14×6

12×9

Fig. 89.

IMPROVED DAMP PROOF COURSE

Secures continuous ventilation. It is made of vitreous stoneware, with tongue and groove joint, through which it is impossible for damp to rise.



For $4\frac{1}{2}$ -inch, 9-inch, $13\frac{1}{2}$ -inch, and 18-inch work.

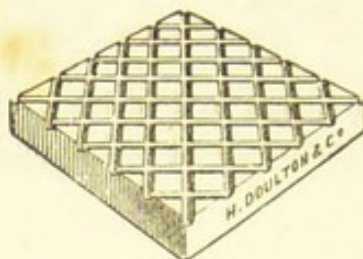
$1\frac{1}{2}$ inch and 3 inches thick,

These are made to suit any thickness of wall.

Fig. 90.

STONEWARE PAVING TILES.

Non-absorbent and imperishable. Adapted for street paving, coach-houses, basements, &c.

*MORTAR.*

In the construction of sewers and drains it is of great importance to use mortar or cement of great strength, and that sets quickly, and hence the patent selenitic mortar merits attention. The Selenitic Mortar Company make the following observations respecting it:—

This invention consists of an improved method of using prepared quick-lime, which is thus converted into a species of cement mortar, which sets rapidly and well, and can be used for concrete and bricklayer's work with a vast gain in strength. When employed as stuff for plastering, it effects a considerable saving in time over that made from lime in the ordinary way. In order to mix the mortar the prepared lime is thrown into water, to which a small quantity of plaster has been added, in the pan of an ordinary mortar mill, and ground for three or four minutes into a creamy paste. The sand, burnt clay, or other ingredients may then be added, and ground for ten minutes more. When a mortar mill cannot be used, a tub or trough may be substituted, and the prepared lime violently stirred with the water and plaster. The mixture is then run out by means of a sluice and made into mortar with sand in the ordinary way. The latter process, however, is not so efficient as the mortar

mill. The experiments which have been made with various limes prove that with double the usual quantity of sand, when a mill is used, the tensile strength of the mortar is increased by this process fourfold.

Selenitic mortar saves half the lime, is four times as strong, and sets in one quarter the time of common mortar.

DIRECTIONS FOR PREPARING PATENT SELENITIC MORTAR
in a mortar mill with a five-foot pan. (One bushel of lime requires about six gallons of water.)

For concrete, throw into the pan of the edge-runner two or three pails of water, to the first of which two pounds of plaster has been added, and gradually introduce a bushel of prepared lime; continue the grinding until the whole is reduced to a creamy paste, and then put two bushels of sand in, and mix this mortar on a board with from eight to ten parts of ballast, turning the mixture over twice with a shovel.

In making hydraulic lime concrete, it will be found of great advantage to employ a mixture of two parts of selenitic clay and one part of lime, in lieu of lime only.

For mortar for bricklaying, use the water, plaster, and prepared lime as before, with five or six bushels of sand, and grind the whole well for nine or ten minutes.

For mortar for pointing, use the water, plaster, and prepared lime as before, and then add two bushels of chalk, slaked lime, or whiting, and three bushels of sand.

TABLE showing the Force necessary to tear apart Common Stock Bricks, bedded one across the other, with various quantities of Cement and Lime, the joint in each case having a sectional area of about twenty square inches.

Nature of Lime or Cement.	Composition.	Age 14 days.	Age 21 days.	Age 28 days.	Age 35 days.	Lbs. per sq. inch in 28 days.	Remarks.
Portland cement	1 cement 6 sand	lbs. 166	lbs. 206	lbs. 313	lbs. 309	lbs. 15½	Portland with less than four parts of sand would be out of the question in point of price.
"	1 " 5 "	304	336	325	433	16½	
"	1 " 4 "	217	367	463	520	23	
Blue lias lime	1 lime 3 "	63	One of the best English limes.
" (selenitic)	1 " 6 "	172	237	249	286	12½	
"	1 " 5 "	161	268	233	267	11½	
"	1 " 4 "	144	268	253	283	12½	
"	1 " 3 "	259	235	252	308	12½	
Barrow lias lime	1 " 4 "	110	141	137	..	6½	
"	1 " 3 "	143	137	183	..	9	
" (selenitic)	1 " 6 "	270	409	399	430	20	
"	1 " 5 "	177	572	399	438	20	
"	1 " 4 "	233	892	418	539	21	
"	1 " 3 "	255	388	541	435	27	A first-class, clayey, Medway lime, selected for selenitic mortar, and now supplied by Messrs. Lee for the purpose.
White chalk lime	1 " 3 "	66	97	93	..	4½	
" (selenitic)	1 " 6 "	207	221	218	..	10½	
"	1 " 5 "	215	243	243	..	12½	
"	1 " 4 "	179	197	197	..	9½	
"	1 " 3 "	160	199	209	..	10½	
Burham lime (selenitic)	1 " 6 "	203	343	408	556	20½	
"	1 " 5 "	291	424	368	490	18½	
"	1 " 4 "	336	385	454	430	22½	
"	1 " 3 "	325	454	484	424	24½	

APPENDICES.

APPENDIX A.

AN ACT TO AMEND THE LAWS RELATING TO THE CONSTRUCTION OF BUILDINGS IN THE METROPOLIS AND ITS NEIGHBOURHOOD.

WHEREAS it is expedient that the laws relating to buildings in the Metropolis and its neighbourhood should be amended: Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows (that is to say):—

PRELIMINARY.

Short Title.

I. This Act may be cited for all purposes as "The Metropolitan Building Act, 1855."

Commencement of Act.

II. This Act shall, except in cases where it is otherwise expressly provided, come into operation on the 1st day of January, 1856.

Interpretation of certain Terms in this Act.

III. In the construction of this Act (if not inconsistent with the context) the following terms shall have the respective meanings hereinafter assigned to them (that is to say):—

"The Treasury" shall mean the Commissioners of Her Majesty's Treasury:

"Public building" shall mean every building used as a church, chapel, or other place of public worship; also every building used for purposes of public instruction; also every building used as a college, public hall, hospital,

theatre, public concert room, public ball room, public lecture room, public exhibition room, or for any other public purposes :

“ External wall ” shall apply to every outer wall or vertical enclosure of any building not being a party wall :

“ Party wall ” shall apply to every wall used or built in order to be used as a separation of any building from any other building, with a view to the same being occupied by different persons :

“ Cross wall ” shall apply to every wall used or built in order to be used as a separation of one part of any building from another part of the same building, such building being wholly in one occupation :

“ Party structure ” shall include party walls, and also partitions, arches, floors, and other structures separating buildings, stories, or rooms which belong to different owners, or which are approached by distinct staircases or separate entrances from without :

The “ area ” of every building shall be deemed to be the superficies of a horizontal section of such building made at the point of its greatest surface, including the external walls and such portion of the party walls as belong to the building, but excluding any attached building the height of which does not exceed the height of the ground story :

“ The base of the wall ” shall mean the course immediately above the footings :

“ Owner ” shall apply to every person in possession or receipt either of the whole or of any part of the rents or profits of any land or tenement, or in the occupation of such land or tenement other than as a tenant from year to year or for any less term, or as a tenant at will :

“ Builder ” shall apply to and include the master builder or other person employed to execute or who actually executes any work upon any building.

“ District surveyor ” shall mean every such surveyor who is appointed in pursuance of this Act, or whose appointment is hereby confirmed, and shall include any deputy or assistant surveyor appointed under this Act :

In all cases in which the name of an officer having local jurisdiction in respect of his office is referred to without mention of the locality to which the jurisdiction extends, such reference is to be understood to indicate the officer having jurisdiction in that place within which is situate the building or other subject matter or any part thereof to which such reference applies :

“ Person ” shall include “ a body corporate.”

LIMITS OF ACT.

*Act to extend to all Places within Limits defined by 18 & 19 Vict.
c. 120.*

IV. This Act shall extend to all places within the limits of the Metropolis as defined by an Act passed in the present session of Parliament, intituled "An Act for the Better Local Management of the Metropolis," and to all other places to which such last-mentioned Act may be extended, unless such places are in making such extension expressly excepted from the operation of this Act ; but nothing herein contained shall affect the exercise of any powers vested by any Act of Parliament in the Commissioners of Sewers of the City of London for the time being.

Division of Act.

- V. This Act shall be divided into five parts :
1. The first part relating to the regulation and supervision of buildings :
 2. The second part relating to dangerous structures :
 3. The third part relating to party structures :
 4. The fourth part relating to miscellaneous provisions :
 5. The fifth part relating to the repeal of former Acts, and to temporary provisions.

PART I.

REGULATION AND SUPERVISION OF BUILDINGS.

*Buildings, &c. herein named exempt from Operation of Part I.
of this Act.*

VI. The following buildings and works shall be exempt from the operation of the first part of this Act :

Bridges, piers, jetties, embankment walls, retaining walls, and wharf or quay walls :

Her Majesty's royal palaces, and any building in the possession of Her Majesty, her heirs and successors, or employed for Her Majesty's use or service :

Common gaols, prisons, houses' of correction, and places of confinement under the inspection of the inspectors of prisons, and Bethlehem Hospital, and the house of occupations adjoining :

The Mansion House, Guildhall, and Royal Exchange of the City of London :

The offices and buildings of the Governor and Company of the Bank of England already erected, and which now form

the edifice called "The Bank of England," and any offices and buildings hereafter to be erected for the use of the said governor and company, either on the site of or in addition to and in connection with the said edifice :

The buildings of the British Museum :

The offices and buildings of the Honourable East India Company already erected, and any offices or buildings hereafter to be erected, for the use of the said company, on the site of or in addition to such existing offices and buildings :

Greenwich Hospital and the buildings in the parish of Greenwich vested in the Commissioners of Greenwich Hospital for the purposes of the said hospital :

All county lunatic asylums, sessions houses, and other public buildings belonging to or occupied by the justices of the peace of the county or city in which the same are situated :

The erections and buildings authorised by an Act passed in the 9th year of the reign of His late Majesty King George IV. for the purposes of a market in Covent Garden :

The Cattle Market, with its appurtenances, erected in pursuance of the Metropolitan Cattle Market Act, 1851 :

The buildings belonging to any canal, dock, or railway company, and used for the purposes of such canal, dock, or railway, under the provisions of any Act of Parliament :

All buildings, not exceeding in height thirty feet, as measured from the footings of the walls, and not exceeding in extent one hundred and twenty-five thousand cubic feet, and not being public buildings, wholly in one occupation, and distant at least eight feet from the nearest street or alley, whether public or private, and at the least thirty feet from the nearest buildings and from the ground of any adjoining owner :

All buildings not exceeding in extent two hundred and sixteen thousand cubic feet, and not being public buildings, and distant at least thirty feet from the nearest street or alley, whether public or private, and at the least sixty feet from the nearest buildings and from the ground of an adjoining owner :

All party fence walls and greenhouses so far as regards the necessary woodwork of the sashes, doors, and frames :

Openings made into walls or flues for the purpose of inserting therein ventilating valves of a superficial extent not greater than forty square inches, if such valves are not nearer than twelve inches to any timber or other combustible material.

Application of Act, except Exemptions before mentioned.

VII. With the exemptions hereinbefore mentioned, this Act shall apply to all new buildings ; and whenever mention is herein made of any building, it shall, unless the contrary appears from the context, be deemed to imply a new building.

Building, when deemed to be New.

VIII. A building shall be deemed to be new whenever the enclosing walls thereof have not been carried higher than the footings previously to the said 1st day of January 1856. Any other building shall be deemed to be an old building.

Alterations of and Additions to Old Buildings.

IX. Any alteration, addition, or other work, made or done for any purpose except that of necessary repair not affecting the construction of any external or party wall, in, to, or upon any old building, or in, to, or upon any new building after the roof has been covered in, shall, to the extent of such alteration, addition, or work, be subject to the regulations of this Act ; and whenever mention is hereinafter made of any alteration, addition, or work in, to, or upon any building, it shall, unless the contrary appears from the context, be deemed to imply an alteration, addition, or work to which this Act applies.

Rebuilding Old Buildings.

X. Whenever any old building has been taken down to an extent exceeding one-half of such building, such half to be measured in cubic feet, the rebuilding thereof shall be deemed to be the erection of a new building ; and every portion of such old building that is not in conformity with the regulations of this Act shall be forthwith taken down.

Division of Old Buildings separated by Irregular Partitions.

XI. Whenever any old buildings are separated by timber or other partitions not in conformity with this Act, then, if such partitions are removed to the extent of one-half thereof, such buildings shall as respects the separation thereof be deemed to be new buildings, and be forthwith divided from each other in the manner directed by this Act.

WALLS.

Structure and Thickness of Walls.

XII. Walls shall be constructed of such substances and of such thickness and in such manner as are mentioned in the first schedule annexed hereto.

RECESSES AND OPENINGS.

Rules as to Recesses and Openings.

