

## THE CLEANSING AND DISINFECTION OF SCHOOLS.

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I DEEPLY appreciate the kind consideration shown by the Committee of this Congress in the selection of such an obscure sanitarian as I am to open a discussion on such an important question as the cleansing and disinfection of schools. Yet in one respect at least, immodest though it may be to say so, I feel myself not unworthy, for I hold the deepest conviction of the importance of the subject. I believe, indeed, that in no way can the apostle of hygiene achieve greater benefit, in no way can he produce a greater harvest by his labour, than by efforts in this direction.

For the last few years the most popular aspect of hygiene has been that which concerns itself with the young. The sanitation of the infant on the one hand, of the school and of the scholar on the other, is pre-eminently the sanitation of the hour. In our boyhood these provinces of public health were as little explored as were the regions of Equatorial Africa; now it is felt that the study of the personal health of the school child and at the school age, and no less of the general hygiene of school premises, is the concern not only of the professional sanitarian, but of every good citizen; so that the children who are compelled to be educated may not necessarily from time to time be compelled also to be sick; but, instead, are enabled to imbibe, along with their geography and their multiplication, golden lessons of cleanliness, its meaning and its benefits.

Thus, when I set myself to prepare this paper, I

speedily apprehended that it was not my part to endeavour to say anything novel, still less to discover and explore any new part of the province; but, if I might, to construct and outline a simple and practical routine for keeping schools and their accessories in the cleanest and healthiest state from day to day and from year to year; so that, by the discussion which followed, we might all be enlightened as to which methods were most effective, which most convenient, and which most economical, and arrive at a happy working compromise between a perfunctory inefficiency on the one hand and an unachievably high ideal on the other.

It were a gross impertinence on my part to dilate upon the aims of school sanitation, but it may be permissible to point out that, in our endeavours, we should have three separate objects in view. Clearly the predominant matter is the health of the children. Since the State compels attendance at school, it is obviously its duty and that of those who administer its laws to provide for the pupil the very best hygienic conditions, so that the schools shall neither aid in the dissemination of the acute infectious maladies of childhood, nor, by their defects, directly excite disordered states of health. Those who most appreciate the benefits of education are those who would least think of comparing its value with that of health, and, even for educational progress, health is an essential requisite. Further, with regard to the due comfort of the child, is it not the case that the corollary of compulsion is an imperative duty on the part of those compelling? So that a fresh and pleasant atmosphere should be provided, with warmth and light in due degree, and an elimination of all that is disagreeable in his environment so far as art and science can achieve that happy result. Yet, again, should we not hope to gain from our sanitary efforts a valuable by-product, as it were,

aiding directly in the work of education? Not only is the school age the period when the mind is most impressionable, but the impressions made at that time of life are the most vivid and indelible of all. The school, therefore, should be bright and fresh and clean and wholesome, not merely to secure the bodily health and comfort of the scholars, but also—a matter of scarcely less importance—to be an example and education to the mind.

You will agree with me, I think, that cleansing and disinfection of schools are not to be regarded as two processes, but as phases of the same process, differing in degree only; that, indeed, disinfection is to be looked upon merely as a specialised cleansing, done with a special reason and for a special object. I admit that cleansing and disinfecting are quite different things when textile fabrics are in consideration. To disinfect a sheet or shirt we put it through a steam disinfectant; but even then it may require to be cleaned in a wash tub in the ordinary way. Conversely, ordinary washing with soap and water, no matter how thorough, will not necessarily disinfect it; were it so, we could dispense with many disinfecting appliances. But with schools or houses the processes are not to be essentially distinguished. Only the other day I had a letter from the manager of a denominational school expressing a desire and an intention to have everything done within and without the school that could make for the health and wellbeing of the attending children, and requesting me to inform him how best to "sterilise" the floors and furniture of the rooms. Of course, I endeavoured to reply to the letter in the admirable spirit in which it had been written, hiding in my heart the thought that if the reverend gentleman were really determined on securing complete sterilisation, he had his work before him!

The moral of this is that we should avoid setting up an impossible standard, but should decide what we may fairly hope to accomplish and aim definitely at that, and neither more nor less. We must bear in mind that the processes which we are to agree to advise will have to be performed in the great majority of instances by those who are not professional sanitarians, and who, in so far as actual measures of disinfection are concerned, are working largely by tradition, or at best in blind fulfilment of instructions. Our methods, therefore, must be simple and precisely stated, allowing no such discretionary power as can only be wisely exercised by those who are conversant with at least the principles of bacteriology. Again, we must not ask the caretakers of schools to do what is unreasonably irksome or what we should not ourselves like to be asked to do, nor, so far as possible, what does not commend itself to average common sense. If we disregard these things we shall most likely have our measures carried out in a perfunctory manner or omitted altogether.

