

PUBLIC HEALTH OF SCHOOLS

and the Necessity for

A STATE DEPARTMENT OF HYGIENE.

Thesis

for the Degree of M.D.,

by

THOMAS WOOD, M.B., C.M., Edin., 1883.



The question of Hygiene, in relation to the spread of disease in schools, and the exclusion of children therefrom, also the subject of hygienic furnishings, such as school desks and seats, periodic disinfection of school buildings, along with all slates, books, maps, etc., as well as careful medical supervision and inspection, has, considering the great and vital importance of the subject, received far too little consideration from the present constituted authorities.

Medical Science has made great strides respecting the knowledge of contagious and dangerous diseases, and their dissemination. Vital statistics clearly prove that this knowledge, and the measures recommended when practically applied, have had a most beneficial effect in preventing the spread of those diseases, and in checking mortality therefrom. Hillier (Public Health, March 1903, p. 301) calls attention to the probable extinction of Phthisis in a generation or more, and presents a diagram, in which the descending line for England shows a probability of such an extinction about 1945 to 50 and in Prussia 1925 to 30. The/

The death rate from this disease has fallen in England from 24 per 10,000 of the living population in 1886 to 19 in 1900; in Prussia there has been a more rapid fall, viz., from 31 per 10,000 in 1886 to 21 in 1900. This decrease is largely attributable to the discovery of the tubercle bacillus and the measures taken to prevent the spread of the disease since its infectious character has become better known.

Public schools bring children from all kinds of homes into close contact with each other; they therefore become the means of spreading infectious diseases, consequently the greater knowledge we now have of their specific cause and propagation, entail new and greater duties on School Authorities, and it necessitates their taking every care and precaution lest the school should become an agent for the spreading of disease. The individual rights of every child are such, that it ought not to be exposed in school to contagion, or infection, if by taking certain precautionary measures such exposure may be avoided.

Having been a member of the Leith School Board for the last nine years, it has been my privilege to take part in the Administration of Education, including/

including all matters relating to the Public Health of the Schools and the scholars, and nothing has struck me more than the incongruous and anomalous condition in which School Hygiene stands to-day, and the want of a complete organisation between the different authorities controlling it. At the present time, for example, the legislature has given the Medical Officer of Health power of control over the general Sanitary arrangements; these can be inspected by him at any time, and all requirements necessary thereto, he can order the Local Administrative Authority to have carried out without delay. (Regulations for Sanitary accommodation are laid down by the Education Department, and the School Inspector reports on these.) He has also powers with regard to all notifiable infectious diseases, Scarlet Fever, Small-pox, Diphtheria, Erysipelas, etc., to prevent all infected persons being admitted to a school. It is made compulsory on the parent and guardian and on the Medical Practitioner, to notify each case to the Medical Officer of Health, as soon as they become aware of its existence.

The Medical Officer of Health, however, has no legal authority to enter a school for the purpose/

pose of examining a scholar; were he to do so and to lay hands on any child in order to ascertain if it were suffering from any infectious disease, he would technically render himself liable to an action of damages for assault.

Article 30 of the Education Code also provides for closure of the school by the Public Health Authority. It says: "Where the managers have complied with any notice of the Sanitary Authority of the District in which the school is situated, or any two members thereof, acting on the advice of the Medical Officer of Health, requiring them for a specified time, with a view to preventing the spread of disease, or any danger to health likely to arise from the condition of the school, either to close the school or to exclude scholars from attendance, they may appeal to the Department, if they consider the notice to be unreasonable."

To the School Board or Local Administrative Authority are left whatever arrangements they may think fit or proper to make with regard to all non-notifiable infectious and other diseases, such as Measles, Whooping Cough, Chicken-pox, Mumps, Affections of the Ears and Eyes, Sore Throat, Ringworm, Scabies or Itch, Pediculosis, etc., etc.

The/

The regulations which are at present in existence throughout the different Boards are characteristic, probably from their variability, rather than from any other principle.

In the enforcing and carrying out of all such regulations for the preventing of the rapid spread of these diseases, the Teacher must take the initiative. This is not always an easy matter, because at the present time he is not entitled to call in any medical aid to his assistance, except at his own expense. Even those notifiable diseases taken cognizance of by the Legislature frequently escape detection. Scarlet Fever and Diphtheria are often so mild in form that it is not thought necessary to see a doctor; a certain period elapses and after what was thought to be a sore throat, a pupil may return to school, still a subject of active infection, and may rapidly spread the disease.

The Education Department exercises control over all school buildings; it has a veto on the erection of all new schools. School Boards are unable to build schools without borrowing money from the Loan Commissioners. Before this can be done, they must obtain the sanction of the Department to the plans for the new school which they purpose/

purpose building. It exercises its powers in this matter by giving or withholding grants of money. Provision for this is made under Chapter II. Article 17 of the Code, which says, "Before any grant is made to a school (Article 4), the Department must be satisfied that ..... (c) the premises are healthy, well lighted, cleaned, warmed, drained, and ventilated, properly furnished, supplied with suitable offices, and certain sufficient accommodation for the children attending the school."

A footnote says: "In administering this article, the Department will endeavour to secure at least 80 cubical feet of internal space, and 8 square feet of area, for each child, but in schools erected since the 1st January 1874, with the aid of a building grant or loan, the average attendance should not exceed the number of children for whom the plans were approved by the Department. There should be exhibited in each class room, or room in which instruction is habitually given, a placard showing the accommodation of the room calculated in accordance with the foregoing rules." It is on the report, which is made by his Majesty's Inspector - according to the Code there must be three such visits annually and of these, previous notice/