XIII. The following rules shall be observed with respect to recesses and openings in walls :—

Recesses and openings may be made in external walls, provided

1. That the backs of such recesses are not of less thickness than eight and a half inches ; and
2. That the area of such recesses and openings do not, taken together, exceed one-half of the whole area of the wall in which they are made :

Recesses may be made in party walls, provided that

1. The backs of such recesses are not of less thickness than thirteen inches ; and
2. That every recess so formed is arched over, and that the area of such recesses do not, taken altogether, exceed one-half of the whole area of the wall of the story in which they are made ; and
3. That such recesses do not come within one foot of the inner face of the external walls :

But no opening shall be made in any party wall except in accordance with the rules of this Act.

The word area, as used in this section, shall mean the area of the vertical face, or elevation of the wall, pier, or recess to which it refers.

MISCELLANEOUS.

As to Timber in External Walls.

XIV. Loophole frames may be fixed within one inch and a half of the face of any external wall ; but all other woodwork fixed in any external wall, except bressummers and story posts under the same, and frames of doors and windows of shops on the ground story of any building, shall be set back four inches at the least from the external face of such wall.

Rules as to Bressummers.

XV. The following rules shall be observed with respect to bressummers and timbers :—

1. Every bressummer must have a bearing in the direction of its length of four inches at the least at each end, upon a sufficient pier of brick or stone, or upon a timber or iron story post fixed on a solid foundation, in addition to its bearing upon any party wall ; and the ends of such bressummer shall not be placed nearer to the centre line of the party walls than four and a half inches :

2. No bond timber or wood plate shall be built into any party wall, and the ends of any beam or joist bearing on such walls shall be at the least four and a half inches distant from the centre line of the party walls :
3. Every bressummer bearing upon any party wall must be borne by a templet or corbel of stone or iron tailed through at least half the thickness of such wall, and of the full breadth of the bressummer.

Height and Thickness of Parapets to External Walls.

XVI. If any gutter any part of which is formed of combustible materials adjoins an external wall, then such wall must be carried up so as to form a parapet one foot at the least above the highest part of such gutter, and the thickness of the parapet so carried up must be at the least eight and a half inches, reckoned from the level of the under side of the gutter plate.

Height of Party Walls above Roof.

XVII. Every party wall shall be carried up above the roof, flat, or gutter of the highest building adjoining thereto, to such height as will give a distance of fifteen inches measured at right angles to the slope of the roof, or fifteen inches above the highest part of any flat or gutter, as the case may be ; and every party wall shall be carried up above any turret, dormer, lantern light, or other erection of combustible materials fixed upon the roof or flat of any building within four feet from such party wall, and shall extend at the least twelve inches higher and wider on each side than such erection ; and every party wall shall be carried up above any part of any roof opposite thereto, and within four feet from such party wall.

As to Chases in Party Walls.

XVIII. In a party wall no chase shall be made wider than fourteen inches, nor more than four and a half inches deep from the face of the wall, nor so as to leave less than eight and a half inches in thickness at the back or opposite side thereof, and no chase may be made within a distance of seven feet from any other chase on the same side of the wall.

As to Construction of Roofs.

XIX. The roofs of buildings shall be constructed as follows ; that is to say :—

1. The flat, gutter, and roof of every building, and every turret, dormer, lantern light, skylight, or other erection placed on the flat or roof thereof, shall be externally covered with slates, tiles, metal, or other incombustible materials, except the doors, door frames, windows, and

window frames of such dormers, turrets, lantern lights, skylights, or other erections :

2. The plane of the surface of the roof of a warehouse or other building used either wholly or in part for purposes of trade or manufacture shall not incline from the external or party walls upwards at a greater angle than forty-seven degrees with the horizon.

Rules as to Chimneys and Flues.

XX. The following rules shall be observed as to chimneys and flues :—

1. Chimneys built on corbels of brick, stone, or other incombustible materials may be introduced above the level of the ceiling of the ground story if the work so corbelled out does not project from the wall more than the thickness of the wall, but all other chimnies shall be built on solid foundations, and with footings similar to the footings of the wall against which they are built :
2. Chimneys and flues having proper doors of not less than six inches square may be constructed at any angle, but in every other chimney or flue the angles shall be constructed of an obtuseness of not less than one hundred and thirty degrees, and shall be properly rounded :
3. An arch of brick or stone or a bar of wrought iron must be built over the opening of every chimney to support the breast thereof, and if the breast projects more than four and a half inches from the face of the wall, and the jamb on either side is of less width than seventeen and a half inches, the abutments must be tied in by an iron bar or bars turned up and down at the ends and built into the jambs for at least eight and a half inches on each side :
4. The inside of every flue, and the back or outside, unless forming part of the outer face of an external wall, must be rendered, pargeted, or lined with fireproof piping :
5. The jambs of every chimney must at the least be eight and a half inches wide on each side of the opening thereof :
6. The breast of every chimney, and the front, withe, partition, and back of every flue, must at the least be four inches in thickness :
7. The back of every chimney opening, from the hearth up to the height of twelve inches above the mantel, must at the least be eight and a half inches thick, if in a party wall, or four and a half inches thick if not in a party wall :

8. The thickness of the upper side of every flue, when its course makes with the horizon an angle of less than forty-five degrees, must be at the least eight and a half inches :
9. Every chimney shaft shall be carried up in brick or stone work all round, at the least four inches thick, to a height of not less than three feet above the roof, flat, or gutter adjoining thereto, measured at the highest point in the line of junction with such roof, flat, or gutter :
10. The brickwork or stonework of any chimney shaft, excepting that of the furnace of any steam engine, brewery, distillery, or manufactory, shall not be built higher above the roof, flat, or gutter adjoining thereto, measured from the highest point in the line of junction with such roof, flat, or gutter, than a height equal to six times the least width of such chimney shaft at the level of such highest point in the line of junction, unless such chimney shaft is built with and bonded to another chimney shaft not in the same line with the first, or otherwise rendered secure :
11. There shall be laid, level with the floor of every story, before the opening of every chimney, a slab of stone, slate, or other incombustible substance, at the least twelve inches longer than the width of such opening, and at the least eighteen inches wide in front of the breast thereof :
12. On every floor, except the lowest floor, such slab shall be laid wholly upon stone or iron bearers, or upon brick trimmers ; but on the lowest floor it may be bedded on the solid ground :
13. The hearth or slab of every chimney shall be bedded wholly on brick, stone, or other incombustible substance, and shall be solid for a thickness of seven inches at the least beneath the upper surface of such hearth or slab :
14. No flue shall be built against any party structure, unless a withe is properly secured thereto, at the least four inches in thickness :
15. No chimney breast or shaft built with or in any party wall shall be cut away unless the district surveyor certifies that it can be done without injuriously affecting the stability of any building :
16. No chimney shaft, jamb, breast, or flue shall be cut into except for the purpose of repair, or doing some one or more of the following things :
Of letting in or removing or altering flues, pipes, or

funnels for the conveyance of smoke, hot air, or steam, or of letting in, removing, or altering smoke jacks :

Of forming openings for soot doors, such openings to be fitted with a close iron door and frame :

Of making openings for the insertion of ventilating valves, subject to the following restriction, that no opening shall be made nearer than twelve inches to any timber or combustible substance :

17. No timber or woodwork shall be placed

In any wall or chimney breast nearer than twelve inches to the inside of any flue or chimney opening ;

Under any chimney opening within eighteen inches from the upper surface of the hearth of such chimney opening ;

Within two inches from the face of the brickwork or stonework about any chimney or flue, where the substance of such brickwork or stonework is less than eight and a half inches thick, unless the face of such brickwork or stonework is rendered ;

And no wooden plugs shall be driven nearer than six inches to the inside of any flue or chimney opening, nor any iron holdfast or other iron fastening nearer than two inches thereto.

Rules as to Close Fires, and Pipes for conveying Vapour, &c.

XXI. The following rules shall be observed as to close fires, and pipes for conveying heated vapour or water ; that is to say :—

1. The floor under every oven or stove used for the purpose of trade or manufacture, and the floor around the same for a space of eighteen inches, shall be formed of materials of an incombustible and non-conducting nature :

2. No pipe for conveying smoke, heated air, steam, or hot water shall be fixed against any building on the face next to any street, alley, mews, or public way :

3. No pipe for conveying heated air or steam shall be fixed nearer than six inches to any combustible materials :

4. No pipe for conveying hot water shall be placed nearer than three inches to any combustible materials :

5. No pipe for conveying smoke or other products of combustion shall be fixed nearer than nine inches to any combustible material :

And if any person fails in complying with the rules of this

section, he shall for each offence incur a penalty not exceeding twenty pounds, to be recovered before a justice of the peace.

Rules as to Accesses and Stairs in certain Buildings.

XXII. The following rule shall be observed with respect to accesses and stairs :—

In every public building, and in every other building containing more than one hundred and twenty-five thousand cubic feet, and used as a dwelling-house for separate families, the floors of the lobbies, corridors, passages, and landings, and also the flights of stairs, shall be of stone or other fire-proof material, and carried by supports of a fire-proof material.

Rules as to Habitable Rooms.

XXIII. The following rules shall be observed with respect to habitable rooms in any building ; that is to say :—

1. Every habitable room hereafter constructed in any building, except rooms in the roof thereof and cellars and underground rooms, shall be in every part at the least seven feet in height from the floor to the ceiling.
2. Every habitable room hereafter constructed in the roof of every building shall be at the least seven feet in height from the floor to the ceiling throughout not less than one-half the area of such room :
3. Cellars and underground rooms shall be constructed in manner directed by the said Act for the Better Local Management of the Metropolis :

And whosoever knowingly suffers any room that is not constructed in conformity with this section to be inhabited shall, in addition to any other liabilities he may be subject to under this Act, incur a penalty not exceeding twenty shillings for every day during which such room is inhabited ; and any room in which any person passes the night shall be deemed to be inhabited within the meaning of this Act.

As to Party Arches over Public Ways.

XXIV. Every party arch, and every arch or floor over any public way, or any passage leading to premises in other occupation, shall be formed of brick, stone, or other incombustible materials : If an arch of brick or stone is used, it shall, in cases where its span does not exceed nine feet, be of the thickness of four and a half inches at the least, but when its span exceeds nine feet, be of the thickness of eight and a half inches at the least : If an arch or floor of iron or other incombustible material is used, it shall be constructed in such a manner as may be approved by the district surveyor.

As to Arches under Public Ways.

XXV. Every arch under any public way shall be formed of brick, stone, or other incombustible materials : If an arch of brick or stone is used, it shall, in cases where its span does not exceed ten feet, be of the thickness of eight and a half inches at the least ; where its span does not exceed fifteen feet, it shall be of the thickness of thirteen inches at least ; and where its span exceeds fifteen feet, it shall be of such thickness as may be approved by the district surveyor : If an arch or other construction of iron or other incombustible material is used, it shall be constructed in such manner as may be approved by the district surveyor.

Rules as to Projections.

XXVI. The following rules shall be observed as to projections :—

1. Every coping, cornice, fascia window dressing, portico, balcony, verandah, balustrade, and architectural projection or decoration whatsoever, and also the eaves or cornices to any overhanging roof, except the cornices and dressings to the window fronts of shops, and except the eaves and cornices to detached and semi-detached dwelling-houses distant at least fifteen feet from any other building, and from the ground of any adjoining owner, shall, unless the Metropolitan Board otherwise permit, be of brick, tile, stone, artificial stone, slate, cement, or other fire-proof material :
2. In streets or alleys of a less width than thirty feet any shop front may project beyond the external wall of the building to which it belongs for five inches and no more, and any cornice of any such shop front may project thirteen inches and no more ; and in any street or alley of a width greater than thirty feet, any shop front may project ten inches and no more, and the cornice may project for eighteen inches from the external walls, but no more :
3. No part of the woodwork of any shop front shall be fixed nearer than four and a half inches from the line of junction of any adjoining premises, unless a pier or corbel of stone, brick, or other fire-proof material, four and a half inches wide at the least, is built or fixed next to such adjoining premises as high as such woodwork is fixed, and projects an inch at the least in front of the face thereof :
4. The roof, flat, or gutter of every building, and every

balcony, verandah, shop front, or other projection, must be so arranged and constructed, and so supplied with gutters and pipes, as to prevent the water therefrom from dropping upon or running over any public way :

5. Except in so far as is permitted by this section in the case of shop fronts, and with the exception of water pipes and their appurtenances, copings, cornices, facias, window dressings, and other like architectural decorations, no projection from any building shall extend beyond the general line of fronts in any street, except with the permission of the Metropolitan Board of Works hereinafter mentioned.

Rules as to the Separation of Buildings, and Limitation of their Areas.