Let me give you two instances of what I mean. In quite a number of the towns and districts of Scotland the instructions regarding infection and disinfection which are given to householders when communicable diseases are notified recommend sulphate of iron; green copperas, as a good and convenient disinfectant, and advise its use in solution of suitable strength, perhaps 10 to 15 per cent. The householder, let us suppose, reads the instructions; he reads of a substance which is rarely familiar to him either by its chemical or its less technical name, and he learns that to do any good he must use pounds of it. Well, the result is—but you know the result as well as I do, that is to say, there is no result. Again, you have all read, doubtless, the Scotch Education Department's recent circular on the

subject which we are at present considering. I think it is on almost every point most excellent, sound, and reasonable; but I do think, if I may say so with respect, that regarding disinfection of copy books, the Department have suggested a process rarely feasible and still more rarely necessary; and that, since no one can foretell which children are to turn out Newtons, Miltons, or Wellingtons, the best way to disinfect copy books is to put them in the fire.

We are agreed, then, that our measures of disinfection must be reasonably practicable, not too cumbrous or tedious, intricate or irksome, and definitely and precisely detailed. We shall agree also that they must be inexpensive, else we shall not have the school boards as allies, and, of course, that, above all, they must be effective, real methods of disinfection, bearing laboratory credentials, not merely pleasant processes for perfuming the air.

Presuming upon your approval, I propose to confine myself to consideration of the cleansing of school interiors. Time is short; I am already close on the prescribed limit, though I have not yet left the generalities. Besides, it is surely better to deal adequately with a sub-topic than to ramble over a whole question.

Allow me, then, to set before you what I conceive to be the minimum standard to which we as sanitarians should ask the educational authorities, school boards, and others, to assist us to attain. I shall divide my subject into four heads—the daily sweeping, the monthly scrubbing, the annual overhaul, and the special disinfection. A few words about each.

The three objects of health, comfort, and educative example all make it desirable that every class-room should be swept and dusted every day. I am well aware of the difficulty often experienced in sparsely

populated rural districts of finding any one who is both fit and willing to perform the work of school cleaning. But the problem of achievement is not before us, and the minimum standard in this regard is a *daily* sweeping and dusting. These should be done with widely open doors and windows, and, of course, with damp materials, of which sawdust, if available in sufficient quantity, is the best. The use of sanitas, eukotas, or some such pleasant smelling substance will give an agreeable and æsthetic finish to the work and do no harm so long as too much reliance is not placed upon it. As to dry sweeping, surely one visit to a schoolroom where it is going on, the operator's head well protected by enswathing flannel, is sufficient demonstration that the process is most objectionable. Such experiences remind me of the parable in the "Pilgrim's Progress" of the "very large parlour which was full of dust, because never swept, the which, after he had reviewed a little while, the Interpreter called for a man to sweep. Now, when he began to sweep the dust became so abundantly to fly about that Christian had almost therewith been choked. Then said the Interpreter to a damsel that stood by, 'Bring hither the water and sprinkle the room,' which, when she had done, it was swept and cleansed with pleasure."

Once every month or, at the very least, every two months (which, allowing for the school vacation, means only five times a year), a much more thorough cleansing of floors, furniture, and all woodwork should take place. This must necessarily be done on the Saturdays, and one or two rooms should be done each week (according to the size of the school) until all are overtaken in rotation. For this object I suggest nothing beyond simple scrubbing with soap and warm water to which has been added, in proper proportion, some disinfectant of high co-efficiency. I do think that if this is done

honestly, desks and forms and dadoes, as well as floors, at least ninety-nine out of every hundred pathogenic organisms will perish in the process, and even the hundredth, if he do survive, will have his constitution permanently impaired by the ordeal. I learn that in one of the Ayrshire schools this periodic scrubbing is done by the girls themselves. Thus, the desired object is gained in a most economical manner, while at the same time the girls are led, so it is said, to take a pride in the cleanliness of their school, and receive excellent practical lessons in household management.

Then, once a year, in the summer vacation, must come the great annual overhaul, the analogy of the housewife's spring cleaning, when nothing should escape. To begin with, maps, pictures, blinds, and all detachable appliances should be removed from the room to the playground or the shelter-shed. Then, if whitewash or distemper of walls needs renewing, it should be done; if not, walls and ceiling should be sprayed with watery disinfectant solution either by means of a special spray apparatus or, if labour is cheap and time no object, by means of a common garden syringe with a fine rose. Were I a braver man, I should drop a hint of the delight it might prove to innumerable Tom Sawyers to take part in this process under the eye of authority, on the analogy of the school-girls in Ayrshire. Then all woodwork, which includes not only floor, desks, and forms, but also wainscot, window frames, cupboards, and blackboards, should be scrubbed as in the monthly process, but with special care that no chinks and crevices escape. Desks, seats, and other articles of furniture which are varnished and not painted, may be thoroughly rubbed all over with a cloth soaked in paraffin. Then the room is ready for the re-admission of its lighter articles, decorations, and the like, but nothing should pass in until it has under-

gone appropriate treatment with a view to its purification. Maps and pictures should be gone over with a wet duster; slates should be washed with warm disinfectant solution. Last of all, the windows should be opened to the fullest and the blinds raised to the top that Nature's glorious agencies of oxygen and sunlight may complete the beneficial work.