notice must be given to the school of one, the other two may be without notice and are called surprise visits - that the Department acts. After schools have been built therefrom, the Inspector becomes the authority in connection with heating, ventilation, overcrowding and all matters relating to the general hygiene of the schools and scholars. One naturally asks what capacity has the Inspector for such work? And the answer is none, beyond that of an ordinary lay individual. He may have had a brilliant career in Classics at Oxford, Cambridge, or some other University, and thus be well qualified for dealing with all matters connected with the Inspection of Education, but he has had no training in Hygiene, and therefore cannot possibly be regarded as an expert in such matters. Then, when we consider the Department, we find there is no expert in Hygiene advising it. When plans are sent up to Dover House they are remitted to the Architect, having control of that section of the work, whose decision on all such matters is absolute. The result is that the plans are returned, stating: "My Lords approve, disapprove, or request certain alterations to be made", accordingly the work is proceeded with. This is a condition of affairs which is very far from satisfactory/



tory and should not, in the interests of the Public Health of our schools, be allowed to continue. At the same time, however, one must not forget that even with these very imperfect arrangements, a great deal has been done and every credit is due to the Inspectors and the Department for this, but this should not blind us to the weakness of the system. That great improvement has taken place can readily be seen, when we compare the School Buildings and conditions of life at school before 1872, when the Education Act was passed, creating a national system of Education, with the condition of things which exists at the present time. Writing on this subject, Dr John Kerr ("Memories Grave and Gay, Forty Years of School Inspection", page 22) says: "In the earlier years of my experience, I had a varied experience of schools of all kinds - some satisfactory in respect to buildings and equipment, some poor in all respects, low roofs, no ventilation, sometimes a stone, sometimes an earthen floor, bad light ..... I recall to mind a very worthy man, who, in his loyalty to her Majesty's Officer, reduced the much too limited number of cubic feet of air in the school room still further by busking the walls and roof with branches of fir trees, and other/

other greenery, to such an extent, that on entering one could imagine oneself in a pine forest. This was pleasant enough in good weather, but on one occasion my visit was made on a wet day. The woollen cloth in which the boys and many of the girls are clad, which had been saturated with peat smoke for months, and some of it, perhaps, for years, getting drenched with the rain, emitted an effluvium which, combined with the smell of the fir branches, and the absence of ventilation, rivalled in solidity and complexity of stench anything I ever experienced before or since." In this case, one would have wished to know what percentage of germs per litre of ammonia and of albuminoid ammonia was present in that atmosphere.

Again he says (page 10): "Another teacher, on being asked how did he find room for 60 pupils in that little place? Replied there was room for more than you would think; a stool was planted in every available space, every corner was filled, some were at my back, some in the corner of the window, and when I could accommodate no more, and the children had their lessons, I sent some of them across the road to sit with a woman who had a spare corner in her house, and thus made room for others." We are glad to think that conditions such as these would not now be tolerated for a day.

One here naturally asks the question, why is it that the Education Department exercises control over the Public Health of Schools? It seems a very anomalous arrangement. The answer is, however, easily found when we consider the history of the whole subject. In 1872 an Act was passed, creating a National System of Education, controlled by Parliament. It abolished what was known as the Denominational System. The inspectors, who, up to that time, had been appointed by the different Churches, with the sanction of Parliament, were transferred to the Department and became Departmental Officials. At that time there was no Public Health Department proper. The arrangements made for Public Health can only be regarded as an apology for such. From the year 1858, when the General Board of Health expired, and the Privy Council assumed its functions, especially those for making regulations for the prevention and spread of epidemics and contagious diseases, until 1871 a state of chaos existed. The functions of the defunct Board were variously, but most inexplicably distributed between the Home Office branch known as the Local Government Acts Office, and the Poor Law Board. The Public Health Act of 1875 with/

with all its defects, was a great step forward in the right direction, but it must be remembered it was not in existence in 1872.

The Public Health of Schools and all matters connected therewith simply fell under the control of the Education Department, and there they have remained ever since. It is to be hoped, however, that it will soon be placed under the management of a State Department of Hygiene, or some similar arrangement.

In some cases, School Boards, with the assistance of the Medical Officer of Health, have drawn up strict regulations for the exclusion of Children from school for the purpose of preventing the spread of infectious diseases, but when numbers of children are thus excluded, the attendances are reduced. The Government grants are paid (Education Code, 1903, article 19, B., 1 (a), (b), (c) - "On the average number of children in attendance throughout the year", consequently the Annual Grant will be less. Many Boards, for this reason, are apt to take a short sighted view of the matter, and are not prepared to adopt very stringent regulations unless they are compelled to do so. Of course, in the end, the enforcement of strict regulations/

# LEITH SCHOOL BOARD.

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## **Notice to Parents, Guardians, and Others, as to Infectious Diseases.**

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The Public Health (Scotland) Act, 1897, section 56, provides that any person in charge of a case of infectious disease, who—

- (1) Sends, or allows such sufferer (however mild the case may be) to be sent to school, or other public place, until free from infection; or
- (2) Is guilty of other acts tending to spread the disease, shall be liable to a penalty of £5.

Section 57 of the same Act provides as follows:—

“57. Every parent or person having care or charge of a child who is or has been suffering from infectious disease, *or who resides in a house where such disease exists or has existed within a period of three months*, who shall knowingly or negligently permit such child to attend school without procuring and producing to the teacher or other person in charge of such school, a certificate from the Medical Officer, which he shall grant free of charge, or from some legally qualified medical practitioner, that such child has become free from disease and infection, and that the house, and everything therein exposed to infection, has been disinfected to the satisfaction of such medical officer or medical practitioner, shall be liable to a penalty not exceeding forty shillings.

“Provided that if a person is not required to send notice in the first instance, but only in default of some other person, he shall not be liable to any penalty if he satisfies the Court that he had reasonable cause to suppose that the notice had been duly sent.

“Any teacher or person in charge of any school, who shall knowingly permit any child to attend such school in contravention of the provisions of this section, shall be liable to a penalty not exceeding forty shillings.”

The Board do not think that parents or guardians would wilfully endanger the health and perhaps the lives of their children and the children of others, by sending to school children who are suffering from infectious disease, or who reside in a house where such disease exists. The Board have, however, thought it necessary to bring the matter in this form to the notice of those in charge of the home life and training of children, lest danger should be caused through ignorance or forgetfulness.