XXVII. The following rules shall be observed as to the separation of buildings, and limitation of their areas :—

1. Every building shall be separated by external or party walls from any adjoining building :
2. Separate sets of chambers or rooms tenanted by different persons shall, if contained in a building exceeding three thousand and six hundred square feet in area, be deemed to be separate buildings, and be divided accordingly, so far as they adjoin vertically by party walls, and so far as they adjoin horizontally by party arches or fire-proof floors :
3. If any building in one occupation is divided into two or more tenements, each having a separate entrance and staircase, or a separate entrance from without, every such tenement shall be deemed to be a separate building for the purposes of this Act :
4. Every warehouse, or other building used either wholly or in part for the purposes of trade or manufacture, containing more than two hundred and sixteen thousand cubic feet, shall be divided by party walls in such manner that the contents of each division thereof shall not exceed the above-mentioned number of cubic feet.

Rules as to uniting Buildings.

XXVIII. The following rules shall be observed as to uniting buildings :—

1. No buildings shall be united unless they are wholly in the same occupation :
2. No buildings shall be united if, when so united, they will, considered as one building only, be in contravention of any of the provisions of this Act :
3. No opening shall be made in any party wall dividing

buildings which, if taken together, would contain more than two hundred and sixteen thousand cubic feet, except under the following conditions :

Such opening shall not exceed in width seven feet or in height eight feet ;

Such opening shall have the floor, jambs, and head formed of brick, stone, or iron, and be closed by two wrought-iron doors, each one-fourth of an inch thick in the panel, at a distance from each other of the full thickness of the wall, fitted to rebated frames, without woodwork of any kind :

4. Whenever any buildings which have been united cease to be in the same occupation, any openings made in the party walls dividing the same shall be stopped up with brick or stone work of the full thickness of the wall itself, and properly bonded therewith.

As to Open Spaces near Dwelling-houses.

XXIX. Every dwelling used or intended to be used as a dwelling-house, unless all the rooms can be lighted and ventilated from a street or alley adjoining, shall have in the rear or on the side thereof an open space exclusively belonging thereto of the extent at least of one hundred square feet.

Construction of Public Buildings.

XXX. Notwithstanding anything herein contained, every public building, including the walls, roofs, floors, galleries, and staircases, shall be constructed in such manner as may be approved by the district surveyor, or, in the event of disagreement, may be determined by the Metropolitan Board ; and, save in so far as respects the rules of construction, every public building shall throughout this Act be deemed to be included in the term building, and be subject to all the provisions of this Act, in the same manner as if it were a building erected for a purpose other than a public purpose.

DISTRICT SURVEYORS.

Buildings to be supervised by District Surveyors.

XXXI. With the exemptions hereinbefore mentioned, every building, and every work done to, in, or upon any building, shall be subject to the supervision of the district surveyor appointed to the district in which the building is situate.

*Power to Metropolitan Board of Works established under
18 & 19 Vict. c. 120.*

XXXII. The following things may be done by the Metropolitan Board of Works, established by the said Act for the Better Local Management of the Metropolis, by order, at their discretion ; that is to say :—

1. They may alter the limits of any district, or unite any two or more districts together, and in any such case place such altered district under the supervision of any existing or of any future district surveyor, with power from time to time to alter any district so made, and do all such matters and things as are necessary for carrying into effect the power hereby given :
2. They may dismiss any existing district surveyor, with the consent of one of Her Majesty's Principal Secretaries of State ; they may suspend any such surveyor as last aforesaid ; they may dismiss or suspend any future district surveyor ; and in case of any suspension or during any vacancy they may appoint a temporary substitute :
3. Whenever any vacancy occurs in the office of any existing or future district surveyor, they may appoint another qualified person in his place :
4. They may pay such amount of compensation as they think fit to any district surveyor who may be deprived of his office, in pursuance of the power hereby given of altering the limits of districts :

But, subject to the provisions herein contained, the several places which at the time when this Act comes into operation are constituted districts under an Act passed in the 8th year of the reign of Her present Majesty, chapter 84, and intituled "An Act for regulating the Construction and Use of Buildings in the Metropolis and its Neighbourhood," for the purposes of that Act, shall continue to be districts for the purposes of this Act, and the several persons who at the time when this Act comes into operation are district surveyors under the provisions of the said Act shall continue to be district surveyors under this Act.

Examination by Institute of British Architects.

XXXIII. The Institute of British Architects may from time to time cause to be examined, by such persons and in such manner as they think fit, all candidates presenting themselves for the purpose of being examined as to their competency to perform the duties of district surveyor, and shall grant certificates of competency to the candidates found deserving of the same ; and no person who has not already filled the office of district

surveyor, or has not already obtained a certificate of competency in pursuance of the said Act of the 8th year of the reign of Her present Majesty, chapter 84, shall be qualified to be appointed to that office, unless he has received a certificate of competency from the said Institute of British Architects, or has been examined in such other manner as the said Metropolitan Board may direct, and been found competent in such examination.

District Surveyor to have and maintain an Office.

XXXIV. Every district surveyor shall have and maintain an office at his own expense in such part of his district as may be approved by the Metropolitan Board of Works.

District Surveyor may appoint Deputy with Consent.

XXXV. If any district surveyor is prevented by illness, infirmity, or any other unavoidable circumstance from attending to the duties of his office, he may, with the consent of the Metropolitan Board of Works, appoint some other person as his deputy to perform all his duties for such time as he may be prevented from executing them.

Assistant Surveyor may be appointed on Emergency.

XXXVI. If at any time it appears to the Metropolitan Board of Works that, on account of the pressure of business in any district, or any other account, the surveyor of that district cannot discharge his duties promptly and efficiently, then such board may direct any other district surveyor to assist the surveyor of such district in the performance of his duties, or appoint some other person to give such assistance, and such assistant surveyor shall be entitled to receive all fees payable in respect of the services performed by him.

District Surveyor not to act in case of Works under his Professional Superintendence.

XXXVII. If any building is executed, or any work done to, in, or upon any building, by or under the superintendence of any district surveyor acting professionally or on his own private account, it shall not be lawful for such surveyor to survey any such building for the purpose of this Act, or to act as district surveyor in respect thereof or in any matter connected therewith, but it shall be his duty to give notice thereof to the said Metropolitan Board, who shall then appoint some other district surveyor to act in respect of such matter.

NOTICES TO DISTRICT SURVEYORS.

Notices to be given to District Surveyor by Builder.

XXXVIII. Two days before the following acts or event, that is to say—

Two days before any building, or any work to, in, or upon any building, is commenced, and also, if the progress of any such building or work is after the commencement thereof suspended for any period exceeding three months, two days before such building or work is resumed, and also if during the progress of any such building or work the builder employed thereon is changed, then two days before any new builder enters upon the continuance of such building or work, it shall be the duty of the builder engaged in building or rebuilding such building, or in executing such work, or in continuing such building or work, to give to the district surveyor notice in writing stating the situation, area, and height, and intended use of the building or buildings about to be commenced, or to, in, or upon which any work is to be done, and the number of such buildings if more than one, and also the particulars of any such proposed work, and stating also his own name and address, but any works to, in, or upon the same building that are in progress at the same time may be included in one notice.

District Surveyor to cause Rules of this Act to be observed.

XXXIX. Every district surveyor shall, upon the receipt of any such notice as aforesaid, and also upon any work affected by the rules of this Act, but in respect of which no notice has been given, being observed by or made known to him, and also from time to time during the progress of any works affected by the rules and directions of this Act, as often as may be necessary for securing the due observance of such rules, survey any building or work hereby placed under their supervision, and cause all the rules of this Act to be duly observed.

Notice to be Evidence of Intended Works.

XL. Every notice given in pursuance of this Act shall be deemed, in any question relative to any building or work, to be *primâ facie* evidence as against such builder of the nature of the building or work proposed to be built or done.

Penalty on Builders neglecting to give Notice.

XLI. If any builder neglects to give notice in any of the cases aforesaid, or executes any works of which he is hereby required

to give notice before giving the same, or, having given due notice of any works, executes the same before the expiration of two days from the time of giving such notice, such builder shall for every such offence incur a penalty not exceeding twenty pounds, to be recovered before a justice of the peace.

District Surveyor may enter and inspect Buildings affected by this Act. Penalty for Refusal.

XLII. At all reasonable times during the progress of any building or work affected by this Act it shall be lawful for the district surveyor to enter and inspect such building or work ; and if any person refuses to admit such surveyor to inspect such building or work, or refuses or neglects to afford such surveyor all reasonable assistance in such inspection, in every such case the offender shall incur for each offence a penalty not exceeding twenty pounds, to be recovered before a justice of the peace.

District Surveyor may enter Buildings to ascertain as to exempted Buildings.

XLIII. The district surveyor may at all reasonable times enter any premises, with the exception of buildings hereinbefore exempted by name, for the purpose of ascertaining whether any buildings erected in such premises are in such a situation or possess such characteristics as are hereinbefore required in order to exempt them from the operation of this Act, and he may do all such things as are necessary for the above purpose ; and if any person refuses to admit such surveyor to enter such premises or to inspect any such building, or neglects to afford to him all reasonable assistance in such inspection, in every such case the offender shall incur for each offence a penalty not exceeding twenty pounds to be recovered before a justice of the peace.

In case of Emergency, Works may be commenced without Notice.

XLIV. If by reason of any emergency any act or work is required to be done immediately, or before notice can be given as aforesaid, then it shall be lawful to do the act or work so required to be done, upon condition that before the expiration of twenty-four hours after such act or work has been begun notice thereof is given to the district surveyor.

PROCEEDINGS BY DISTRICT SURVEYORS IN CASE OF IRREGULARITY.

Notice by District Surveyor in case of Irregularity.

XLV. In the following cases, that is to say,—

If in erecting any building or in doing any work to, in, or upon any building, anything is done contrary to any of

the rules of this Act, or anything required by this Act is omitted to be done ; or

In cases where due notice has not been given,—

If the district surveyor, on surveying or inspecting any building or work, finds that the same is so far advanced that he cannot ascertain whether anything has been done contrary to the rules of this Act, or whether anything required by the rules of this Act has been omitted to be done ;

In every such case the district surveyor shall give to the builder engaged in erecting such building, or in doing such work, notice in writing requiring such builder, within forty-eight hours from the date of such notice, to cause anything done contrary to the rules of this Act to be amended, or to do anything required to be done by this Act, but which has been omitted to be done, or to cause so much of any building or work as prevents such district surveyor from ascertaining whether anything has been done or omitted to be done as aforesaid to be to a sufficient extent cut into, laid open, or pulled down.

On Noncompliance with Notice, Justice to summon Builder, and make Order to comply with Requisition.

XLVI. If the builder to which such notice is given makes default in complying with the requisition thereof within such period of forty-eight hours, the district surveyor may cause complaint of such noncompliance to be made before a justice of the peace, and such justice shall thereupon issue a summons requiring the builder so in default to appear before him ; and if upon his appearance, or in his absence, upon due proof of the service of such summons, it appears to such justice that the requisitions made by such notice or any of them are authorised by this Act, he shall make an order on such builder commanding him to comply with the requisitions of such notice, or any of such requisitions that may in his opinion be authorised by this Act, within a time to be named in such order.

Penalty on Noncompliance with Order of Justice.

XLVII. If such order is not complied with, the builder on whom it is made shall incur a penalty not exceeding twenty pounds a day, to be recovered before a justice of the peace, during every day of the continuance of such noncompliance, and in addition thereto the district surveyor may, if he thinks fit, proceed with a sufficient number of workmen to enter upon the premises, and do all such things as may be necessary for enforcing the requisitions of such notice, and for bringing any building or work into conformity with the rules of this Act,

and all expenses incurred by him in so doing and in any such proceedings as aforesaid may be recovered from the builder on whom such order was made, in a summary manner, before a justice of the peace, or may be recovered from the owner of the premises in the same manner in which expenses incurred by the commissioners hereinafter named in respect of dangerous buildings are hereinafter directed to be recovered from any owner ; and if the owner cannot be found, or if, on demand, he refuses or neglects to pay the aforesaid expenses, the district surveyor shall have the same power of taking and selling the building in respect of which the order is made, and of applying the proceeds, as is thereby given to the commissioners.

Penalty on Workmen, &c. doing anything contrary to Rules of Act.

XLVIII. If any workman, labourer, servant, or other person employed in or about any building, wilfully, and without the privity or consent of the person causing such work to be done, does anything in or about such building contrary to the rules of this Act, he shall for each such offence incur a penalty not exceeding fifty shillings.

FEES OF DISTRICT SURVEYORS.

Payments to District Surveyors in respect of Matters in First Part of Second Schedule.

XLIX. There shall be paid to the district surveyors, in respect of the several matters specified in the first part of the second schedule hereto, the fees therein specified, or such other fees, not exceeding the amounts therein specified, as may from time to time be directed by the Metropolitan Board of Works ; but one fee only shall be chargeable with respect to any such works done in, to, or upon any building as are in pursuance of the provisions hereinbefore contained included in one notice ; and if in consequence of any reduction being made by the said Metropolitan Board in the amount of the said scheduled fees the income of any existing district surveyor is diminished, the Metropolitan Board shall grant to him compensation in respect of such diminution.