It will be admitted that faithful execution of all these steps is not to be expected of caretakers and charwomen unless they have a high sense of honour and duty ("sweeping a room as for Thy laws") and a belief in the reasonableness of the procedure. And we shall agree that, if the whole is faithfully done, there is little risk of infectious material remaining in the classroom. But on exceptional occasions, as when diphtheria has been prevalent in a district, and has either seemed to have been spread by school attendance or specially associated with the pupils of one particular school, or when children recovering from mild attacks of scarlet fever have been inadvertently allowed to return to school, it may be necessary to perform a still more elaborate process. This may be requisite not so much to secure its primary object as to allay public anxiety. The latter I do not consider to be an unworthy motive. On such occasions we, the sanitary officials, are likely to be invoked, and some form of fumigation will probably be suggested. I think I am right in saying with regard to all methods of gaseous disinfection that not only is faith in their efficacy on the wane, but also the belief in their necessity. If we have disinfected all the removable contents of a room and cleansed all its surfaces, I do not think that there is anything left to be done by germicidal vapours that cannot be done as well by fresh air and copious sunshine. Disinfection and fumigation are practically synonymous words in the popular mind, and



by this confusion a false confidence is apt to be induced. I therefore think that it is better and more honest to omit all artificial processes of aërial disinfection from our routine procedure.

Our special disinfection thus resembles very closely the annual overhaul, except that everything must be done with particular thoroughness; thus, to quote Dr. Leslie Mackenzie, "When a serious outbreak of infectious disease occurs the spraying must proceed to profuse wetting of all dust-covered surfaces." In such cases the help of the painter should be invoked that all walls may be limewashed or re-painted, and the aid and supervision of the sanitary inspector to ensure the thoroughness and completeness of the process. In such cases, also, books may have been particularly exposed to infection, and so may require special attention and treatment. Admittedly their disinfection without their destruction is a difficult problem. I think there are only two reliable alternatives—burning if the books are of little value, disinfection by steam in a proper apparatus if their preservation is of moment. By the latter process only the covers are damaged.

It may be asked, "Need the actual measures of disinfection vary according to the disease whose prevalence it is desired to check?" In domestic disinfection we know that the answer is in the affirmative, and that the steps vary according to whether it is the bacillus of enteric fever or of diphtheria, whose destruction is their object. But in school disinfection, as a rule, we must aim more widely, and endeavour to make our measures so drastic that no disease germs will escape. On the occurrence of cerebro-spinal fever, popular anxiety is so great that it may be permissible or expedient to offer up an oblation of sulphur or formalin on the altar of public sentiment. In the

diffusion of measles, and probably also of whooping cough and simple epidemic catarrh, the school is probably never involved, except in so far as children are gathered together in close proximity within its walls. Thus, it is likely that free currents of air, sunlight, and the element of time are the most reliable factors in disinfection in such cases.

The subjects of school construction and school equipment are not before us; but there are one or two points in these subjects which bear so vitally upon our topic that I must refer to them for a moment. An essential part or accompaniment of all our measures is abundant aëration. It would seem obvious that when schools are empty and being cleaned a far more vigorous ventilation is desirable, nay, essential, than would be tolerable while teaching is in progress. Yet I find, alas, that even new schools have such meagre apertures that any real ventilation, in the original sense of the word, is quite impossible. Then the struggle against dust is so large and so essential a part of the whole campaign that I think we may properly ask school architects to keep this in mind when their designs are in progress. Every chink and crevice, every inaccessible space, every hidden cranny, complicates the work of school disinfection. This especially applies, as experience shows, to heating apparatus, the machinery of ventilation, cupboards for maps and diagrams, and flooring. Just as a floor of good, durable, hard wood will last longer and be much more easily kept in clean condition, and so prove ultimately economical, so with wall covering. A washable paint will cost more to begin with than distemper or whitewash, but it will last much longer, it will look better, and, most important of all, it will greatly simplify and promote the processes of cleansing. As another of those trifles which count for so much in the aggregate, I would

suggest the provision of rough door mats in the lobbies. How the patience of the school cleaner must be tried by the work of removing the mud which need never have been brought within the schoolroom.