The following is a list of the commoner, but not all, of the infectious diseases, viz. :—

**Measles.**

**German Measles.**

**Scarlet Fever.**

**Whooping Cough.**

**Mumps.**

**Chicken Pox.**

**Membranous Croup.**

**Diphtheria.**

**Small Pox.**

**Typhus Fever.**

The symptoms of these diseases are generally well known amongst parents, but the following notes may be helpful to some, viz. :—

**Measles.**—Sudden attack of feverishness; slight shivering fits; 'running at the eyes and nose'; and other symptoms of an influenza cold. The rash appears on the fourth day, first on face and neck; it is of a dusky red colour, runs together in small blotches raised above the skin, and often of a horse-shoe shape. The colour of the skin between the blotches is natural. Most infectious in the early stages.

**German Measles.**—Rose-red rash, somewhat similar to that of measles, and sore throat, but no 'running at the nose.' It is a slight affection, often mistaken for rose-rash, but is as infectious as measles.

**Scarlet Fever (or Scarlatina).**—Sudden attack of feverishness; flushed face; shivering fits, varying in intensity, according to the severity of the case; weariness and headache; often sickness and vomiting; sore throat, with enlarged tonsils; red and inflamed throat, and pains below jaw. The rash appears on second day, in the form of numberless minute dots of a bright scarlet or crimson hue, perceptibly rough to the touch, covering neck, and very rarely the face; and the tongue is coated with white, pierced by innumerable red points, hence called the 'strawberry tongue.' After the rash has disappeared, the skin begins to peel off in scurf or scales from the face and body, and in large flakes from the hands and feet. In the mildest form, this 'peeling' is sometimes the only sign. It is distinguished from the non-contagious scaly eruptions by (1) (in older children) the large flakes peeling off the hands and feet; (2) its being accompanied by little if any itching; (3) not being exaggerated about the hairy scalp and joints; (4) the appearance of the tongue; and (5) the history of the case. All discharges from nose, mouth, throat, ears, or sores on lips or face, are very infectious from beginning to end of the illness, but the infection is most dangerous when this peeling is taking place, and the strictest care should be taken to keep the child in the house until this stage has passed.

**Whooping Cough.**—Symptoms of a cold in the head, with restlessness, slight fever, and oppression of chest. In about a fortnight, if unchecked, the cough gradually assumes its spasmodic character. After a succession of violent expulsive coughs, a long breath is taken, accompanied by a long crowing or 'whoop,' the fits of coughing and whooping being repeated until the child seems on the point of suffocation; the face becomes livid, and the eyes prominent, and the frame so shaken that the little sufferer tries to steady itself by laying hold of something for support. Usually the child vomits after a fit of coughing, and the vomited matter is extremely infectious.

Besides those diseases above mentioned, the following diseases are also infectious, viz. :—

*Epidemic Sore Throat.*

„ *Influenza.*

„ *Ophthalmia.*

*Ophthalmia* (inflammation of the eye), especially when marked by the formation of matter along the edges of the eyelids, is infectious, and calls for the separation of the children affected.

The symptoms of all the foregoing diseases may be summarised as follow :—

1. Sore throat with feverishness may indicate diphtheria, scarlet fever, German measles, or a simple sore throat. A child affected with sore throat should be at once kept at home for medical treatment.

2. Signs of a severe cold, accompanied by sneezing and running at eyes or nose, may indicate measles or influenza (both infectious).

3. Swelling in front of and below the ears may almost always be considered as a mark of mumps, especially if on both sides of face; but the swellings may be due to scarlet fever or diphtheria.

4. Spasmodic coughing, especially when it makes the child purple in the face or causes sickness, or bleeding at the nose, almost always indicates whooping cough.

Whenever a scholar is affected with a rash, or with sickness, feverishness, or extreme lassitude, parents should at once keep the child away from school, and should not again send it until all doubt of the nature of the affection is removed. By these means, the schools may be made most potent factors in eradicating infectious and contagious diseases.

The periods of infectivity given below will be found useful, viz. :—

**Measles.**—Three weeks from the commencement of the disease, if all rash and cough have ceased.

**Scarlet Fever.**—Seven weeks from the commencement of the disease, if peeling has ceased, and there is no sore throat, or discharge from nose, ear, or skin.

**Whooping Cough.**—Six weeks from the commencement of the disease, if all cough has ceased.

**Mumps.**—Three weeks from the commencement of the disease, if all swelling has subsided.

**Chicken Pox.**—Three weeks from the commencement of the disease, if every scab has fallen off.

**Ringworm.**—Only when all scabs have healed, and all the scurf has disappeared (time indefinite).

**Diphtheria.**—Periods varying from four to twelve weeks or more from the commencement of the disease.

**Small Pox.**—Six weeks from the commencement of the disease, if every scab has fallen off.

Under judicious treatment, the period of infectivity may be considerably shortened, but no child suffering as above can be admitted after a shorter period of absence, unless provided with a medical certificate.

For their own safety, as well as for that of others, parents are strongly advised to consult a properly qualified doctor in all cases of doubt, as they may thus often save themselves and families from much suffering and danger.

Children who have been exposed to infection from any of the following diseases can only be safely re-admitted to school (if they remain in good health and have taken proper means for disinfection) after the following periods of quarantine :—

<b>Measles</b> (including German Measles),	.	.	.	.	<b>16 days.</b>
<b>Scarlet Fever,</b>	.	.	.	.	<b>14 "</b>
<b>Whooping Cough,</b>	.	.	.	.	<b>21 "</b>
<b>Mumps,</b>	.	.	.	.	<b>24 "</b>
<b>Chicken Pox,</b>	.	.	.	.	<b>18 "</b>
<b>Diphtheria,</b>	.	.	.	.	<b>12 "</b>
<b>Small Pox,</b>	.	.	.	.	<b>18 "</b>

*The infectious diseases specifically mentioned in this circular do not form an exhaustive list of these diseases, and no one who fails to comply with the*

*Public Health Acts will be exonerated from the consequences of such failure because of the absence herein of reference to any infectious disease.*

Under the Infectious Disease Notification Act, 1889, a medical practitioner or other person in charge of a case of infectious disease must, under a penalty not exceeding forty shillings, at once notify the fact to the Medical Officer of the Local Authority. At present the diseases thus notifiable are Small Pox, Cholera, Diphtheria, Membranous Croup, Erysipelas, Scarlatina or Scarlet Fever, and the Fevers known by any of the following names: Typhus, Typhoid, Enteric, Relapsing, Continued, or Puerperal; and also any infectious disease to which the Act has been applied by the Local Authority in manner provided by the Act.