Metropolitan Board may appoint Special Fees for Services not provided for.

L. If any special service is required to be performed by the district surveyor under the first part of this Act, for which no fee is specified in the said schedule, the Metropolitan Board of

Works may order such fee to be paid for such service as they think fit, and the district surveyor shall have the same remedy for recovering such special fee as if the same were expressly named in the said schedule.

Periods when Surveyors entitled to Fees.

LI. At the expiration of the following periods, that is to say,
Of one month after the roof of any building surveyed by any district surveyor under this Act has been covered in,
Of fourteen days after the completion of any such work as is by this Act placed under the supervision of the district surveyor,
Of fourteen days after any special service in respect of any building has been performed,
the district surveyor shall be entitled to receive the amount of fees due to him from the builder employed in erecting such building, or in doing such work, or in doing any matter in respect of which any special service has been performed by the surveyor, or from the owner or occupier of the building so erected or in respect of which such work has been done or service performed ; and if any such builder, owner, or occupier refuses to pay the same, such fees may be recovered in a summary manner before a justice of the peace, upon its being shown to the satisfaction of such justice that a proper bill specifying the amount of such fees was delivered to such builder, owner, or occupier, or sent to him in a registered letter addressed to his last known residence.

RETURNS BY DISTRICT SURVEYORS.

District Surveyor to make Monthly Returns to Metropolitan Board of Works.

LII. Every district surveyor shall, within seven days after the first day of every month, make a return to the Metropolitan Board of Works, in such manner as they may appoint, of all notices and complaints received by him relative to the business of his district, and the results thereof, and of all matters brought by him before any justice of the peace, and of all the several works supervised and special services performed by him in the exercise of his office within the previous month, and of all fees charged or received in respect thereof, and specify in such return the description and locality of every building built, rebuilt, enlarged, or altered, or on which any work has been done under his supervision, with the particular nature of every work in respect of which any fee has been charged or received.

Return duly signed to be a Certificate that Works are agreeable to Act.

LIII. Every such return shall be signed by such surveyor, and shall be deemed to be a certificate that all the works enumerated therein as completed have been done in all respects agreeably to this Act, according to the best of his knowledge and belief, and that they have been duly surveyed by him.

Superintending Architect to audit Accounts of Fees charged by District Surveyors, and to report in case of Excess.

LIV. The officer hereinafter mentioned as the Superintending Architect of Metropolitan Buildings, or such other officer as the Metropolitan Board of Works appoint, shall from time to time examine the said monthly returns made by the district surveyors; and in case any fees therein specified appear to such officer to be unauthorised by this Act, or to exceed in amount the rates hereby made payable, or in case any such account appears to be in any respect fraudulent or untrue, he shall make his report in writing to that effect to the Metropolitan Board of Works, who shall thereupon take such steps in the matter as they deem expedient.

POWERS OF METROPOLITAN BOARD OF WORKS.

Power for Metropolitan Board of Works to modify Rules.

LV. The Metropolitan Board of Works may, by order, made with the consent of Her Majesty in Council, alter, in such manner as they may think fit, the rules for the regulation of the thickness of walls contained in the first schedule hereto.

Buildings to which Rules of Act are inapplicable.

LVI. Whenever any builder is desirous of erecting any iron building, or any other building to which the rules of this Act are inapplicable, he shall make an application to the Metropolitan Board of Works, stating such desire, and setting out a plan of the proposed building, with such particulars as to the construction thereof as may be required by the said Board; and the latter, if satisfied with such plan and particulars, shall signify their approval of the same, and thereupon such building may be constructed according to such plan and particulars; but it shall not be lawful for such Board to authorise any warehouse or other building used either wholly or in part for the purposes of trade or manufacture to be erected of greater dimensions than two hundred and sixteen thousand cubic feet, unless it is divided by party walls in manner hereinbefore required.

Power of Metropolitan Board to make General Rules.

LVII. The said Metropolitan Board may, for the purpose of regulating the proceedings of such applicants as aforesaid, from time to time issue such general rules as to the time and manner of making such applications, as to the plans to be presented, as to the expenses to be incurred, and as to any other matter or thing connected therewith, as they may think fit.

Approval of Board, how signified.

LVIII. The approval by the Metropolitan Board of Works of any plans or particulars, in pursuance of the foregoing provisions, shall be signified by writing under the hand of the Superintending Architect of Metropolitan Buildings, and countersigned by the chairman of such Board, or by any other officer appointed by the Board.

Board to issue Forms of Notices.

LIX. The said Metropolitan Board may from time to time prepare or sanction forms of the various notices required by this Act, and may from time to time make such alterations therein as they deem requisite ; and they shall cause every such form to be sealed with the seal of the Board, or marked with some other distinguishing mark ; and any notice made in a form sanctioned by the Board shall in all proceedings be held sufficient in law.

Expenses of Orders to be borne by Builders.

LX. All expenses incurred in and about the obtaining such approval of the Metropolitan Board of Works as aforesaid shall be paid by the builder to the said Superintending Architect, or to such other person as the said Board may appoint, and in default of payment may be recovered in a summary manner.

District Surveyor to see Plans carried into Execution.

LXI. A copy of any plans and particulars, approved by the Metropolitan Board of Works, shall be furnished to the surveyor within whose district the building to which such plans and particulars relate is situate, and thereupon it shall be the duty of such district surveyor to ascertain that the same is built in accordance with the said plans and particulars.

Power to Metropolitan Board to appoint Superintending Architect and Clerks.

LXII. The Metropolitan Board of Works may, for the purpose of aiding in the execution of this Act, appoint some fit person;

to be called the "Superintending Architect of Metropolitan Buildings," together with such number of clerks as they think fit ; such architect and clerks shall be removable by the said Metropolitan Board, and shall perform such duties as the said Board direct ; but it shall not be lawful for any Superintending Architect to practise as an architect, or to follow any other occupation.

Superintending Architect may appoint Deputy, with Consent.

LXIII. If the Superintending Architect is prevented by illness, infirmity, or any other unavoidable circumstance from attending to the duties of his office, he may, with the consent of the Metropolitan Board of Works, appoint some other person as his deputy to perform all his duties for such time as he may be temporarily prevented from executing them.

Salaries to Architect and Clerks.

LXIV. There shall be paid to such Superintending Architect and clerks such salaries as the said Metropolitan Board may from time to time direct.

EXPENSES.

Power of Metropolitan Board to pay Salaries.

LXV. The said Metropolitan Board may at any time hereafter, by order, cause such fixed salary as they may determine to be paid to any district surveyor by way of remuneration instead of fees, provided the amount of such remuneration be not less than the amount of the average of the fees for the last three years ; and thereupon such surveyor shall pay all fees received by him under this Act into the hands of the said Superintending Architect.

Moneys received by Superintending Architect to be paid to the Metropolitan Board.

LXVI. All moneys received by the Superintending Architect in pursuance of this Act shall be accounted for and paid by him into the hands of the treasurer of the said Metropolitan Board, at such time and in such manner as the said Board may direct.

Metropolitan Board may pay Salaries out of Rates.

LXVII. The said Metropolitan Board may at any time hereafter provide, either wholly or partially, for the payment of

salaries to the district surveyors, or to any of them, out of the rates leviable by such Board, in pursuance of the said Act for the Better Local Management of the Metropolis, and may thereupon abolish or reduce any fees hereby made payable to the district surveyors.

Expenses, how borne.

LXVIII. All expenses of carrying into execution this Act, not hereby otherwise provided for, shall be deemed to be expenses incurred by the said Metropolitan Board in the execution of the said Act for the Better Local Management of the Metropolis, and shall be raised and paid accordingly.

PART II.

DANGEROUS STRUCTURES.

Survey to be made of Dangerous Structures.—8 Vict. c. 84, s. 40.

LXIX. Whenever it is made known to the commissioners hereinafter named that any structure (including in such expression any building, wall, or other structure, and anything affixed to or projecting from any building, wall, or other structure) is in a dangerous state, such commissioners shall require a survey of such structure to be made by the district surveyor, or by some other competent surveyor, and it shall also be the duty of the district surveyor to make known to the said commissioners any information he may receive with respect to any structure being in such state as aforesaid.

Definition of "Commissioners."

LXX. In cases where any such structure is situate within the City of London or the liberties thereof, hereinafter included under the expression "the City of London," the expression "the Commissioners" shall mean "the Commissioners of Sewers of the City of London;" but when such structure is situate elsewhere, it shall mean "the Commissioners of Police of the Metropolis," or such one of them as may be authorised by one of Her Majesty's principal Secretaries of State to act in the matter of this Act.

Surveyor on Completion of Survey to give Certificate.

LXXI. Upon the completion of his survey the surveyor employed shall certify to the said commissioners his opinion as to the state of any such structure as aforesaid.

Proceedings to be taken in respect to Certificate.

LXXII. If such certificate is to the effect that such structure is not in a dangerous state, no further proceedings shall be had in respect thereof, but if it is to the effect that the same is in a dangerous state, the commissioners shall cause the same to be shored up, or otherwise secured, and a proper hoard or fence to be put up for the protection of passengers, and shall cause notice in writing to be given to the owner or occupier of such structure requiring him forthwith to take down, secure, or repair the same, as the case requires.

On Noncompliance with Notice, Justice to summon Owner, &c. and make Order to comply with Requisition.

LXXIII. If the owner or occupier to whom notice is given as last aforesaid fails to comply, as speedily as the nature of the case permits, with the requisition of such notice, the said commissioners may make complaint thereof before a justice of the peace; and it shall be lawful for such justice to order the owner, or on his default the occupier, of any such structure to take down, repair, or otherwise secure, to the satisfaction of the surveyor who made such survey as aforesaid, or of such other surveyor as the said commissioners may appoint, such structure or such part thereof as appears to him to be in a dangerous state, within a time to be fixed by such justice; and in case the same is not taken down, repaired, or otherwise secured within the time so limited, the said commissioners may with all convenient speed cause all or so much of such structure as is in a dangerous condition to be taken down, repaired, or otherwise secured, in such manner as may be requisite; and all expenses incurred by the said commissioners in respect of any dangerous structure by virtue of the second part of this Act shall be paid by the owner of such structure, but without prejudice to his right to recover the same from any lessee or other person liable to the expenses of repairs.

If Owner cannot be found, Commissioners may sell Structure, giving the Surplus to Owner, &c.

LXXIV. If such owner cannot be found, or if, on demand, he refuses or neglects to pay the aforesaid expenses, the said commissioners, after giving three months' notice of their intention to do so, by posting a printed or written notice in a conspicuous place on the structure in respect of which or of part of which they have incurred expense, or on the land whereon it stands, may sell such structure, and they shall, after deducting from the

proceeds of such sale the amount of all expenses incurred by them, restore the surplus (if any) to the owner.

Payments by or to the Commissioners, how made.

LXXV. All payments hereby directed to be made by or to the commissioners shall in the cases of payments in respect of any structure situate within the City of London be made by or to the Chamberlain of the City out of or to the consolidated rate made by the Commissioners of Sewers, and in the cases of payments in respect of any structure situate elsewhere within the limits of this Act be made by or to the Receiver of Metropolitan Police, in the same manner in which payments are made by or to such Chamberlain and Receiver respectively in the ordinary course of their business ; but no commissioner or other officer shall be liable in respect of any loss that may be sustained by any person in consequence of the exercise by the said commissioners of the powers hereby given them, unless such loss happens through the wilful default of such commissioner or other officer.

Surplus, how to be applied if no Demand made for it.

LXXVI. In cases where any surplus is hereby made payable to any owner, if no demand for the same is made by any person entitled thereto within one year, then the same shall be paid into the Bank of England in the name and with the privity of the Accountant-General of the Court of Chancery, to be placed to his account there to the credit of the owner (describing him so far as the commissioners can), subject to the control of the court, and to be paid out to the owner on his applying by petition, and proving his title thereto.

Fees to District Surveyor.

LXXVII. There shall be paid to the district surveyor, or to such other surveyor as aforesaid, in respect of his services under the second part of this Act, such fees, not exceeding the amounts specified in the second part of the second schedule hereto, as may from time to time be directed by the said Metropolitan Board.

Metropolitan Board may appoint Special Fees for Services not provided for.

LXXVIII. If any special service is required to be performed by the district surveyor, or by such other surveyor as aforesaid, under the second part of this Act, for which no fee is specified in the said schedule, the said Metropolitan Board may order such fee to be paid for such service as they think fit.

Fees to be deemed Part of Expenses.

LXXIX. All fees paid to the district surveyor, or to such other surveyor as aforesaid, by virtue of the second part of this Act, shall be deemed to be expenses incurred by the said commissioners in the matter of the dangerous structure in respect of which such fees are paid, and shall be recoverable by them from the owner accordingly.