I have perforce left many interesting matters unconsidered, such as the disinfection of museum specimens—if there is a process which efficiently disinfects a stuffed bird yet leaves it a serviceable museum specimen, I have not heard of it; such as the habitual use of saliva in the cleaning of slates, a process so general and so obnoxious that one desires the elimination of the slate as an educational appliance altogether; such as the cleaning of windows, which must necessarily be modified to suit weather, season, and exposure; and of ventilating apparatus. Experience has shown me that when a school has undergone, as it is said, a sanitary overhaul, the condition of the Tobin's tubes, if they exist, is an excellent and a reliable indication of the thoroughness of the process.

I am well aware that it must seem to you that on the one hand I have been repeating what every one here knows perfectly well; that on the other I have been dwelling on rather petty minutiae. For the former sin I crave your indulgence; of the latter I am not ashamed. It is, I think, by agreeing broadly as to what are the best procedures, and then elaborating them to the smallest and apparently most insignificant details, that we shall make progress towards the success of this, perhaps the most important, most beneficent, work which can ever fall to our hands.

#### DISCUSSION.

Dr. M. J. OLIVER (Newton St. Boswells)—Mr. President, ladies and gentlemen, I have listened to this very interesting paper with great pleasure, and in my remarks will endeavour not to go into the matter so fully as has been done by Dr.

Dewar. Like other medical officers of health, I have done a great deal of school inspection, especially with regard to cleanliness. The first thing that struck me is that there is no standard of cleanliness maintained. One School Board considers a school clean and another considers an equally clean school dirty, as in the case of a large number of schools the Boards take no means of conferring one with another.

H.M. Inspector of Schools, Mr. C. J. N. Fleming, introduced a system in the Border school districts, by which every schoolmaster kept a record of the details of cleaning. An entry of the date is made whenever a room is washed, or dusted, or the walls whitewashed, or anything else done. These entries are made in a book, and once a year these books are sent to the medical officer of health of the district in which the schools are situated, and thus one can take these records and compare the amount of cleansing done in each school. It was soon apparent that there were great differences in the methods followed by various School Boards. I have, in my annual report, given details of the results of the working of this system, and, while I do not propose to inflict the whole report on you, I shall give you one or two extracts to show the principal results.

First, with regard to cleansing floors, and, considering the amount of mud carried into the school on the children's boots, this must be considered as one of the most important items. The following figures refer to 51 schools in the county of Roxburgh. In the case of 2 the floors were scrubbed every week, and at intervals of one month in the case of 4, two months in the case of 6, three months in the case of 11, four months in the case of 14, six months in the case of 10, and twelve months in the case of 3. In the case of 1 school the interval is longer than the teacher can remember. Either the floors must be washed too often in some schools or too seldom in others.

It would naturally be thought that benches and desks would receive particular attention, but we find that in 10 schools the woodwork is not washed at all, and in 1 school it is washed only at long intervals. Thirteen have the desks washed once a year and 8 once in three months, 7 every four months and 4 every two months, 1 every month, and, in the case of 2 schools, once a week. There is but little system followed, in one school the floors not being scrubbed at all and in another the schoolroom being kept clean but the privies being filthy.

I find that the issue of the instructions as to cleaning by the Local Government Board has done a very considerable

amount of good. A large number of School Boards have had their attention directed to the matter. While I consider that the methods advocated by the Board could not well be improved upon, there is, to my mind, one defect, and that is that the Board does not indicate the frequency with which the cleansing operations should be performed, and that seems to me to be the crux of the whole question. I have visited schools in the country which seemed to me almost perfectly clean, and the woodwork was scrubbed just about as white as it is in any well-kept kitchen. This cleanliness was attained by the old-fashioned method—the use of soap and water.

In many schools, which are not so clean as they ought to be, the master is paid so much a year to undertake the cleaning, and I think that is a system which should be stopped by those responsible for it, because it is an inducement to the master to wink at dirt. Members of School Boards speak about the question of payment and the difficulty with the ratepayers, but I think we should maintain that we cannot economise in keeping a class-room clean. Economy is a very good thing in its right place, but I am not prepared to admit that the children should live in a dirty room because the public cannot find money enough to keep it clean. We find that, in all ragged schools, workhouse schools, Navy and Army schools, the premises are kept perfectly clean, and I cannot see why the ratepayers' children should not have just as clean a schoolroom as the children in these charitable or rate-supported institutions. While being quite in accord with Dr. Dewar's views as to methods of cleanliness, I find a tendency in the circular by the Board to trust to the use of the disinfecting spray, and members of School Boards are apt to imagine that when they have purchased a spraying apparatus the whole thing is done. Those who are responsible for the cleanliness of our schools should keep clearly before them that what is wanted is plenty of good, old-fashioned scrubbing, lots of soap, water, and elbow grease. Spraying is a good thing for the disinfection of a clean surface, but it will not disinfect a dirty one, as the disinfectant may not come into contact with the material requiring its action. Light and air are good disinfectants, but their action is exceedingly slow and somewhat uncertain, and I think that the beneficial effects of their action have been over-estimated by some.

The effect of the experience I have had is that I am a strong advocate of soap and water, and, if you have plenty of both, you will have good results.