The Board trust that parents and guardians will heartily co-operate with them in carrying out the provisions of the Public Health Acts, by not only exercising the greatest care and caution, as far as the children directly under their charge are concerned, but by informing the Medical Officer for the Burgh, or the School Board, of any cases known to them of parents who are sending children to school at variance with the provisions of these Acts. Information of this kind will be held as private, if desired.

SCHOOL BOARD OFFICES,

2 LINKS PLACE,

LEITH, *April 1899.*



regulations results in invariably causing a decrease of disease, and consequently an improvement in the general attendance and thereby increasing the Grant. This is what happened in Leith; a series of strict regulations was drawn up, which the Medical Officer of Health (then Dr Leslie Mackenzie) was invited to revise and alter according to what he thought proper. This he most willingly consented to do. They were then printed, circulated in the schools and brought into force in April 1899. To show the nature and scope of the regulations contained in the circular, I cannot do better than submit a copy.

The enforcement of these regulations had the effect of causing an increase in the absenteeism of about 5 per cent., e.g., from 13.8 to 18.7, but within four months, this increase was wiped out, the figures then standing at 13.9, as compared with 13, and since that time they have improved.

At the present time there is no universal Scheme. School Boards simply do as they think best and the system adopted may, or may not be good. What is needed, and what seems to me the only remedy for such an unsatisfactory arrangement, is the constitution of some authorised expert body, to/

to lay down regulations on all the above matters. It should not be left in the hands of non expert bodies, such as School Boards, who cannot be expected to have the requisite knowledge on these points, and who are not always disposed to invite the co-operation of the Medical Officer of Health to assist them to draw up regulations for this purpose. Considering the rapid advances which are being made in the Science of Hygiene, only some expert or such a body as I have indicated could be expected to keep in touch with all modern requirements. For example, one may cite the case of pulmonary tuberculosis. What Board has made regulations for the exclusion of such cases from School? It is a serious matter when one considers, that such a case may be sitting day after day at the same dual desk with another pupil - in fact, pupils all around - and exposing them to infection from the tubercle bacillus. Such a case as this only needs to be mentioned, to prove the necessity for medical inspection of schools, with powers to have such cases and all doubtful ones examined, in order to protect the other children. At present, there is no authority for excluding such a case.

Then there is another question of vast importance/

portance which hitherto has not received anything like the attention it should. That is a universal and carefully prepared statistical return of the causes of absenteeism from sickness of all children attending school. This would be of incalculable value. It would throw a great deal of light on the incidence of diseases amongst children, and also in different schools. It would enable investigations to be made which would undoubtedly lead to a diminution of diseases in many schools. It would be of great value in supplementing the great and useful work which has been done in respect of the chemical and biological examination of the air of schools. It would, when carefully worked out all over the country, and the results of the different schools came to be compared with the different systems of ventilation in use, throw a great deal of light on the subject and so enable us to arrive at correct definite views. It would thus assist school Boards throughout the country when erecting new schools, to decide what method of ventilation to adopt, this being at the present time one of the most debatable and therefore, one of the most difficult and unsatisfactory problems they have to face.

Keeping/



Appendix 3.

List of Application for Exemption from Attendance at a Day School considered by the School Attendance Committee—Leith, 5th November 1903.

No. of Case for year ending 31st March next	Address.	NAMES OF Parents.	Children.	Age.	Standard.	Day School at which enrolled.	Recommendation of Committee. "Yes" if case should be granted. "No" if case should be declined.
81	7 Water Close .	Marion Thorburn (widow)	Mary	13	III.	Couper Street	Yes
82	5 Lawrie Street .	Lewis Young, moulder .	Helen	13	VI.	Gt. Junction St.	Yes
83	8 Elm Place .	Flora Thom (widow) .	Betsy	13½	VI.	Lochend Road	Yes
84	3 Tennant Street .	Annie M'Bride (husband absconded)	Thomas	13½	VI.	Yardheads	Yes
85	8 Pirrie Street .	James Gilchrist, lorryman	Adam	13½	VI.	Gt. Junction St.	Yes
86	5 Bowling-green St. .	Jane McIntosh (widow) .	George	13¾	V.	Bonnington Rd.	Yes
87	7 Lapidie Place .	Janet Pellow (widow) .	Alexander	13½	VI.	North Fort St.	Yes
88	8 Kirkgate .	George Taylor, boilermaker	George	13½	VI.	Yardheads	Yes
89	33 Bonnington Road .	Marion Kemp (guardian) .	Robert	12½	VI.	Gt. Junction St.	Yes
90	34 Couper Street .	Mary Harie (widow) .	John	13½	V.	St. Mary's	Yes

Keeping many of these facts in view, the Leith School Board, in June 1901, decided on having a carefully detailed return of all absenteeism from sickness. This, so far as I know, is the most elaborate return of the kind in Scotland. Until that date, the return made was in the form of the officer's visiting reports. In it, all absentees were returned under four heads only, viz., Scarlet Fever, Measles, other infectious diseases and kept at home owing to infectious disease. I here submit a copy of this return.

From this monthly return I have compiled a series of tables showing the incidence of the different diseases in each school, and also showing the percentages. Before, however, dealing with these, I think it desirable, very shortly to describe the different methods of ventilation in the various schools; later on, it will be shown to have some bearing on the subject. There are in the districts altogether twelve schools with three systems of ventilation. First ~~then~~, there is the system in vogue in all the old schools, which are heated by open fires, viz., Tobin's tubes for air inlets, the chimney acting as an outlet. This, in every case, is supplemented by open windows/

dows when thought necessary by the teacher. This class of school comprises Victoria School, Nehaven, Links Place, St. Thomas's, North Fort Street, Bonnington Road and Yardheads.