Justice of Peace may cause Inmates to be removed from Dangerous Structures.

LXXX. In cases where a structure has been certified by a district surveyor, or such other surveyor as aforesaid, to be dangerous to its inmates, a justice of the peace may, if satisfied of the correctness of such certificate, upon the application of the said commissioners, by order under his hand direct any inmates of such structure to be removed therefrom by a constable or other peace officer, and if they have no other abode, he may require them to be received into the workhouse established for the reception of the poor of the place in which such structure is situate.

Powers of Commissioners to appoint Officers.

LXXXI. Subject to the approval of one of Her Majesty's principal Secretaries of State, the said commissioners may appoint such persons at such salaries, and make such regulations, as they think fit for carrying into execution the second part of this Act ; and all expenses incurred by them not hereby otherwise provided for shall, in the case of expenses incurred by the said Commissioners of Police, be deemed to be expenses incurred by them in respect of the police force of which they are commissioners, and be payable accordingly ; and all expenses incurred by the said Commissioners of Sewers shall be paid out of the said consolidated rate.

PART III.

PARTY STRUCTURES.

PRELIMINARY.

Definition of Building Owner and Adjoining Owner.

LXXXII. In the construction of the following provisions relating to party structures, such one of the owners of the premises separated by or adjoining to any party structure as is

desirous of executing any work in respect to such party structure shall be called the building owner, and the owner of the other premises shall be called the adjoining owner.

RIGHTS OF BUILDING AND ADJOINING OWNERS.

Rights of Building Owner.

LXXXIII. The building owner shall have the following rights in relation to party structures ; that is to say :—

1. A right to make good or repair any party structure that is defective or out of repair :
2. A right to pull down and rebuild any party structure that is so far defective or out of repair as to make it necessary or desirable to pull down the same :
3. A right to pull down any timber or other partition that divides any buildings, and is not conformable with the regulations of this Act, and to build instead a party wall conformable thereto :
4. In the case of buildings having rooms or stories the property of different owners intermixed, a right to pull down such of the said rooms or stories or any part thereof as are not built in conformity with this Act, and to rebuild the same in conformity with this Act :
5. In the case of buildings connected by arches or communications over public ways or over passages belonging to other persons, a right to pull down such of the said buildings, arches, or communications, or any part thereof, as are not built in conformity with this Act, and to rebuild the same in conformity with this Act :
6. A right to raise any party structure permitted by this Act to be raised, or any external wall built against such party structure, upon condition of making good all damage occasioned thereby to the adjoining premises or to the internal finishings and decorations thereof, and of carrying up to the requisite height all flues and chimney stacks belonging to the adjoining owner on or against such party structure or external wall :
7. A right to pull down any party structure that is of insufficient strength for any building intended to be built, and to rebuild the same of sufficient strength for the above purpose, upon condition of making good all damage occasioned thereby to the adjoining premises, or to the internal finishings and decorations thereof :
8. A right to cut into any party structure upon condition of making good all damage occasioned to the adjoining premises by such operation :

9. A right to cut away any footing or any chimney breasts, jambs, or flues projecting from any party wall, in order to erect an external wall against such party wall, or for any other purpose, upon condition of making good all damage occasioned to the adjoining premises by such operation :
10. A right to cut away or take down such parts of any wall or building of an adjoining owner as may be necessary in consequence of such wall or building overhanging the ground of the building owner, in order to erect an upright wall against the same, on condition of making good any damage sustained by the wall or building by reason of such cutting away or taking down :
11. A right to perform any other necessary works incident to the connection of party structure with the premises adjoining thereto :

But the above rights shall be subject to this qualification, that any building which has been erected previously to the time of this Act coming into operation shall be deemed to be conformable with the provisions of this Act if it is conformable with the provisions of an Act passed in the 14th year of His late Majesty King George III., chapter 78, or with the provisions of the said Act of the 8th year of Her present Majesty, chapter 84.

Rights of Adjoining Owner.

LXXXIV. Whenever the building owner proposes to exercise any of the foregoing rights with respect to party structures, the adjoining owner may require the building owner to build on any such party structure certain chimney jambs, breasts, or flues, or certain piers or recesses, or any other like works for the convenience of such adjoining owner ; and it shall be the duty of the building owner to comply with such requisition in all cases where the execution of the required works will not be injurious to the building owner, or cause to him unnecessary inconvenience or unnecessary delay in the exercise of his right ; and any difference that arises between any building owner and adjoining owner in respect of the execution of such works as aforesaid shall be determined in manner in which differences between building owners and adjoining owners are hereinafter directed to be determined.

Rules as to Exercise of Rights by Building and Adjoining Owners.

LXXXV. The following rules shall be observed with respect

to the exercise by building owners and adjoining owners of their respective rights :—

1. No building owner shall, except with the consent of the adjoining owner, or in cases where any party structure is dangerous, in which cases the provisions hereby made as to dangerous structures shall apply, exercise any right hereby given in respect of any party structure, unless he has given at the least three months' previous notice to the adjoining owner by delivering the same to him personally, or by sending it by post in a registered letter addressed to such owner at his last known place of abode :
2. The notice so given shall be in writing or printed, and shall state the nature of the proposed work, and the time at which such work is proposed to be commenced :
3. No building owner shall exercise any right hereby given to him in such manner or at such time as to cause unnecessary inconvenience to the adjoining owner :
4. Upon the receipt of such notice the adjoining owner may require the building owner to build or may himself build on any such party structure any works to the construction of which he is hereinbefore mentioned to be entitled :
5. Any requisition so made by an adjoining owner shall be in writing or printed, and shall be delivered personally to the building owner within one month after the date of the notice being given by him, or be sent by post in a registered letter addressed to him at his last known place of residence : it shall specify the works required by the adjoining owner for his convenience, and shall, if necessary, be accompanied with explanatory plans and drawings :
6. If either owner does not, within fourteen days after the delivery to him of any notice or requisition, express his consent thereto, he shall be considered as having dissented therefrom, and thereupon a difference shall be deemed to have arisen between the building owner and the adjoining owner :
7. In all cases not hereby specially provided for where a difference arises between a building owner and adjoining owner in respect of any matter arising under this Act, unless both parties concur in the appointment of one surveyor, they shall each appoint a surveyor, and the two surveyors so appointed shall select a third surveyor, and such one surveyor, or three surveyors, or any two of them, shall settle any matters in dispute between

- such building and adjoining owner, with power by his or their award to determine the right to do and the time and manner of doing any work, and generally any other matter arising out of or incidental to such difference ; but any time so appointed for doing any work shall not commence until after the expiration of such period of three months, as is hereinbefore mentioned :
8. Any award given by such one surveyor, or by such three surveyors, or any two of them, shall be conclusive, and shall not be questioned in any court, with this exception, that either of the parties to the difference may appeal therefrom to the county court within fourteen days from the date of the delivery of any such award as aforesaid, and such county court may, subject as hereinafter mentioned, rescind or modify the award so given in such manner as it thinks just :
 9. If either party to the difference makes default in appointing a surveyor for ten days after notice has been given to him by the other party in manner aforesaid to make such appointment, the party giving the notice may make the appointment in the place of the party so making default :
 10. The costs incurred in obtaining any such award as aforesaid shall be paid by such party as such one surveyor, or three surveyors, or any two of them, may determine :
 11. If the appellant from any such award as aforesaid, on appearing before the county court, declares his unwillingness to have the matter decided by such court, and proves to the satisfaction of the judge of such court that in the event of the matter being decided against him he will be liable to pay a sum, exclusive of costs, exceeding fifty pounds, and gives security, to be approved by such judge, duly to prosecute his appeal and to abide the event thereof, all proceedings in the county court shall thereupon be stayed ; and it shall be lawful for such appellant to bring an action in one of Her Majesty's superior courts of law at Westminster against the other party to the difference ; and the plaintiff in such action shall deliver to the defendants an issue or issues whereby the matters in difference between them may be tried ; and the form of such issue or issues, in case of dispute, or in case of the non-appearance of the defendant, shall be settled by the court in which the action is brought ; and such action shall be prosecuted and issue or issues tried in the same manner and subject to the same incidents in and subject

to which actions are prosecuted and issues tried in other cases within the jurisdiction of such court, or as near thereto as circumstances admit :

12. If the parties to any such action agree as to the facts, a special case may be stated for the opinion of any such superior court as aforesaid, and any case so stated may be brought before the court in like manner and subject to the same incidents in and subject to which other special cases are brought before such court, or as near thereto as circumstances admit ; and any costs that may have been incurred in the county court by the parties to such action as is mentioned in this section shall be deemed to be costs incurred in such action, and be payable accordingly.

Power for Building Owner to make Entry on Premises to effect Works.—Penalty on Persons obstructing.

LXXXVI. Whenever any building owner has become entitled, in pursuance of this Act, to execute any work, it shall be lawful for him, his servants, agents, or workmen, at all usual times of working, to enter on any premises, for the purpose of executing and to execute such work, removing any furniture, or doing any other thing that may be necessary, and if such premises are closed, he or they may, accompanied by a constable or other officer of the peace, break open any doors in order to effect such entry ; and any owner or other person that hinders or obstructs any workman employed for any of the purposes aforesaid, or wilfully damages or injures the said work, shall incur for every such offence a penalty not exceeding ten pounds, to be recovered before a justice of the peace.

Security to be given by Building Owner, if required by Adjoining Owner.

LXXXVII. Any adjoining owner may, if he thinks fit, by notice in writing given by himself or his agent, require the building owner, before commencing any work which he may be authorised by this Act to execute, to give such security as may be agreed upon, or in case of difference may be settled by the judge of the county court, for the payment of all such costs and compensation in respect of such work as may be payable by such building owner.

Rules as to Expenses in respect of Party Structure.

LXXXVIII. The following rules shall be observed as to expenses in respect of any party structure (that is to say) :—

As to expenses to be borne jointly by the building owner and adjoining owner :

1. If any party structure is defective or out of repair, the expense of making good or repairing the same shall be borne by the building owner and adjoining owner in due proportion, regard being had to the use that each owner makes of such structure :
2. If any party structure is pulled down and rebuilt by reason of its being so far defective or out of repair as to make it necessary or desirable to pull down the same, the expense of such pulling down and rebuilding shall be borne by the building owner and adjoining owner in due proportion, regard being had to the use that each owner makes of such structure :
3. If any timber or other partition dividing any building is pulled down, in exercise of the right hereinbefore vested in a building owner, and a party structure built instead thereof, the expense of building such party structure, and also of building any additional party structures that may be required by reason of such partition having been pulled down, shall be borne by the building owner and adjoining owner in due proportion, regard being had to the use that each owner makes of such party structure, and to the thickness required to the respective buildings parted thereby :
4. If any room or stories, or any part of rooms or stories, the property of different owners, and intermixed in any building, are pulled down in pursuance of the right hereinbefore vested in any building owner, and rebuilt in conformity with this Act, the expense of such pulling down and rebuilding shall be borne by the building owner and adjoining owner in due proportion, regard being had to the use that each owner makes of such rooms or stories :
5. If any arches or communications, or any parts thereof, are pulled down in pursuance of the right hereinbefore vested in any building owner, and rebuilt in conformity with this Act, the expense of such pulling down and rebuilding shall be borne by the building owner and adjoining owner in due proportion, regard being had to the use that each owner makes of such arches or communications.

As to expenses to be borne by building owner :

6. If any party structure or external wall built against the same is raised in pursuance of the power hereinbefore vested in any building owner, the expense of raising the same, and of making good all such damage, and of

- carrying up to the requisite height all such flues and chimneys as are hereinbefore required to be made good and carried up, shall be borne by the building owner :
7. If any party structure which is of proper materials and sound, or not so far defective or out of repair as to make it necessary or desirable to pull down the same, is pulled down and rebuilt by the building owner, the expense of pulling down and rebuilding the same, and of making good all such damage as is hereinbefore required to be made good, shall be borne by the building owner :
 8. If any party structure is cut into by the building owner, the expense of cutting into the same, and of making good any damages hereinbefore required to be made good, shall be borne by such building owner :
 9. If any footing, chimney breast, jambs, or floor is cut away in pursuance of the powers hereinbefore vested in any building owner, the expense of such cutting away, and of making good any damage hereinbefore required to be made good, shall be borne by the building owner.

Account of Expenses of Works to be delivered to Adjoining Owner within One Month.

LXXXIX. Within one month after the completion of any work which any building owner is by this Act authorised or required to execute, and the expense of which is in whole or in part to be borne by an adjoining owner, such building owner shall deliver to the adjoining owner an account in writing of the expense of the work, specifying any deduction to which such adjoining owner or other person may be entitled in respect of old materials, or in other respects ; and every such work as aforesaid shall be estimated and valued at fair average rates and prices, according to the nature of the work and the locality, and the market price of materials and labour at the time.