The following communication by James A. Hislop, M.D., D.P.H., Hamilton, was read by Dr. Watt:—

With the advent of compulsory education the State assumed a burden, in its relation to the child as a scholar, that has gradually increased with each succeeding year.

The advances in science are daily imposing upon us new and growing responsibilities, with the result that school hygiene in this process of evolution is receiving increased attention, and has now become a matter of the greatest national interest and concern.

Where the conditions which produce ill-health and disease are known, it is our bounden duty as enlightened individuals to remove them, so far as we can, and assist in maintaining the health and well-being of the child at school.

Medical supervision of the scholar and his environment ought, therefore, to become a part, and a prominent part, of school organisation.

In considering the subject before us we cannot dissociate the child from the school itself, as it is the personal element which mainly creates the necessity for cleansing and disinfecting. It might be desirable, therefore, to consider the question briefly in three aspects—

- (1) The necessity for cleansing and disinfecting.
- (2) The powers of public health authorities in regard to cleansing and disinfecting.
- (3) The procedure in cleansing and disinfection.

(1) The necessity for cleansing and disinfecting is materially obvious, and the Education Department exercises a control over school buildings in this respect.

If reference be made to Article 17 (c) of the Scotch Education Code for 1908, it will be found that, "before any grant is made to a school (Article 4), the Department must be satisfied that . . . the premises are healthy, well lighted, *cleaned*, warmed, drained, and ventilated, properly furnished, supplied with suitable offices, and contain sufficient accommodation for the children attending the school."

Although the article anticipates regular cleansing and provides for natural disinfection by light and air, supervision must be exercised by those in authority to see that the provisions stipulated are carefully observed and enforced. What, then, renders this cleansing and disinfecting necessary? If we enter a class-room in the morning, before the work of the day begins, everything looks bright and clean, and the air fresh and pure, but at the end of the school day we not



only find visible particles of dirt and dust, but, it may be, a close, disagreeable smell. The dirt and dust have been introduced by the scholars, and consists of dried mud from the roads, dried secretions and scales of skin, healthy or diseased, shed from the body; exhalations from the lungs, woollen and cotton fibres from clothing and material carried by the wind from outside. It is made up of inorganic and organic particles. The former may not be very harmful, but the latter, through the agency of micro-organisms, is liable to undergo rapid decomposition and produce the "stuff" atmosphere which we associate with a crowded or ill-ventilated room. It is the germ life, moreover, invisible in itself, which may cause disease and ill-health, so that, quoting from the excellent memorandum prepared by the expert advisers of the Local Government Board for Scotland on this subject, "To cleanse a school properly it is necessary to destroy the germ life as well as remove the visible dirt." Infection in school may be spread from scholar to scholar by personal contact, and in the majority of cases this is the method whereby infection is transmitted. Thus a child sickening from diphtheria, measles, whooping-cough, or scarlet fever may kiss another child, or scatter the fine spray from the mouth and throat during the act of coughing, and so transmit infection; or a healthy child may suck a slate pencil or lick a slate which has been previously used by a scholar suffering from a mild sore throat, probably diphtheria.

To obtain effective results from cleansing and disinfecting, which would otherwise be absolutely useless, I would strongly urge the need for attention to the personal element as the means whereby the disease germs are carried to the school, and the necessity for instructing the scholar to avoid such habits as will tend to transmit infection.

In the county of Lanark last year nine schools were examined owing to suspicion that school influence was a causative factor in the spread of diphtheria. About 1200 swabs were taken from the throats of scholars present, and of these no fewer than 81, nearly 7 per cent. of those swabbed, contained the diphtheria bacillus.

To control infection, therefore, it is not only necessary to carry out a cleansing and a disinfecting of the premises, but to exclude the personal element also, which renders this needful.

(2) The powers of public health authorities in regard to cleansing and disinfecting.

As it is not practicable in dealing with the question of cleansing and disinfecting to separate the individual from

his environment, it is necessary to take into account both scholar and school.

With regard to the former, it may be a question of uncleanness or infection.

On 10th October, 1901, the Local Government Board for Scotland issued a circular letter to local authorities drawing attention "to the mutual advantages of co-operation with the School Boards in their districts in the discharge of their respective duties," and, amongst other things, they draw attention to "children who present themselves at school in a state of uncleanness so gross that they cannot be allowed to mingle with other children," and referring the local authority "to consider as to the exercise of their powers under section 40 of the Public Health Act, 1897. In burghs the provisions of sections 118 and 119 of the Burgh Police Act will also be available . . ." In this direction, the Board direct attention also to the Cleansing of Persons Act, 1897.

In the case of an infected scholar, the sections having reference thereto I will merely mention.

Section 45 provides for entry into schools and the examination of children.

Section 56 imposes a penalty on exposure of infected persons and things.

