REPORTS

ON

SANITARY ENGINEERING IN HOUSES,
HOSPITALS, AND PUBLIC
INSTITUTIONS.

By WILLIAM EASSIE, C.E.

I.

ATTENTION to sanitary matters has now become of paramount importance with the householder, for reasons which are too recent to require recapitulation. Until very lately, the essentials to health, as far as regards the house, occupied far too little attention. The chief interest of proprietor, architect, and builder alike, was concentrated upon the outside elevations and inside fittings, and the drainage and foundations were left without a tithe of the care which they ought to have received. As a consequence of this, many public and private buildings were badly drained, unprotected from dampness, insufficiently ventilated, and incompletely warmed and lighted. In former times, and in the majority of our town and country houses planned by our forefathers, even less attention was paid to these vital questions; and if the evils have not been remedied, such houses are consequently inhabited at a very considerable amount of risk. It may be said that our ancestors erred through ignorance, and their posterity through neglect.

If the majority of the houses, etc., which were built—say three score and ten years ago—were examined, the chief nuisances would be found to arise from rotten brick drains of large diameter, from old disused cesspools, from the infiltration of sewage into wells, from the want of damp-proofing, and the like. Many of our modern built habitations are, however, not much better off in these respects. There, the drain-pipes are sometimes too small, not laid to proper fall, badly jointed, connected direct with the sewer, and without any ventilation whatsoever. The waste-pipes act as mere conveyances for the sewer-air, the cisterns yield tainted or putrid water, and from the damp basements arise chilliness and rheumatisms. Indeed, it would be safer, as a rule, to inhabit the old house rather than the new.

The purpose of these papers is to point out in the plainest language exactly what ought to be done to render ancient or modern houses healthy, and to describe the special appliances which can be used with advantage. The same observations will apply to the projection and erection of future houses. Drainage will receive a moderate attention, and proper means of disconnecting and ventilating the drains will be pointed out. The correct uses of traps will be set forth, and the illusions which have surrounded them explained.

Some practical rules will also be offered respecting water-closets; and several earth and ash closet systems will receive notice. A few necessary remarks upon warming and ventilation will probably conclude the series.

It is due to the medical profession to state that its members have ever been foremost in pointing out the danger of many practices which had been unwittingly prolonged by their architectural brethren. The uselessness of water-sealed traps when the air of the sewers is in a compressed state; the necessity of ventilating house-drains; the danger of trusting to well-waters, except under certain circumstances; the reduction of phthisis consequent upon a well ordered system of water-drainage—these are a few instances of their watchfulness. In all probability, but for the plain speaking of our physicians and surgeons, our habitations would be in a desperate plight. The professions of medicine and architecture are in no way rivals, but are both necessary to the realisation of a perfect piece of architecture, be it cottage, mansion, school-house, theatre, or hospital.

When, however, a dogma of hygiene has been promulgated by the profession of medicine, the means of its mechanical enforcement are left to the architect and engineer. Very often, therefore, the appliances which were invented to carry out his own beneficial ideas are unknown to the medical man, the chief reason being that the descriptions of them are only to be found in architectural works or in price-lists.

It is hoped that these brief papers will prove of benefit to the readers of this JOURNAL, as bringing together under their own eyes illustrations and descriptions of the best sanitary goods.

What are known as open channellings are frequently found to be very useful. Fig. 1 represents the ordinary blue Broseley channel brick, much used in asphalté flooring, and in garden guttering, etc. Fig. 2 shows a kind of pavement gutter-brick suitable for a laundry or backyard. Bricks like fig. 1 are also made with an enhanced number of side indents so as to receive the water delivered by the pavement bricks, and covers are also made for these channel bricks. The use of the open drain-tile, drawn at fig. 3, would be chiefly to convey the wastes from wash-basins and the kitchen slop-waters away to the garden on the earth-drainage system. In this case the joints should be kept one inch and a half apart, and when that part of the garden was sufficiently treated, these surface pipes could then be laid in another direction. Fig. 4 illustrates a half-pipe with socketed joints, such as would be invaluable in the conveyance of these wastes and slops to some distance from the house when they could enter the drain or sewer. It would also serve as a good garden gutter.