The second method is that of hot water pipes on the low pressure system with Tobin's tube inlets, the outlets being carried up to the roof, where a large Bunsen gas burner is utilised to cause an up current. Open windows are also used as inlets when required. The schools using this system, are Craighall Road, Lorn Street, Junction Street, Couper Street and Lochend Road.

The third system employed is that of Key's of Glasgow, which has been introduced into the Leith Academy. Here you have a fan in the basement, which takes air in from the street level (This school faces Leith Links, consequently there is no through traffic; had it been otherwise, it would have been very objectionable to have had the air from the street level). The fan drives the air first through a screen of cocoanut fibre, down which water is allowed to trickle. The air is then passed over hot pipes into a shaft or tunnel from which ducts lead to all the different class rooms. At the entrance of each duct, there is/

is a shutter arrangement to regulate the amount of air. There is also a coil of hot pipes at the beginning of each duct, whereby the temperature of the air passing to each room can be regulated. The air is admitted to the class room by an opening in the wall about eight feet from the ground. It is directed towards the ceiling, passes to the opposite side of the room and returns to an exit opening on the level of the floor, usually on the same side of the room as the inlet opening. This exit opening, by means of a duct, carries the vitiated air to the roof, where it is allowed to escape. A condition in this system, which must be rigidly observed, is that the doors and windows must be kept carefully closed, otherwise, the through current of air in the different class rooms is interefred with. I think it is also necessary to state here, that with two exceptions, every school has its own school area - that is to say, a certain defined district from which it draws its children. These district schools are all non-paying, and elementary. They carry on the education of the scholars up to, and are inclusive of what used to be the VI. Standard, but what is now known as the Merit Certificate, which enables scholars/



scholars to be admitted to a secondary or Higher Grade School. The two exceptions to the above are Trinity Academy (Craighall Road) and Leith Academy. In both these, the elementary department is fee-paying and they draw their scholars from all parts of the town. The Higher Grade department is free and the scholars consist of Merit Certificate pupils drawn from all the schools in the Burgh.

At first sight, these facts may appear trivial and irrelevant, but when the nature of the district from which these pupils are drawn, is borne in mind, it will be evident that it enables one to gain a knowledge of the children throughout the Burgh in general and the schools in particular.

Tables I. to XVII. give the numbers of children absent from the different schools for each month with the cause from June 1901 to January 1904.

TABLE I. - Scarlet Fever.

Name of School	1901.												1902.												1903.												1904.		
	June	July	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Sept	Oct.	Nov.	Dec.	Jan.										
Trinity Academy	-	-	4	5	10	9	11	8	7	7	6	5	2	1	3	5	5	1	-	1	1	-	1	1	1	1	3	6	8	8									
Leith Academy	2	2	1	5	5	2	2	4	4	5	2	4	3	-	1	3	2	3	1	-	-	1	-	1	-	-	-	1	10										
Victoria	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	1	1	-	1	-	-	-	-	1	-	-	2	1	-										
Couper Street	12	5	3	5	7	5	4	4	2	5	3	4	2	-	1	1	1	1	1	1	4	1	1	1	1	-	1	2	5										
Gt. Junction Rd.	-	-	5	6	7	5	-	1	-	-	1	1	-	-	-	1	-	-	-	-	5	3	5	3	-	3	2	1	3										
Lochend Road	3	1	3	4	5	5	6	3	2	-	1	1	4	4	-	-	2	4	-	-	1	3	5	5	5	2	1	2	4										
Yardheads	1	-	3	2	1	-	-	-	1	3	4	1	1	1	1	-	2	1	2	1	-	-	-	1	-	-	-	2	2										
Links Place	1	-	-	2	-	3	1	1	-	-	-	-	-	-	1	-	-	-	-	-	3	2	1	-	2	-	1	3	6										
St. Thomas'	-	-	1	2	1	1	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2										
No. Fort Street	5	2	9	10	8	7	4	4	2	1	2	-	-	-	-	-	-	-	-	-	-	4	5	2	7	1	2	3	3										
Bonnington Rd.	-	-	1	7	11	6	5	8	8	5	3	3	3	-	2	1	-	-	2	1	1	3	1	-	2	1	1	-	-										
Lorn Street	4	-	-	1	3	3	5	3	-	1	2	2	2	3	7	3	3	6	5	4	4	1	1	3	8	14	9	3	3										
Totals	28	11	30	49	58	46	39	36	26	31	25	21	14	10	19	16	18	10	16	17	19	13	19	18	20	24	29	30	46										

TABLE II. - Measles

Name of School	1901												1902												1903												1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan								
Trinity Academy	103	75	-	-	1	2	-	-	2	5	9	7	6	-	-	-	-	-	4	1	1	1	-	-	-	1	3	2									
Leth Academy	79	51	-	-	-	-	-	-	-	1	1	36	32	-	1	1	2	1	9	28	30	7	-	-	-	-	-	-									
Victoria	24	-	-	-	-	-	-	-	-	-	3	2	6	-	-	2	56	75	26	1	2	-	-	-	-	-	-	-									
Couper Street	22	12	-	-	-	1	3	-	6	8	3	4	2	13	1	2	5	27	53	66	39	15	-	-	-	-	-	-									
Gt. Junction Rd.	7	2	1	-	1	-	-	1	-	2	2	3	2	-	2	5	14	20	27	40	17	5	1	-	-	-	-	-									
Lochend Road	16	4	-	3	5	2	3	3	-	1	4	-	-	-	-	-	-	6	91	93	7	-	-	-	-	-	-										
Yardheads	4	7	-	-	-	-	-	-	-	3	-	7	28	2	1	2	32	36	20	7	7	-	-	-	-	-	-	-									
Links Place	1	2	-	1	-	-	-	-	-	-	3	-	-	17	57	35	6	2	7	2	2	2	-	-	-	-	-	-									
St. Thomas'	7	1	-	-	-	-	-	-	2	-	1	1	-	-	-	-	3	5	4	11	4	4	-	-	-	4	1	-									
No. Fort St.	31	23	-	1	-	-	-	-	-	2	1	-	1	-	-	-	1	16	6	1	1	-	-	-	1	-	-	-									
Bonnington Rd.	6	2	-	-	-	-	4	3	3	4	2	-	1	4	-	62	29	16	8	3	-	-	-	2	1	-	-	-									
Lorn Street	23	6	-	-	-	-	3	1	1	-	1	2	3	-	1	-	2	2	1	14	72	50	30	-	1	4	3	-									
Totals	223	185	1	5	7	5	13	8	14	26	30	62	81	36	63	107	128	177	251	298	219	115	55	32	1	4	8	7	2								

TABLE III. - Whooping Cough.