Section 57 imposes a penalty on sending children to school so as to spread infection.

In dealing with the *school premises*, we must bear in mind that the word "house," as defined in the Public Health Act, means dwelling-house, and includes "schools," and that the word "premises" includes lands, buildings, . . . whether public or private.

Section 16 (8) defines as a nuisance "any school-house . . . not kept in a cleanly state."

Section 40 is applicable to "filthy houses or any article of bedding or clothing if the impurity is such as to affect or endanger the health of any persons. . . ."

Section 45 gives power of entry to inspect the school and premises when infectious disease is suspected.

Sections 46 and 47 provide for the disinfection of schools, and for the destruction and disinfection of other articles likely to retain infection.

The powers of local authorities are therefore considerable, and it only requires a system of mutual co-operation between the local authority and School Boards in order to obtain the greatest benefit from these powers and controlling agencies.



## (3) The procedure in cleansing and disinfecting.

This has been detailed so carefully in the pamphlet issued jointly by the Local Government Board and Scotch Education Department that it is difficult to suggest better, as the directions are based upon actual experience, and take full account of practical difficulties.

It is absolutely necessary, however, that teachers and school managers should appreciate its importance, and that they should be ready to spend a sufficient sum in order that this important item of school administration be carried out efficiently and methodically.

Dry dusting and sweeping should be discountenanced.

As a routine procedure, a *daily cleansing* should be undertaken after the day's work is finished. This should comprise a thorough sweeping of the floors, over which sawdust, thoroughly wetted with water or some disinfectant, has been previously sprinkled. The sawdust ought subsequently to be burned in a fire or furnace.

When the floors have been swept, the desks and school furniture should be dusted with a damp cloth. If practicable, early next morning the desks and furniture ought to be again wiped with a damp cloth before school resumes. Lavatories and offices should be inspected and flushed or sprayed with disinfectant when required.

A *monthly*, or in some localities a *weekly*, *cleansing* may be required, and should comprise a thorough washing of floors, desks, and woodwork generally, with soap and water, while windows might receive a cleaning also. Books should be dusted with a damp cloth, especially the solid edges between the boards, and further freed from dust by hitting two books together in the open air. If slate pencils and slates are used, the former may be cleansed by placing in running water or some disinfectant, and the latter by washing with soap and water and subsequently flushing with running water. It would be much better to discontinue the use of slates altogether, and so discourage the habit of spitting, frequently resorted to even although a sponge is used. Cloak-rooms, lobbies, covered playgrounds, and outside offices should receive attention, scrubbing with soap and water where necessary, and finally spraying with some disinfectant.

The annual cleansing, in addition to the measures already mentioned, should include a thorough examination of the whole school premises. The condition of school floors should be noted, and all cracks and crevices, which might serve as a repository for dust and germs, should be filled in,

and defective woodwork generally replaced by new material. Walls might be lime-washed, repapered, painted, or varnished as occasion requires.

Ventilators and heating appliances should be carefully inspected. Water supply, drainage arrangements, and receptacles for refuse and rubbish should be examined, and any defects should be rectified.

Disinfection or special cleansing is undertaken as necessity arises, and after an epidemic of some infectious disease, such as measles, which has had an association with the school.

Although aerial disinfection may not be of such importance as the personal hygiene of the scholar and the sterility of the implements with which he performs his duties, yet the routine work of cleansing and disinfection impresses the mind and tends to inculcate habits which have an educative influence upon the scholar. For the disinfection of class-rooms there is, perhaps, no more efficacious method than the use of Lingner's steam disinfecting apparatus, using Formaldehyde as the disinfectant. A fine spray is projected all over the room at a fairly high temperature, so that the vapour penetrates every crevice. It disinfects ceiling, walls, floors, desks, furniture, and curtains at one operation.

In the county of Lanark this is the apparatus commonly used, and numerous disinfections are carried out annually by this method—some on account of infectious disease, some at the request of the School Board and others in a routine way during the holiday season.

Taking a school of six rooms, and the price of formalin at 3s. 8d. per gallon, methylated spirits at 3½d. per pint, and including the wages and expenses of sanitary inspector and assistant, the cost of disinfecting works out at about 15s. to 16s. 6d. a school, or an average of about 2s. 6d. per room. In the landward part of the county there are about 230 schools, and the question might be asked, unless when disinfection is undertaken on account of infectious illness, should the cost be borne by the local authority, or, in part at least, by the school authority? If, however, one of the school staff could render assistance, and a demonstration be given to scholars, it could be done much more economically, and the educative influence upon the scholars would be beneficial also. Again, if a simple spray pump or a garden syringe with a fine rose were employed instead of Lingner's apparatus, the cost, using two pints of formalin on an average for each room, would work out roughly at 1s. per room. For the special disinfection of books and small rooms, the following apparatus has been found ser-