Adjoining Owner may appeal against Account.

XC. At any time within one month after the delivery of such account, the adjoining owner, if dissatisfied therewith, may declare his dissatisfaction to the party delivering the same, by notice in writing given by himself or his agent, and specifying his objections thereto ; and upon such notice having been given a difference shall be deemed to have arisen between the parties, and such difference shall be determined in manner hereinbefore provided for the determination of differences between building and adjoining owners.

Building Owner may recover, if no Appeal made.

XCI. If within such period of one month as aforesaid the party receiving such account does not declare in manner aforesaid his dissatisfaction therewith, he shall be deemed to have accepted the same, and shall pay the same, on demand, to the party delivering the account, and if he fails to do so the amount so due may be recovered as a debt.

Penalty on Delay of Payment by Adjoining Owner.

XCII. Where the adjoining owner is liable to contribute to the expenses of building any party structure, until such contribution is paid, the building owner at whose expense the same was built shall stand possessed of the sole property in such structure.

As to Expenses incurred on Requisition of Adjoining Owner.

XCIII. Where any building owner has incurred any expenses on the requisition of an adjoining owner, the adjoining owner making such requisition shall be liable for all such expenses, and in default of payment the same may be recovered from him as a debt.

Penalty on Building Owner failing to execute required Works.

XCIV. Where any building owner is, by the third part of this Act, liable to make good any damage he may occasion to the property of the adjoining owner by any works authorised to be executed by him, or to do any other thing upon condition of doing which his right to execute such works is hereby limited to arise, and such building owner fails within a reasonable time to make good such damage or to do such thing, he shall incur a penalty, to be recovered before a justice of the peace, not exceeding twenty pounds for each day during which such failure continues.

Consent how given on behalf of Persons under Disability.

XCV. Where, in pursuance of this Act, any consent is required to be given, any notice to be served, or any other thing to be done by, on, or to any owner under disability, such consent may be given, such notice may be served, and such thing may be done by, on, or to the following persons, on behalf of such persons under disability ; that is to say :—

By, on, or to a husband, on behalf of his wife ;

By, on, or to a trustee, on behalf of his cestuique trust ;

By, on, or to a guardian or committee, on behalf of an infant, idiot, or lunatic.

Consent how given on behalf of Persons not to be found.

XCVI. Where any consent is required to be given or any other thing to be done by any owner in pursuance of this Act, if there is no owner capable of giving such consent or of doing such thing, and no person empowered by this Act to give such consent or to do such thing on behalf of such owner, or if any owner so capable, or any person so empowered, cannot be found, the judge of the county court shall have power to give such consent or do or cause to be done such thing on behalf of such owner, upon such terms, and subject to such conditions, as he may think fit, having regard alike to the nature and purpose of the subject-matter in respect of which such consent is to be given, and to the fair claims of the parties on whose behalf such consent is to be given; and such judge shall have power to dispense with the service of any notice which would otherwise be required to be served.

PART IV.

MISCELLANEOUS PROVISIONS.

Payment of Expenses by Owners.

XCVII. Where it is hereby declared that expenses are to be borne by the owner of any premises (including in the term "owner" the adjoining and building owner respectively), the following rules shall be observed with respect to the payment of such expenses:—

1. The owner immediately entitled in possession to such premises, or the occupier thereof, shall in the first instance pay such expenses, with this limitation, that no occupier shall be liable to pay any sum exceeding in amount the rent due or that will thereafter accrue due from him in respect of such premises during the period of his occupancy:
2. If there are more owners than one, every owner shall be liable to contribute to such expenses in proportion to his interest:
3. If any difference arises as to the amount of contribution, such difference shall be decided by arbitration, to be conducted in manner directed by the Companies' Clauses' Consolidation Act, 1845; and for that purpose the clauses of the said Act with respect to the settle-

ment of disputes by arbitration shall be incorporated with this Act :

4. If some of the owners liable to contribution cannot be found, the deficiency so arising shall be divided amongst the parties that can be found :
5. Any occupier of premises who has paid any expenses under this Act may deduct the amount so paid from any rent payable by him to any owner of the same premises ; and any owner of premises who has paid more than his due proportion of any expenses may deduct the amount so overpaid from any rent that may be payable by him to any other owner of the same premises :
6. If default is made by any owner or occupier in payment of any expenses hereby made payable by him in the first instance, or if default is made by any owner in payment of any other expenses or moneys due from him by way of contribution or otherwise in pursuance of this Act, then in addition to any other remedies hereby provided such expenses and moneys, if arising in respect of any matter within the provisions of the third part of this Act, may be recovered as a debt in due course of law, but if arising in respect of any other matter under this Act may be recovered in a summary manner.

Rules as to Service of Notices, Summonses, and Orders.

XCVIII. The following rules shall be observed with respect to the giving or service of any notice, summons, or order directed to be given or served under this Act in cases not hereinbefore provided for :—

1. A notice, summons, or order may in all cases be served personally :
2. A notice, summons, or order may be served on any builder by leaving the same or sending it in a registered letter addressed to him at his place of address as stated by him to the district surveyor, or by putting up such notice, summons, or order on a conspicuous part of the building or premises to which the same relates :
3. A notice, summons, or order may be served on the owner or occupier of any premises by leaving the same with the occupier of such premises, or with some inmate of his abode, or if there is no occupier by putting up such notice, summons, or order on a conspicuous part of the building or premises to which the same relates ; and it shall not be necessary to name the owner or occupier of such premises ; nevertheless, when the owner of any such premises and his residence, or that

of his agent are known to the party by whom or on whose behalf any notice, summons, or order is intended to be served, it shall be the duty of such party to send every such notice, summons, or order by the post in a registered letter addressed to the residence or last known residence of such owner or of his agent :

4. A notice, summons, or order may be served on any district surveyor by leaving the same at his office.

As to Things authorised to be done by a County Court.

11 & 12 Vict. c. 71.

XCIX. Whenever anything is hereby authorised to be done by a county court, it may be done as follows ; that is to say, if such thing arises in respect of any structure or other subject matter situate within the City of London or the liberties thereof, by the Sheriffs' Court established by a local Act passed in the 11th year of the reign of Her Majesty, chapter 71, intituled "An Act for the more easy Recovery of Small Debts and Demands within the City of London or the Liberties thereof," and if such thing arises in respect of any structure or other subject matter situate elsewhere, by the county court having jurisdiction within the district in which such structure or other subject matter is situate.

Manner of Determining Differences.

C. In cases where jurisdiction is hereby given to a county court, such court may from time to time make such order in respect of matters so brought before it as it may think fit, with power to settle the time and manner of executing any work, or of doing any other thing, and to put the parties to the case upon such terms as respects the execution of the work as it thinks fit : it shall also have power to award or refuse costs according to circumstances, and to settle the amount thereof.

Form of Proceedings in County Court.

CI. Proceedings in any county court in respect of any matter arising under this Act shall be conducted in the same manner as proceedings are conducted in any case within the ordinary jurisdiction of such court, or as near thereto as circumstances permit ; and orders made by the judge of any such court may be enforced by execution, committal, or otherwise, in a similar manner to that in which the orders of such court are ordinarily enforced.

Appeal from Decision of County Court.

CII. If either party in any case over which jurisdiction is hereby given to a county court feels aggrieved with the decision of such court in respect of any point of law, or the admission or

rejection of any evidence, he may appeal therefrom in the same manner and upon the same terms in and upon which he might have appealed from the decision of such court in any case within the ordinary jurisdiction of such court, or as near thereto as circumstances permit ; but no such appeal shall be allowed unless the value of the matter in difference between the parties exceeds fifty pounds ; and the opinion of the judge before whom the case is tried as to such value shall be conclusive.

Recovery of Penalties.

CIII. All penalties under this Act, and all fees, moneys, costs, or expenses by this Act directed to be recovered in a summary manner, may be recovered in manner directed by an Act passed in the 11th and 12th years of the reign of Her present Majesty Queen Victoria, chapter 43, intituled "An Act to Facilitate the Performance of the Duties of Justices of the Peace out of Sessions within England and Wales with respect to Summary Convictions and Orders" ; and whenever anything is hereby authorised or required to be done by or before a justice of the peace, it may be done as follows ; that is to say, if such thing arises in respect of any building or wall situate within the City of London, by or before one or more justice or justices of the peace for the said City or by any metropolitan police magistrate, and if such thing arises in respect of any building or wall situate elsewhere within the limits of this Act, by or before any metropolitan police magistrate.

Application of Penalties.

CIV. Any justice of the peace in any case over which jurisdiction is hereby given to him may make such order as to the costs of any proceedings of which he has cognisance as he thinks just ; he may also direct the whole or any part of any penalty imposed by him under this Act to be applied in or towards payment of the costs of the proceedings ; and, subject to such direction, all penalties shall be paid into the hands of the treasurer of the said Metropolitan Board, to be applied in such manner as the said Board thinks fit.

Provisions as to Limitation of Time when due Notice has not been given.

CV. In cases where any building has been erected or work done without due notice being given to the district surveyor, the district surveyor may, at any time within one month after he has discovered that such building has been erected or work done, enter the premises for the purpose of seeing that the regulations

of this Act have been complied with, and the time during which the district surveyor may take any proceeding, or do anything authorised or required by this Act to be done by him, in respect of such building or work, shall begin to run from the date of his discovering that such building has been erected or work done.

Power to Appeal to Superior Courts.

CVI. In every case, except in respect of fees of a district surveyor, in which jurisdiction is hereinbefore given to a justice of the peace, if either party to any such case is dissatisfied with the determination of the justice so convicting, in respect of any point of law, or of the admission or rejection of any evidence, such party may, upon giving notice within seven days to the other party of his intention to appeal, appeal therefrom to any of the superior courts of common law at Westminster ; subject to this restriction, that no such appeal shall be made by any district surveyor except with the consent of the justice before whom the case is tried, and that no such appeal shall be made by any other party to the case except upon giving such security for costs, and, if the case requires it, in addition thereto, such undertaking in respect of desisting in the meantime from any works complained of, or in respect of any other matter or thing arising in the case, as the justice thinks fit.

Form of Appeal.

CVII. Any appeal so made shall be in the form of a special case, to be agreed on by both parties, or, if the parties cannot agree, to be settled by the justice from whose decision the appeal is made ; and such case shall be transmitted by the appellant to the rule department of the master's office in the court in which the appeal is to be brought, and be heard in manner provided by the practice of such court.

Notice of Action.

CVIII. No writ or process shall be sued out against any district surveyor or other person for anything done or intended to be done under the provisions of this Act until the expiration of one month next after notice in writing has been delivered to him or left at his office or usual place of abode, stating the cause of action, and the name and place of abode of the intended plaintiff, and of his attorney or agent in the cause ; and upon the trial of any such action the plaintiff shall not be permitted to go into evidence of any cause of action which is not stated in such last-mentioned notice ; and unless such notice is

proved the jury shall find for the defendant; and every such action shall be brought or commenced within six months next after the accrual of the cause of action, and not afterwards, and shall be laid and tried in the county or place where the cause of action occurred, and not elsewhere; and the defendant shall be at liberty to plead the general issue, and give this Act and all special matter in evidence thereunder.

PART V.

REPEAL OF FORMER ACTS, AND TEMPORARY PROVISIONS.

REPEAL.

Repeal of 8 & 9 Vict. c. 84, except ss. 54 to 63, and 9 & 10 Vict. c. 5.

CIX. From and after the commencement of this Act, the following Acts, that is to say, an Act passed in the 8th year of the reign of Her present Majesty, chapter 84, and intituled "An Act for Regulating the Construction and the Use of Buildings in the Metropolis and its Neighbourhood," with the exception of the sections relating to dangerous and noxious businesses, and numbered respectively 54, 55, 56, 57, 58, 59, 60, 61, 62, and 63, and an Act passed in the 9th year of the reign of Her present Majesty, chapter 5, and intituled "An Act to Amend an Act for Regulating the Construction and Use of Buildings in the Metropolis and its Neighbourhood," are throughout the limits of this Act and elsewhere hereby repealed, subject to the following provisions; that is to say:—

1. That such repeal shall not affect any proceedings authorised to be taken by the said Acts or either of them in respect of any act, omission, penalty, matter, or thing, and pending before the official referees or any other tribunal at the time of the commencement of this Act:
2. That in cases where any act, omission, or thing has occurred previously to the time of the commencement of this Act, in respect of which, if this Act had not passed, proceedings might have been taken under the said Acts or either of them, then proceedings in respect of such act, omission, or thing may be had under this Act in manner following; that is to say, if the matter in question is anything relating to the rights of building and adjoining owners in respect of party structures, proceedings may be had in the county court, but if the matter in question relates to the recovery of any penalty

or to any other thing, proceedings may be had before any justice of the peace.