The open channels, figs. 5 and 6, are those manufactured by Messrs. Doulton of Lambeth, as sewage-carriers in irrigation farms. Any depth of trough can be got by the introduction of the insertion-blocks seen at fig. 6, and, if needful, one side can be made higher than the other, which would prove a boon in yards and in lawn-borders. A pipe with a continuous slit, to allow the overflow of the sewage-tank contents upon the land, is exhibited at fig. 7. This would make an excellent pipe to convey the house-drainage, soil excepted, to a trap leading into the drain, and so disconnecting the house from the sewer. In this case it should be surrounded by concrete; and, when the pavement was laid down, the longitudinal aperture would afford a means of clearing away any obstructions.

Fig. 8 presents a view of the common circular drain-pipe, and fig. 9 a view of the oval drain-pipe; both have socketed joints. In common with nearly all sanitary pipes, they are made either altogether of pipe-clay, or with an admixture of fire-clay. Sometimes they are salt-glazed, sometimes glass-glazed. Both kinds of pipe, and both systems of manufacture, are alike good, and it is not necessary to be particular as to which is used. These pipes are made from two inches to thirty-six inches in diameter.

Fig. 10 illustrates a diminishing or enlarging pipe, the use of which is obvious; and fig. 11 what is called the half-socket pipe, which is often used where it is necessary to frequently examine the drains. Another method of achieving this is to drop what is called a butt-pipe between two pipes which are constructed with half-sockets at each end, and this is shown at fig. 12. This pattern is sold by Mr. Northern of Lambeth. A pipe made up of two half-pipes, with a V joint running along on each side, is made by the same firm for a similar purpose, and this is drawn at fig. 13.

Amongst the first and best systems of affording access for the in-

spection of drains, was that of Mr. Jennings of Lambeth, whose socket and saddle-cover piping is drawn at fig. 14. Messrs. Stiff and Son of Lambeth devised a somewhat similar arrangement, but assert that the broad base upon the foot of their bottom chair gives greater solidity to the line of drain; see fig. 15.

The opercular, or lidded pipe of Messrs. Doulton and Co., is drawn at fig. 16, and, by the adoption of this pattern, the whole interior of a drain can be opened up; the same might be done with the pipe, fig. 15. The difference, however, is, that the drain-pipes laid with the Doulton pipes might still remain almost full and allow no escape of their contents, whilst the latter would overflow at the height of half their diameter. The other pattern, drawn at fig. 17, is the Newton capped pipe of Messrs. Cliff and Son of Leeds, extensively used in the North.

The last access-pipe which we need describe is the capped one of Creeke, made by Messrs. Standing and Marten of Poole, Dorsetshire; see fig. 18. The security of a flange is here given to the socket-piece:

The foregoing represent the best of their respective classes, and might compare equally well with each other. Illustrations have been given of Surrey, Yorkshire, and Dorchester specimens, merely for the benefit of the readers residing the nearest to these chief drain-pipe-making localities, as the laying of Lambeth pipes near Poole, or Poole pipes near Leeds, would be a waste of money.

When making junctures to such pipes as those drawn at figs. 8 and 9, it is usual to insert a length of pipe having cast upon it the kind of juncture wanted. These are represented in the above cut.

In the case of the pipes yielding means of inspection, the junctions are differently made. At A, fig. 14, a large tributary pipe is joined to the saddle and delivers above the running sewage. At B, fig. 15, and at E, fig. 18, a small inlet is shown in the body of the pipe. At C, fig. 17, a delivery is sketched directly through the cap, such as might happen in the case of a soil pipe; and at C, fig. 15, the same accommodation is shown so as to receive a smaller waste pipe. At D, fig. 18, a right or left hand delivery is seen to take place altogether above the pipe; and at E, fig. 18, an acute angled junction receives a smaller pipe in the direction of the flow of sewage. Any one of these varied systems will equally well serve their purpose.