viceable and convenient for transport:—In the case of books, a small cupboard or room is chosen, and the books are placed edgewise on a perforated shelf or hung over a wire so as to allow the leaves to remain as open as possible. The disinfecting apparatus, placed underneath, consists of a copper dish on a tripod, with a spirit lamp below, having a circular wick. The flame should be protected at the sides by brass gauze to prevent the formalin in the copper receptacle taking fire. For the disinfection of water-closets, pail-closets, and urinals, chlorinated lime will, perhaps, be found the most economical and efficient disinfectant. In addition to chemical disinfectants, however, it is most important to attend to natural disinfection by throwing the windows widely open and flushing the classrooms with fresh air at every available opportunity, and keeping open a sufficient number of windows even when the children occupy the room, to prevent any approach to "stiffness" of the atmosphere.

Cleaning and disinfecting of school premises is a branch of scholastic work as important as the educational work, and if the memorandum of the Boards and the discussion of the subject to-day by the members of the Sanitary Association of Scotland are the means of emphasising its importance, it will no doubt have a reward in effecting an improvement upon the general health of the scholar.

Mr. P. C. SMITH (Arbroath)—Mr. President, ladies and gentlemen, there are two points in connection with school cleaning that I should like to refer to. The first is the method, or, rather, want of method, that is employed. In many schools you will find that, while the floors are well washed and kept clean, the walls are altogether left out of the question. While we have laws stipulating when a factory or a bakehouse is to be lime-washed or painted, there is no law laid down as to how often the walls of a school should be whitewashed or painted. I remember some years ago in a school with which I am well acquainted the walls were whitewashed and a calendar hung up—one of those terrible examples for children where you see a youth leaving school and going up a ladder with a brilliant career, and another youth sinking down. I had occasion to visit that district recently, and thought that I should like to see the school again, and there the terrible example still remained pasted up, silent witness to show that these walls had not been washed since 1885. I think some system should be adopted whereby the walls of schools should be whitewashed oftener than once in twenty-five years. Then

another point I wish to refer to is the fact that in the design of the school there should be no little places for dust to accumulate. While ornamental detail is all very well, it is not wanted in a school. I had occasion to attend the disinfecting of a school which had been closed, and, in spraying the walls, suddenly some black streaks became visible coming down the wall, and I found on the top of some ornamental design quite a heavy coating of dust. In designing schools I think all such details of plaster or wood work that harbour dust and dirt should be left out altogether. These are the only points that I wish to refer to.

Councillor MACDONALD (Motherwell)—Mr. President, ladies and gentlemen, I think, if you are going to have papers like this, you ought to invite delegates from the Educational Institute to be present with you. In regard to the cleansing and disinfecting of schools, we claim in Motherwell to be pioneers in this movement, for when our enthusiastic medical officer of health, Dr. Jack, took up duty, he, at the request of the School Board, drew out a simple code of instruction in these matters for the guidance of teachers. Shortly after, a very elaborate memorandum was issued by the Education Department wherein very specific instructions are given for the cleansing of all articles in and about the school. A "cleansing register" must also be kept, wherein all details of the periodic cleaning of the school are entered. I agree with the other speakers that no mention is made in the memorandum as to how often schoolrooms should be washed, but a hint from His Majesty's inspector when visiting the school should easily put that on a proper and regular system. Many of the regulations mentioned in the memorandum, and explained by Dr. Dewar, are too elaborate and too expensive; thus, slates are rapidly going out of use, and it would be cheaper to burn old copies, &c., than disinfect them. I cordially agree with Dr. Dewar in his desire that the cleansing of our schools should be effective and inexpensive; but I cannot agree with his method of reducing expense by setting the senior girls to wash the floors and the boys to use the hose. For a time or two, I have no doubt, such a combination would be delightful, and a considerable amount of fun could be had out of the operation.

I am afraid that, in offering this suggestion, Dr. Dewar has not taken the irate parent into consideration. He has evidently had no experience of the wrathful mother. I have had considerable experience, and I treat her with respect. I am sure that if this method of cleaning schools were adopted in Dr. Dewar's district, the good ladies of

Fifeshire would very soon let it be known that *they* would provide their girls with sufficient practice in floor-washing at home. It is surely the duty of the educational authorities to provide in an efficient manner for this important duty, and I think it is an infringement of the Education Act for School Boards to farm out the cleaning and heating of the school. Such a procedure is unknown in our larger schools, and in the villages and rural districts where a niggardly allowance is made it can only result in uncomfortable and insanitary schoolrooms. This is not in keeping with modern methods, and belongs rather to the times when our grandfathers went unwillingly to school with a peat or two under their arms—the daily winter contribution to the school fire.

Dr. Dewar has outlined a very simple and effective routine for keeping schoolrooms and teaching appliances in a sweet and pleasant state; but I think it should be the duty of the sanitary inspectors to make frequent visits to the schools within their district, and more especially when infectious disease is prevalent, to see that these measures are systematically carried out.