3. That so much of the Act of the 14th year of King George III., chapter 78, as was excepted from the operation of the said Act of the 8th year of Her present Majesty, chapter 84 (that is to say), the sections numbered respectively 74, 75, 76, 77, 78, 80, 81, 82, 83, 84, 85, and 86, shall continue in full force.

As to Contracts made previously to Passing of Act.

CX. Any contract made previously to the passing of this Act for the erection of a new building shall be carried into effect in the same manner as if this Act had been passed at the time of the making thereof, and the necessary deviations from the terms of such contract may be made accordingly ; and if any dispute arises in respect of any loss sustained by any party to such contract by reason of such necessary deviation, such dispute shall be determined by the county court ; and whenever any costs or expenses have been paid by any owner in pursuance of this Act, then as to any structure held under any lease or agreement made previously to the commencement of this Act, it shall be lawful for such owner to recover the same from the persons hitherto liable by law, or by such existing lease or contract, to maintain or repair the structure in respect of which such costs and expenses have been incurred.

Liabilities under Contract between Landlord and Tenant not to be affected.

CXI. Nothing herein contained shall vary or affect the rights or liabilities as between landlord and tenant under any contract between them.

As to Iron Buildings constructed before this Act comes into Operation.

CXII. In cases where any iron building has been constructed or is in the progress of construction previously to the time at which this Act comes into operation, and doubts are entertained whether such building is permitted by law, any person interested in such building may make an application to the Commissioners of Works and Buildings, to signify their approval of such building ; and the Commissioners of Works and Buildings, upon being satisfied of the stability of such building, may approve of the same, and upon such approval being given such building shall be deemed to have been constructed in manner permitted by law, and this section shall come into operation immediately after the passing of this Act.

Compensation to Official Referees and Registrar.

CXIII. The official Referees and Registrar of Metropolitan Buildings may, within six months from the time at which this Act comes into operation, apply to the Commissioners of Her Majesty's Treasury for compensation in respect of the loss they have sustained by reason of the abolition of their offices ; and the Commissioners shall take any such application into consideration, and award such compensation, either by way of a gross sum or annual payment, as they think just, having regard to the nature of the office, the time during which the applicant has held the same, and generally to the special circumstances of each case ; and any compensation so given shall be paid out of moneys to be provided by Parliament ; and such compensation, when made by annual payment, shall be subject to this proviso, that if any such official referee or registrar is at any time thereafter appointed to any public office in respect of which he receives a salary, the payment of the compensation awarded to him under this Act shall be suspended so long as he receives such salary, if the amount thereof is greater than such compensation, or if not shall be diminished by the amount of such salary.

Compensation to Clerks in Office of Metropolitan Buildings.

CXIV. Any person, except the said official referees and registrar, who at the time when this Act comes into operation is employed in the Office of Metropolitan Buildings may within six months from such time apply to the Metropolitan Board of Works for employment, and such Board shall thereupon take such application into consideration, and they shall either employ the applicant at a salary not less in amount than that which he enjoyed when in the said Office of Metropolitan Buildings, or at a less salary, awarding to him compensation in respect of such diminution of salary, or they shall award to him such compensation, if any, as they, or in the event of the applicant feeling aggrieved with their decision, as the Commissioners of the Treasury, think just, having regard to the nature of the office, the time during which it has been held by the applicant, and generally to the special circumstances of the case ; and any expenses incurred by the said Board in carrying into effect this section shall be deemed to be expenses incurred in the execution of the said Act for the Better Local Management of the Metropolis, and be raised accordingly ; nevertheless, if any such clerk or servant as aforesaid at any time thereafter is appointed to any public office, or to any office under the said Metropolitan Board, in respect of which he receives a salary, the payment of the compensation awarded to him under this Act shall be suspended so long as he

receives such salary, if the amount thereof is greater than the amount of such compensation, or if not shall be diminished by the amount of such salary ; but, notwithstanding anything herein contained, the Metropolitan Board may, in the event of their employing any person mentioned in this section, dismiss him, with the consent of the Treasury.

FIRST SCHEDULE.

PRELIMINARY.

Structure of Buildings.

1. Every building shall be enclosed with walls constructed of brick, stone, or other hard and incombustible substances, and the foundations shall rest on the solid ground, or upon concrete, or upon other solid substructure.

Construction of Walls of Brick, Stone, &c.

2. Every wall constructed of brick, stone, or other similar substances shall be properly bonded and solidly put together with mortar or cement, and no part of such wall shall overhang any part underneath it, and all return walls shall be properly bonded together.

Extra Thickness of certain Stone Walls.

3. The thickness of every stone wall in which the beds of the masonry are not laid horizontally shall be one-third greater than the thickness prescribed for stone walls in the rules hereinafter contained.

Thickness of Walls.

4. The thickness of every wall as hereinafter determined shall be the minimum thickness.

Height of Story.

5. The height of every topmost story shall be measured from the level of its floor up to the under side of the tie of the roof, or up to half the vertical height of the rafters, when the roof has no tie ; and the height of every other story shall be the clear height of such story exclusive of the thickness of the floor.

Height of External and Party Walls.

6. The height of every external and party wall shall be measured from the base of the wall to the level of the top of the topmost story.

Length of Walls.

7. Walls are deemed to be divided into distinct lengths by return walls, and the length of every wall is measured from the centre of one return wall to the centre of another ; provided that such return walls are external, party, or cross walls of the thickness hereinafter required, and bonded into the walls so deemed to be divided.

Footings of Walls.

8. The projection of the bottom of the footing of every wall, on each side of the wall, shall be at least equal to one-half of the thickness of the wall at its base ; and the diminution of the footing of every wall shall be formed in regular offsets, and the height from the bottom of such footing to the base of the wall shall be at the least equal to one-half of the thickness of the wall at its base.

PART I.

RULES FOR THE WALLS OF DWELLING-HOUSES.

Thickness of Walls of Dwelling-houses.

1. The external and party walls of dwelling-houses shall be made throughout the different stories of the thickness shown in the following table, arranged according to the heights and lengths of the walls, and calculated for walls up to one hundred feet in height, and supposed to be built of bricks not less than eight and a half inches and not more than nine and a half inches in length, the heights of the stories being subject to the condition hereinafter given.

I.

II.

III.

IV.

Height up to 100 feet.	Length up to 45 feet. Two stories, $21\frac{1}{2}$ inches. Three stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.	Length up to 80 feet. Two stories, 26 inches. Two stories, $21\frac{1}{2}$ inches. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.	Length unlimited. One story, 30 inches. Two stories, 26 inches. Two stories, $21\frac{1}{2}$ inches. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.
Height up to 90 feet.	Length up to 45 feet. Two stories, $21\frac{1}{2}$ inches. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.	Length up to 70 feet. One story, 26 inches. Two stories, $21\frac{1}{2}$ inches. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.	Length unlimited. One story, 30 inches. Two stories, 26 inches. One story, $21\frac{1}{2}$ inches. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.
Height up to 80 feet.	Length up to 40 feet. One story, $21\frac{1}{2}$ inches. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.	Length up to 60 feet. Two stories, $21\frac{1}{2}$ inches. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.	Length unlimited. One story, 26 inches. Two stories, $21\frac{1}{2}$ inches. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.
Height up to 70 feet.	Length up to 40 feet. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.	Length up to 55 feet. One story, $21\frac{1}{2}$ inches. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.	Length unlimited. One story, 26 inches. Two stories, $21\frac{1}{2}$ inches. One story, $17\frac{1}{2}$ inches. Remainder, 13 inches.
Height up to 60 feet.	Length up to 30 feet. One story, $17\frac{1}{2}$ inches. Remainder, 13 inches.	Length up to 50 feet. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.	Length unlimited. One story, $21\frac{1}{2}$ inches. Two stories, $17\frac{1}{2}$ inches. Remainder, 13 inches.
Height up to 50 feet.	Length up to 30 feet. Wall below the topmost story, 13 inches. Topmost story, $8\frac{1}{2}$ inches. Remainder, $8\frac{1}{2}$ inches.	Length up to 45 feet. One story, $17\frac{1}{2}$ inches. Rest of wall below top- most story, 13 inches. Topmost story, $8\frac{1}{2}$ inches. Remainder, $8\frac{1}{2}$ inches.	Length unlimited. One story, $21\frac{1}{2}$ inches. One story, $17\frac{1}{2}$ inches. Remainder, 13 inches.
Height up to 40 feet.	Length up to 35 feet. Wall below two topmost stories, 13 inches. Two topmost stories, $8\frac{1}{2}$ inches. Remainder, $8\frac{1}{2}$ inches.	Length unlimited. One story, $17\frac{1}{2}$ inches. Rest of wall below topmost story, 13 inches. Topmost story, $8\frac{1}{2}$ inches. Remainder, $8\frac{1}{2}$ inches.	
Height up to 30 feet.	Length up to 35 feet. Wall below two topmost stories, 13 inches. Two topmost stories, $8\frac{1}{2}$ inches. Remainder, $8\frac{1}{2}$ inches.	Length unlimited. Wall below topmost story, 13 inches. Topmost story, $8\frac{1}{2}$ inches. Remainder, $8\frac{1}{2}$ inches.	
Height up to 25 feet.	Length up to 30 feet. From base to top of wall, $8\frac{1}{2}$ inches.	Length unlimited. Wall below topmost story, 13 inches. Topmost story, $8\frac{1}{2}$ inches. Remainder, $8\frac{1}{2}$ inches.	

Explanation of Tables.

3. In using the above table the height of the wall is to be reckoned on the first vertical column on the left hand of the table, and the length of the wall on the corresponding horizontal column. The thickness of the wall in each story is given in inches, and begins with the wall from the base upwards.

Qualification in case of certain Walls.

4. If any external or party wall, measured from centre to centre, is not more than twenty-five feet distant from any other external or party wall to which it is tied by the beams of any floor or floors, other than the ground floor, or the floor of any story formed in the roof, the length of such wall is not to be taken into consideration, and the thickness of the wall will be found in the second vertical column in the above table.

Condition in respect of Stories exceeding a certain Height.

5. If any story exceeds in height sixteen times the thickness prescribed for the walls of such story in the above table, the thickness of each external and party wall throughout such story shall be increased to one sixteenth part of the height of the story ; but any such additional thickness may be confined to piers properly distributed, of which the collective widths amount to one-fourth part of the length of the wall.

Restriction in case of certain Stories.

6. No story enclosed with walls less than thirteen inches in thickness shall be more than ten feet in height.

Thickness of Walls built of Materials other than such Bricks as aforesaid.

7. The thickness of any wall of a dwelling-house, if built of materials other than such bricks as aforesaid, shall be deemed to be sufficient if made of the thickness required by the above tables, or of such less thickness as may be approved by the Metropolitan Board, with this exception, that in the case of walls built of stone in which the beds of the masonry are not laid horizontally no diminution shall be allowed in the thickness required by the foregoing rules for such last-mentioned walls.

Rule as to Buildings not being Public Buildings or Buildings of the Warehouse Class.

8. All buildings, excepting public buildings, and such buildings

as are hereinafter defined to be buildings of the warehouse class, shall, as respects the thickness of their walls, be subject to the rules given for dwelling-houses.

PART II.

RULES FOR THE WALLS OF BUILDINGS OF THE WAREHOUSE CLASS.

Definition of Warehouse Class.

1. The warehouse class shall comprise all warehouses, manufactories, breweries, and distilleries.

Thickness at Base.

2. The external and party walls of buildings of the warehouse class shall at the base be made of the thickness shown in the following table, calculated for walls up to one hundred feet in height, and supposed to be built of bricks not less than eight and a half inches and not more than nine and a half inches in length.

3. TABLE.

I.	II.	III.	IV.
Height up to 100 feet.	Length <u>up to 55 feet.</u> Base, 26 inches.	Length <u>up to 70 feet.</u> Base, 30 inches.	Length <u>unlimited.</u> Base, 34 inches.
Height up to 90 feet.	Length <u>up to 60 feet.</u> Base, 26 inches.	Length <u>up to 70 feet.</u> Base, 30 inches.	Length <u>unlimited.</u> Base, 34 inches.
Height up to 80 feet.	Length <u>up to 45 feet.</u> Base, 21½ inches.	Length <u>up to 60 feet.</u> Base, 26 inches.	Length <u>unlimited.</u> Base, 30 inches.
Height up to 70 feet.	Length <u>up to 30 feet.</u> Base, 17½ inches.	Length <u>up to 45 feet.</u> Base, 21½ inches.	Length <u>unlimited.</u> Base, 26 inches.
Height up to 60 feet.	Length <u>up to 35 feet.</u> Base, 17½ inches.	Length <u>up to 50 feet.</u> Base, 21½ inches.	Length <u>unlimited.</u> Base, 26 inches.
Height up to 50 feet.	Length <u>up to 40 feet.</u> Base, 17½ inches.	Length <u>up to 70 feet.</u> Base, 21½ inches.	Length <u>unlimited.</u> Base, 26 inches.
Height up to 40 feet.	Length <u>up to 30 feet.</u> Base, 13 inches.	Length <u>up to 60 feet.</u> Base, 17½ inches.	Length <u>unlimited.</u> Base, 21½ inches.
Height up to 30 feet.	Length <u>up to 45 feet.</u> Base, 13 inches.	Length <u>unlimited.</u> Base, 17½ inches.	
Height up to 25 feet.	Length <u>unlimited.</u> Base 13 inches.		