There remain only two pipes with which it would be well to be conversant. One is the combined drain-pipe and subsoil-pipe of Messrs. Brooke and Sons of Huddersfield, sketched at fig. 19. This system is the only one which permits a dry foundation for drainage-pipes in swampy ground. The subsoil water enters at the loose joints of the retort-shaped pipes underneath, and can be collected at intervals and used in flushing the drain-pipes above. The other pipe, which is drawn at fig. 20, is the only method extant for carrying sewage through water or across a river, and shutting out such sewage from the purer element. The dark filling in between the ends of the pipe represents a packing of lead poured in whilst molten, and the cup-like shape and the absence of bolts make the joint quite flexible.

ASSOCIATION INTELLIGENCE.

ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION, 1872.

NOTICE is hereby given, that the Annual Meeting for 1872 will be held at Birmingham, on the 6th, 7th, 8th, and 9th days of August next.

May 23rd, 1872.

FRANCIS FOWKE, *General Secretary*.

Annual Meeting, August 1872.

Notice of Motion by DR. A. B. STEELE.

That the Treasurer be authorised to pay the travelling expenses of members attending the meetings of Committee of Council, and of its Subcommittees in all cases in which provision for such payment does not already exist.

Notice of Motion by Dr. A. B. STEELE.

That Laws 15 and 16 be so altered as to read as follows.

Law 15.

1. The subscription to the Association shall be one guinea *per annum*, which shall entitle each member to receive the publications of the Association for the current year. The subscription shall date and be considered due in advance on the 1st of January in each year, except in the case of a member admitted on or after the 1st July, when the subscription for such part of a year shall be half a guinea in advance.

2. Any member whose subscription shall not have been paid on or before the 31st December of the current year shall be suspended from all privileges of membership, and at the end of the succeeding year, if the arrears be still unpaid, he shall cease to be member, and shall be ineligible for readmission until he shall have paid all arrears due at the period of his suspension.

3. Any member wishing to withdraw from the Association shall give written notice of his intention to the General Secretary on or before the 1st December of the current year, and neither withdrawal, suspension, nor erasure of a member's name from the Books of the Association, shall be deemed either in honour or equity to relieve such member from his liabilities to the Association.

THE ANNUAL MUSEUM.

THE Committee invite contributions of the following articles.

1. New or improved Surgical Instruments or Apparatus.
2. New Drugs or Pharmaceutical Preparations.
3. New Articles of Diet for Invalids.
4. New Medical Works.
5. Pathological Specimens, wet or dry; and Casts, Photographs, Drawings, or Diagrams, illustrative of Pathological Conditions.
6. Preparations, etc., illustrative of Diseases of the Organs of Circulation; and Instruments employed in their detection and treatment. It is the intention of the Committee to arrange these in a separate department of the Museum.

Contributors are requested to send a description of the matters which they propose to exhibit to the Honorary Secretaries before July 13th, as it is intended to issue a printed catalogue.

CHARLES J. BRACEY, M.B., Old Square, Birmingham.
ROBERT JOLLY, M.D., Newhall Street, Birmingham.

COMMITTEE OF COUNCIL: NOTICE OF MEETING.

NOTICE is hereby given, that a meeting of the Committee of Council will be held at the Queen's Hotel, Birmingham, on Wednesday, the 5th day of June next (not Saturday, the 8th, as previously advertised), at Three o'clock in the afternoon.

FRANCIS FOWKE, *General Secretary*.

37, Great Queen Street, W.C., May 27th, 1872.

METROPOLITAN COUNTIES BRANCH.

AN Ordinary Meeting of this Branch will be held at the House of the Society of Arts, John Street, Adelphi, on Wednesday, June 5th, at 8 P.M., when DR. RUSSELL REYNOLDS, F.R.S., President of the Branch, will read a paper on "The Scientific Value of the Legal Tests of Insanity".

A. P. STEWART, M.D.

ALEXANDER HENRY, M.D.

} *Honorary Secretaries*

75, Grosvenor Street, W., May 23rd, 1872.