Mr. C. J. N. FLEMING—Mr. President, ladies and gentlemen, as this is a school subject, I think it is my duty that I should make some remarks on it. I have listened with great interest, as you all have done, to the excellent remarks that have been made in connection with the cleansing of schools, and I should like to take this opportunity of publicly thanking the medical officers of the counties with which I have to do for their kindness and for the many kind suggestions made to me in our endeavours to raise the standard of cleanliness in the schools of the district. You have heard from my friend, Dr. Oliver, an account of the state of cleanliness in Roxburgh, and from that you will see that all is not as it should be, and that really one must say that the schools are not as clean as I think everybody would wish them to be. I can only say that I think we are improving in school hygiene, and I think generally the public are becoming more interested in it. School managers have invariably taken the question up, and have made improvements in the way of water-closets and things of that kind. A little more money has been spent in various ways, and, so far, that is thoroughly satisfactory, but there are many things to which I would like to call your attention. I know that I am addressing practically a meeting of experts, and we who are dealing with the administration of education need the help of experts in various ways. We are asked how often we

should wash the floors and how often we should clean the walls, and so on. Can you guide us? We want you, if you can—and I believe you can—in every district to enter the schools and tell the teacher or whoever is in charge that that school is not as clean as it should be.

There is another question which has not been touched upon, but I think it is of great importance. That is the question of the spread of disease and of infection in schools. Really it appears a poor thing to have to say that if a certain disease, such as whooping-cough, begins, it seems to spread through the whole school, and I don't think it is right. I think the public need a good deal of education in the matter of annulling the spread of disease. They seem to think that it is all a matter that must be gone through. The child must have its whooping-cough and its measles, but I say it is not the case. I don't think we shall be able to stop it till we have a thoroughly cleanly school and a thorough disinfection, and also proper isolation of those cases, and, perhaps, a little more attention given to it by teachers. I think one of the things that has been alluded to is the question of expense. I believe very often managers are to blame in the matter. Sometimes the teacher gets a certain amount of money, perhaps £3 or £4 a year, and for that he has got to clean the school and heat it. I know cases where a man has been paid £3, and has had to pay £2 for the coal alone and 10s. is left for cleaning. He has got, perhaps, 1000 square feet to wash, and he gets a woman to wash that, and it is obvious the amount of work that has to be done. When you meet with a contract of that sort, you are not surprised to come in and find that the school on a cold day in winter is very cold. Now, I think this is wrong. It is not right to contract in such a way for the coal or cleaning, because in the long run it is a temptation to the cleaners to scamp the work.

Dr. THOMAS F. DEWAR, in reply—Mr. Chairman, ladies and gentlemen, I shall put my remarks into the briefest possible space. I very much appreciate the attention with which you listened to the paper. I have been handed in three questions. The first is, "Do you approve of making floors sticky so that dust will stick to them?" and my answer is "No"; I think that soap and water can do the most effective cleaning. The second is, "Are these sticky washes sanitary?" and the third is, "Is there any way of making the dust in the cracks between the boards stick there?" You all know the evils which we associate in our mind with dust in crevices. I do not think we want anything which



will allow the dust to remain in crevices. There is only one point which I can take exception to. The process of disinfecting copy books is unduly intricate, and I think the best way of disinfecting copy books is to put them in the fire. It pleases me very much to find that you have in the South what we have been trying also in the North, namely, the co-operation in sanitary inspection of schools between H.M. Inspector and the county medical officer. I hope that all over the country the school officers will be brought to share the views which we have been putting forward. The subject is not a controversial one, but I am very pleased to think that we have had a fairly successful discussion.

### THE HOUSING AND TOWN PLANNING BILL, 1908, IN RELATION TO THE REQUIRE- MENTS OF SCOTLAND.

By Mr. F. G. HOLMES, C.E., Burgh Surveyor, Govan.

OF the many sanitary and public health subjects which are regularly discussed at the meetings of this Association there is none which is more deserving of the serious consideration of the members than the principle of housing and town planning, and therefore it is appropriate that at this, our earliest opportunity, we should discuss the Housing and Town Planning Bill which is presently before Parliament. Indeed, I might go further, and suggest that in future all bills proposing to deal with sanitary and public health matters should at the earliest possible opportunity receive our careful consideration, because I know of no Association which is more competent to deal with such subjects than an Association which is largely composed of the chairmen and members of many of our most important local authorities and their executive officers, who are dealing every day with these subjects in all their various details. After such consideration, written representations might, if found desirable, be submitted thereon, and I venture to believe that they would be found most valuable in the transformation stages of such bills into Acts of Parliament.

So far as Scotland is concerned, the purpose of the bill is to amend the law relating to the housing of the working classes and to provide for the making of town planning schemes. A paper including an exhaustive criticism of the bill would take up much more