Name of School	1901												1902												1903												1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Sept	Oct	Nov	Dec	Jan								
Trinity Acad:	2	2	-	2	1	21	34	28	13	6	-	-	2	-	-	-	4	4	4	12	13	2	2	-	-	-	-	-	1								
Leith Academy	6	7	3	1	-	-	1	2	2	2	1	3	5	8	1	-	23	19	12	7	2	1	1	-	-	-	-	-	1								
Victoria	1	6	-	-	-	-	-	2	4	13	17	17	36	-	-	1	13	9	4	1	1	2	2	4	4	1	3	-	3								
Couper Street	40	23	2	8	4	-	1	4	10	23	25	23	9	1	3	11	29	24	15	17	19	19	9	4	14	23	16	10									
Gt: Junct: St:	7	4	6	5	-	-	-	-	13	18	8	1	1	1	7	12	6	3	2	-	-	-	-	-	-	-	-	2	13								
Lochend Road	75	35	2	-	1	2	1	3	2	2	2	1	-	-	-	3	29	23	8	2	1	1	1	-	-	-	-	-									
Yardheads	10	14	2	-	4	4	-	28	27	18	2	1	-	-	-	1	2	3	4	2	9	14	15	3	1	1	1	5									
Links Place	12	8	4	3	-	-	-	-	-	-	-	-	-	-	-	1	4	2	18	7	12	-	-	-	-	2	-	2									
St. Thomas'	4	2	-	2	1	1	1	-	2	3	5	6	7	-	2	2	-	3	6	13	9	9	9	2	2	1	-	1									
No: Fort St:	41	37	1	1	2	-	-	-	-	4	10	15	9	-	-	4	6	6	2	2	-	-	-	1	-	-	-	17									
Bonn: Road	7	6	-	-	-	-	-	1	1	2	3	4	10	9	7	4	11	9	7	3	4	5	5	-	-	2	3	20									
Lorn Street	5	5	1	3	1	2	1	-	-	3	2	10	22	14	7	5	3	1	2	-	-	1	-	-	-	-	-	11									
TOTALS	210	149	21	25	14	30	39	68	74	93	75	81	101	33	27	30	39	127	102	84	61	74	54	41	13	19	30	22	83								

TABLE IV. - Mumps.

Name of School	1901												1902												1903												1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan								
Trinity Acad:	-	-	-	-	-	-	-	-	-	-	3	2	-	-	-	37	53	3	1	1	1	-	-	-	-	-	-	-	2	6							
Leith Academy	1	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	2	5	2	1	-	-	-	-	-	1	5	18								
Victoria	1	-	-	-	1	2	-	1	-	33	31	-	1	-	-	2	2	2	1	1	-	-	-	-	1	-	-	6									
Couper Street	6	1	1	2	-	2	-	5	7	2	-	-	-	-	2	3	3	-	-	2	1	-	-	2	-	3	-	2									
Gt: Junction St:	8	4	-	-	2	1	1	3	2	-	-	2	0	1	1	4	3	1	1	-	1	1	-	-	-	1	12	-									
Lochend Road	3	5	-	1	53	45	8	7	2	-	4	-	-	24	34	19	2	-	-	-	-	-	1	-	-	-	9	9									
Yardheads	4	6	2	2	1	1	2	1	2	1	1	-	-	-	-	-	-	1	1	1	1	-	-	-	-	3	4	17									
Links Place	-	-	-	-	-	-	4	6	3	13	17	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-									
St. Thomas'	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-									
No: Fort St:	4	6	-	2	-	-	-	-	2	15	16	9	-	1	-	-	-	7	3	3	-	-	-	-	-	4	-	2									
Bonn: Road	5	7	1	-	-	-	-	-	1	2	1	2	-	1	2	1	2	-	-	-	1	-	1	5	13	25	16	2									
Lorn Street	4	4	4	22	29	26	7	5	2	-	-	1	2	1	1	1	1	2	1	4	-	1	1	13	15	7	3										
TOTALS	37	34	8	29	86	77	22	24	18	27	71	57	17	3	28	77	86	18	17	12	7	3	2	2	8	27	52	55	65								

TABLE V. - Chicken-Pox.

Name of School	1901												1902												1903												1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan								
Trinity Acad:	-	-	3	27	25	12	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	6	17	23								
Leith Academy	-	-	1	6	19	20	4	1	-	2	1	3	2	1	-	-	-	-	1	1	-	-	-	-	-	-	-	1	4								
Victoria	-	-	-	-	-	1	-	2	-	-	1	-	-	-	-	-	-	-	5	2	-	1	1	-	-	-	-	2	12								
Couper Street	5	3	1	4	7	4	7	16	18	4	3	1	1	1	-	-	3	2	1	5	4	2	2	2	-	-	5	2									
Gt: Junction St:	-	-	-	-	2	3	1	-	1	1	1	-	-	-	-	-	-	1	7	-	-	2	14	7	-	1	-	1									
Lochend Road	-	-	-	2	-	1	1	2	-	13	32	38	6	1	1	-	-	1	-	-	-	-	2	3	-	-	-	-									
Yardheads	-	1	-	1	-	-	2	5	4	4	8	4	2	-	1	-	-	-	1	1	2	-	-	1	-	-	1	-									
Links Place	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-									
St. Rhomas'	2	2	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	1									
No: Fort St:	1	2	-	6	19	21	3	1	-	2	3	1	-	3	1	-	6	4	-	-	-	6	6	2	-	2	12	5									
Bonn: Road	4	4	1	1	1	1	-	-	-	-	7	13	7	2	4	1	-	-	-	6	9	3	3	1	-	-	1	1									
Lorn Street	-	2	-	-	2	5	9	2	8	9	8	4	1	1	4	4	3	1	1	-	-	-	-	1	-	-	-	-									
TOTALS	12	14	6	49	77	70	28	29	31	35	64	64	19	9	14	5	4	12	15	15	12	20	28	15	2	6	10	41	48								

TABLE VI. - Diphtheria.