Explanation of Table.

4. The above table is to be used in the same manner as the table previously given for the walls of dwelling-houses, and is subject to the same qualifications and conditions respecting walls not more than twenty-five feet distant from each other.

Thickness at Top of Walls and through Intermediate Space.

5. The thickness of the walls of buildings of the warehouse class at the top, and for sixteen feet below the top, shall be thirteen inches ; and the intermediate parts of the wall between the base and such sixteen feet below the top shall be built solid throughout the space between straight lines drawn on each side

of the wall, and joining the thickness at the base to the thickness at sixteen feet below the top, as above determined ; nevertheless in walls not exceeding thirty feet in height the walls of the top-most story may be eight inches and a half thick.

Condition in respect of Stories exceeding a certain Height.

6. If in any story of a building of the warehouse class the thickness of the wall, as determined by the rules hereinbefore given, is less than one-fourteenth part of the height of such story, the thickness of the wall shall be increased to one-fourteenth part of the height of the story ; but any such additional thickness may be confined to piers properly distributed, of which the collective widths amount to one-fourth part of the length of the wall.

Thickness of Walls built of Materials other than such Bricks as aforesaid.

7. The thickness of any wall of a building of the warehouse class, if built of materials other than such bricks as aforesaid, shall be deemed to be sufficient if made of the thickness required by the above tables, or of such less thickness as may be approved by the Metropolitan Board, with this exception, that in the case of walls built of stone in which the beds of the masonry are not laid horizontally no diminution shall be allowed in the thickness required by the foregoing rules for such last-mentioned walls.

MISCELLANEOUS.

Cross Walls.

1. The thickness of a cross wall shall be two-thirds of the thickness hereinbefore required for an external or party wall of the same dimensions, and belonging to the same class of buildings, but never less than eight and a half inches, and no wall subdividing any building shall be deemed to be a cross wall unless it is carried up to two-thirds of the height of the external or party walls, and unless the recesses and openings therein do not exceed one-half of the vertical surface of the wall in each story.

Extra Thickness of certain Stone Walls.

2. The thickness of every stone wall in which the beds of the masonry are not laid horizontally shall be one-third greater than the thickness prescribed in the rules aforesaid.

3. Buildings to which the preceding rules are inapplicable require the special sanction of the Metropolitan Board of Works.

SECOND SCHEDULE.

FEES PAYABLE TO DISTRICT SURVEYORS.

PART I.

Fees for New Buildings.

For every building not exceeding four hundred square feet in area, and not more than two stories in height	s. d.
For every additional story	30 0
For every additional square of 100 feet or fraction of such square	5 0
But no fee shall exceed ten pounds.	2 6
And for every building not exceeding four hundred square feet in area, and of one story only in height, the fee shall be	15 0

Fees for Additions or Alterations.

For every addition or alteration made to any building after the roof thereof has been covered in, the fee shall be half of the fee charged in the case of a new building.	
For inspecting the arches or stone floors over or under public ways	10 0
For inspecting the formation of openings in party walls	10 0

PART II.

For inspecting dangerous structures, by direction of the Commissioners of Police or Sewers	20 0
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N.B.—In this schedule “area” shall include the area of any attached building.

[*Note.*—By the Metropolitan Building Act (Amendment) Act, 1860 (23 & 24 Vict. c. 52), it was enacted that the rules as to the cubical dimensions in the Metropolitan Building Act, 1855, are not to apply to buildings to be used for the manufacture of machinery and the boilers of steam vessels, provided that such buildings shall consist of one floor only, &c.]

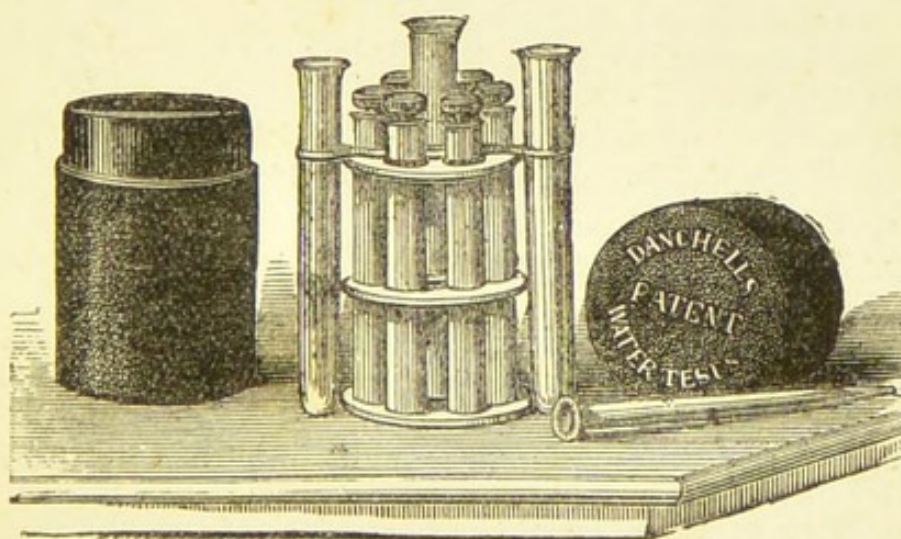
APPENDIX B.

DANCHELL'S WATER TESTING APPARATUS.

It is desirable that a simple combination of apparatus for testing water qualitatively, and in somewhat a popular manner, should be in the hands of the inspector of nuisances, and, indeed, of every intelligent person, and one of the most convenient is that sold by the London and General Water Purifying Company. The following diagram represents the apparatus in a compact form, and the directions which follow as to the use of the tests are sufficiently clear. Should the enquiry throw a doubt on the purity of the water, a proper chemical analysis should be made.

Fig. 91.

DANCHELL'S TESTING APPARATUS.



The above sketch is that of the smaller size ; the larger does not take out of its case.

DIRECTIONS FOR USE.

Two test tubes are provided, so as to permit of two descriptions of water being operated on at the same time, thus allowing a comparison to be made of their respective degrees of purity. These tubes in the small apparatus (but not in the large) fit into hinged hoops attached to the frame holding the bottles. To save the trouble and uncertainty of dropping the fluids from the bottles, a dropping glass is provided: by inserting its point into the bottle of test fluid required, and placing the thumb upon the other opening, the requisite quantity can be readily conveyed to the water, and allowed to drop into it by simply relaxing the pressure.

All these tests are dependent upon the appearance presented by the water after the addition of one or other of the test-fluids. The best method of observing this appearance is by looking from above *down* into the tube, or as in the tests for lead, carbonate and sulphate of lime, looking sideways at the tube; not, however, holding it against the light, but against some dark object, when the cloudy appearance caused by the presence of the object sought for will, if it be present, be readily observed. In all cases, the test-tubes should be nearly filled with the water to be tried.

Of course, after the addition of any of the test fluids, it is necessary to refill the tube with a fresh supply of water before proceeding to test for any other substance.

The utmost cleanliness should be observed. The test and dropping tubes should be thoroughly rinsed out after each operation, and wiped quite dry, and polished with a clean bit of rag—an old silk rag is the best.

The bottles containing the test fluids must always be kept carefully stoppered.

Seven bottles, containing the standard test fluids, are supplied in the small apparatus. Their contents are as follow:—

- No. 1. Test for ammonia (solution of zinc).
- „ 2. Test for decomposed organic matter (permanganate of potash).
- „ 3. Negative test for lead (solution of acetate of lead).
- „ 4. Positive test for lead (solution of bichromate of potash).
- „ 5. Test for carbonate of lime (oxalate of ammonia).
- „ 6. Test for sulphate of lime and sulphuric acid (nitrate of baryta).
- „ 7. Test for iron (solution of prussiate of potash).

To Test for Ammonia.—No. 1 will show whether ammonia be present or not; and, although this substance may be derived

from other sources than the putrefaction of organic matter, there is always a strong presumption that this matter is present when ammonia is found.

To the water, if in the smaller test tube, add three drops, or if in the larger, add five drops of the test fluid. If ammonia be present, a cloudy or milky appearance will be observed.

Test for Decomposed Organic Matter.—No. 2. This is a coloured fluid, and it communicates a bright violet-rose colour to the water when first added. If, however, decomposed organic matter be present in a degree hurtful to health, this colour is changed to a dull yellow ; or, if a still larger quantity exists in the water, the colour will in time entirely disappear. Where the colour is rendered paler, but still retains a decided reddish tinge, then we may infer that, although putrefying organic matter is present, it is so in such minute quantities as are not likely to be immediately hurtful. One drop* to the smaller or two to the larger test glass is the quantity of this fluid to be added to the water. It should be allowed to stand for two hours ; if, however, the change in colour takes place before the expiration of this time, it is a stronger indication of the impurity of the water—the rule being that the quicker and more perfect the discolouring of the water tested, the greater is the quantity of decomposing organic matter present : if also, upon the addition of a few more drops, a change in colour is manifested, it is a sign that a very large and dangerous quantity of putrefying organic matter is present.

To Test for Lead.—Here are supplied two tests, No. 3 and No. 4. The object of No. 3 test is to ascertain whether a water is at all capable of holding lead in solution. If, by adding a few drops, a milky or cloudy appearance presents itself, it shows that the water is not capable of holding any lead in solution ; but, on the contrary, in No. 4, if upon the addition of five drops to the larger or three drops to the smaller tube a dull or clouded appearance ensues, then it is certain that lead is present. The quantity in solution will be indicated by the degree of opaqueness produced ; but, however small this may be, it may be taken for certain that such water is dangerous for use.

To Test for Carbonic Acid and Carbonate of Lime or Chalk.—No. 5 is the test fluid, of which add from five to ten drops. If carbonate of lime be present, the water will show, after a little while, a clouded or milky appearance, and in a few hours a white precipitate will be found at the bottom of the tubes.

If this appearance takes place before and not after a short

* The smaller the quantity of this test applied the sooner will the result be shown. It is also essential to test the water previously for iron (with the No. 7 test), as, if present, it will mislead, the indications being the same as if organic matter were present.

boiling of the water, it is a proof of the presence of free carbonic acid ; but if it takes place also after the boiling, then it must be carbonate of lime.

To Test for Sulphate of Lime or Sulphuric Acid.—For this purpose use fluid No. 6. If sulphate of lime be present, it is indicated in the same way as in the last case, that is, by a milky appearance, and by the formation of a white precipitate after adding a few drops. Sulphuric acid is found by the same means ; and it makes the same appearance, with this difference, that when the cloud sinks to the bottom, it indicates sulphate of lime ; whilst, if it remains at the top, or is uniformly diffused, it proves the presence of sulphuric acid.

To Test for Iron.—No. 7 is the test of the presence of this metal. If upon adding a few drops to the water a blue colour is produced directly, or after some time, it shows that iron is held in solution. From the intensity of the colour the quantity present may be inferred.

Water may be readily impregnated artificially with iron by throwing into it a few rusty nails, hoops, or other objects.

ADDITIONAL DIRECTIONS FOR THE LARGE APPARATUS.

No. 4. *Test for Lead.*—*Sulphuretted Hydrogen.*—On adding a few drops a black precipitate will ensue after standing a few hours. This is a much more delicate test than bichromate of potash ; but it shows the presence of iron as well ; and in order to distinguish whether it be the one or the other, No. 7 is to be applied also, which will affect the iron, but not the lead.

No. 8. *Test for Chlorine or Chlorides.*—*Nitrate of Silver.*—By adding two or three drops of this test a white precipitate will follow, which will disappear by adding as many drops of No. 9 test, but will remain after adding No. 10.

No. 9. *Test for Phosphates.*—*Ammonia.*—A white cloudy appearance will follow the addition of two or three drops of this test, if phosphates are present.

No. 10. *Nitric Acid.*—Auxiliary test to No. 8.

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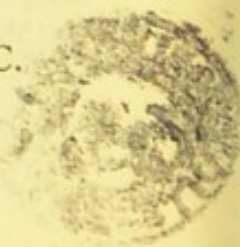
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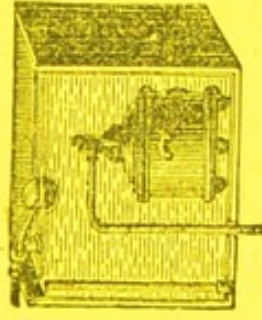
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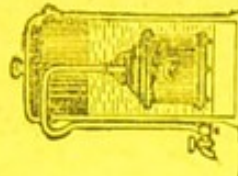
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