Name of School	1901					1902					1903					1904													
	June	July	Sept.	Oct.	Nov.	Jan.	Feb.	Mar.	Apr.	May	July	Sept.	Oct.	Nov.	Dec.	Jan.													
Trinity Acad:	-	-	1	-	-	-	-	-	1	1	1	1	1	1	1	6	6	4	5	2	1	-	-	3					
Leith Academy	4	2	-	1	2	1	1	2	-	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-	-				
Victoria	-	-	-	-	-	-	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
Couper Street	1	-	1	1	2	2	-	-	3	1	2	-	-	2	3	4	2	2	2	-	-	-	-	-	-				
Gt: Junction St:	-	-	4	2	2	2	4	5	2	2	-	-	1	3	1	1	3	1	1	1	3	-	-	-	-				
Lochend Road	-	-	-	1	2	2	3	1	1	-	-	2	3	2	-	-	1	-	-	-	-	-	-	-	-				
Yardheads	1	-	1	-	1	1	10	2	1	1	2	-	-	2	-	1	1	1	-	-	-	-	-	-	-				
Links Place	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
St. Thomas'	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
No: Fort St:	2	2	1	2	1	2	2	1	1	1	1	-	-	-	2	2	2	1	6	-	-	-	-	-	-				
Bonn: Road	2	2	1	1	4	4	4	4	1	1	2	4	3	3	3	6	4	3	-	-	-	-	-	-	-				
Lorn Street	7	11	2	3	-	1	1	1	2	2	1	-	-	3	3	3	2	2	1	1	3	1	1	-	-				
TOTALS	17	17	11	11	14	15	25	17	9	11	9	7	6	8	7	13	16	19	17	20	11	13	4	5	3	2	1	-	3

TABLE VII. - Sore Throat

Name of School	1901												1902												1903						1904	
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan			
Trinity Acad:	-	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Leith Academy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Victoria	5	4	12	26	16	12	9	16	-	-	-	-	-	-	-	-	8	21	4	8	4	7	-	-	-	-	-	-	-	2		
Couper Street	14	15	27	34	28	20	13	23	31	15	24	18	11	24	29	18	21	32	17	19	28	22	20	27	8	31	34	34	20			
Gt: Junc: St:	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Lochend Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Yardheads	5	12	12	21	24	29	7	27	16	6	11	11	17	7	15	23	15	12	21	5	17	12	9	3	8	15	4	10	5			
Links Place	-	28	36	41	44	46	21	23	27	19	27	24	11	11	19	23	18	29	18	23	17	27	-	13	25	34	29	28	27			
St. Thomas'	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3		
No:Fort St:	25	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	13	2	-	-		
Bonn: Road	21	9	12	34	20	14	22	21	16	10	13	14	7	11	27	20	21	15	6	14	14	11	4	5	13	16	16	14	7			
Lorn Street	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
TOTALS	71	83	99	107	132	121	72	110	90	52	75	79	46	51	111	88	83	92	70	62	77	74	33	48	57	108	102	88	64			



TABLE VIII. - Ringworm.

Name of School	1901												1902												1903						1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan		
Trinity Acad:	3	-	2	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	1	2		
Leith Academy	2	1	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	-	-	-		
Victoria	-	-	-	-	-	1	1	1	1	-	-	-	-	-	2	-	-	-	-	-	-	3	2	2	-	1	6	3	2		
Couper St:	9	6	2	3	2	-	3	4	4	4	6	5	7	5	8	5	4	2	2	3	5	2	6	6	3	1	5	1	2		
Gt: Junc: St:	3	2	-	2	1	2	-	-	-	1	-	-	-	1	-	1	3	2	2	-	-	-	-	-	-	-	1	2	-		
Lochend Road	-	-	3	1	-	-	2	5	3	-	-	2	+	1	-	1	1	1	-	-	1	3	3	-	-	-	-	-	1		
Yardheads	3	3	-	-	-	6	9	-	5	5	2	2	2	6	5	10	6	15	11	8	6	9	17	5	2	7	5	7			
Links Place	-	3	-	-	-	8	3	2	7	-	-	12	17	1	8	2	4	6	-	2	3	2	1	3	4	1	3	5	4		
St. Thomas'	-	-	-	1	1	-	-	1	2	1	-	1	1	-	-	-	-	-	2	2	-	-	-	-	-	-	1	-	1		
No: Fort St:	4	3	-	2	4	2	4	1	1	4	6	9	8	7	8	7	4	4	7	5	7	-	-	-	-	-	1	5	6		
Bonn: Road	13	8	3	-	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Lorn Street	6	7	5	9	9	7	8	8	9	21	18	15	13	12	10	14	9	2	6	7	5	3	1	1	-	2	-	-	2		
TOTALS	43	33	17	20	22	31	35	22	32	26	32	46	48	35	39	39	31	33	31	30	28	23	31	17	7	17	18	23	26		

TABLE IX. - Itch.

Name of School	1901												1902												1903												1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan								
Trinity Acad:	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Leith Academy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Victoria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Couper Street	6	7	-	2	4	3	2	2	8	7	4	2	1	2	2	3	1	-	1	6	3	1	1	1	-	-	-	-	-								
Gt: Junc: St:	2	2	3	2	2	-	14	10	3	-	-	-	-	-	6	9	4	4	7	-	2	5	6	4	6	5	7	1	-								
Lochend Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Yardheads	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Links Place	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
St. Thomas'	1	1	-	4	-	-	3	2	2	1	1	1	1	-	-	-	1	1	1	1	1	1	-	-	-	-	-	-	-								
No: Fort St:	1	-	-	-	-	-	-	1	1	-	2	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-								
Bonn: Road	-	-	-	-	5	5	18	20	20	-	21	-	5	7	11	7	8	8	9	15	21	14	16	-	13	13	15	6	13								
Lorn Street	-	-	-	-	-	1	4	3	2	-	-	-	1	6	1	2	1	1	1	1	1	1	1	-	-	-	-	-	-								
TOTALS	10	10	3	8	11	9	41	38	36	8	26	5	7	10	25	20	15	14	19	26	29	22	29	4	18	20	21	7	15								

TABLE X. - Affections of Ears and Eyes.

Name of School	1901												1902												1903												1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan								
Trinity Acad:	6	11	11	15	3	5	10	15	11	3	7	9	-	11	9	19	18	21	32	44	16	26	22	15	33	7	3	3	7	9	12	14					
Leith Academy	9	8	5	15	19	10	18	29	15	13	17	15	12	9	16	19	18	16	20	23	19	12	11	8	3	12	19	28	30	16							
Victoria	27	17	19	28	17	19	22	17	19	9	17	14	8	16	29	23	27	27	12	18	20	21	15	20	15	12	6	11	18	17							
Couper Street	29	22	36	59	59	55	45	51	43	45	34	35	24	19	18	33	27	27	34	22	27	27	25	32	25	36	46	40	40	39							
Gt: Junc: St:	17	12	16	21	30	26	18	17	11	26	19	30	9	11	20	30	15	11	14	14	15	13	14	5	4	15	12	4	8	3							
Lochend Road	19	6	8	23	36	39	24	37	27	44	28	20	-	20	34	27	32	24	31	19	35	-	14	16	13	37	31	31	32								
Yardheads	33	11	26	38	21	23	28	39	45	34	39	21	12	21	21	18	16	19	20	19	22	22	12	9	21	25	21	19	18								
Links Place	23	20	24	24	26	39	36	29	32	33	52	49	22	21	28	23	19	16	19	21	16	17	17	20	15	23	21	19	19								
St. Thomas'	11	6	5	7	9	19	20	18	11	14	18	16	5	14	23	21	13	14	16	16	15	15	19	15	12	9	15	14	12	9							
No: Fort St:	35	30	28	50	41	26	41	44	38	53	36	44	16	30	39	36	22	24	38	35	30	24	30	14	12	16	28	22	27								
Bonn: Road	31	17	17	35	24	18	28	26	29	43	31	36	17	19	41	25	39	44	31	31	42	29	24	22	23	25	26	22	20								
Lorn Street	23	19	22	22	22	22	19	9	19	21	13	9	4	16	12	20	9	11	8	11	15	4	2	4	15	11	12	17	16								
TOTALS	263	179	217	337	308	301	309	329	300	338	311	298	129	207	315	295	267	273	256	259	270	195	215	148	194	240	243	251	230								

TABLE XI. - Diseases of Respiratory Organs.

Name of School	1901												1902												1903												1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan								
Trinity Acad:	-	-	17	8	2	10	2	2	3	2	11	-	-	-	14	2	8	42	32	18	1	21	3	1	18	16	7	14	20								
Leith Academy	10	3	7	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Victoria	1	-	-	4	7	5	-	6	5	4	2	2	-	-	-	-	-	-	-	1	2	-	-	-	-	1	-	-									
Couper Street	8	4	1	3	12	11	4	10	10	7	6	3	-	-	-	4	7	14	-	5	4	3	-	-	-	3	10	8	-								
Gt. Junc: St:	17	13	22	31	24	38	17	10	11	11	13	5	-	7	23	15	8	9	10	7	8	5	2	5	6	8	5	3									
Lochend Road	2	1	2	25	30	30	13	20	14	-	7	13	-	20	-	12	11	13	9	10	7	-	-	18	-	-	1	1									
Yardheads	3	4	1	4	8	5	-	13	9	12	4	3	2	7	9	7	4	4	4	4	3	5	3	-	-	3	6	7	6								
Links Place	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
St. Thomas'	-	-	1	1	-	1	-	-	1	2	-	-	-	-	-	-	1	-	-	-	-	-	-	2	-	2	-	-	-								
No: Fort St:	1	-	27	10	20	15	13	13	11	7	11	8	5	4	9	15	12	13	8	-	14	8	-	5	8	27	-	11	7								
Bonn: Road	-	-	-	9	8	10	3	7	8	14	8	7	2	2	6	8	4	2	-	2	1	1	2	-	1	2	2	2	-								
Lorn Street	4	4	2	4	2	-	3	9	7	3	2	-	-	4	5	1	1	-	1	1	1	-	-	-	-	7	4	6									
TOTALS	46	29	80	97	113	125	55	90	79	82	65	41	7	44	68	52	96	66	45	32	48	13	31	27	58	42	52	43									

Table XII. - Aches, Teeth, Limbs, etc.

Name of School	1901												1902												1903												1904											
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan																			
Trinity Acad:	48	30	47	65	75	56	51	72	72	60	82	57	23	36	42	49	57	51	55	54	52	60	65	50	48	64	49	56	47																			
Leith Academy	37	46	21	49	29	19	33	20	31	25	36	32	9	19	32	17	18	34	27	31	37	28	25	20	23	33	24	37	26																			
Victoria	34	27	72	59	34	32	56	50	45	41	19	40	41	49	36	44	27	34	19	19	24	30	20	25	34	45	49	38	32																			
Couper Street	131113124163137106156156126131121139	89106111103100108100116121145127106138130135112107																																														
Gt. Junc: St:	68	53	43	64	56	64	67	58	59	57	49	51	32	48	46	51	71	54	64	37	55	39	46	38	47	38	31	47	36																			
Lochend Road	65	46	62	77	57	52	64	55	40	40	27	39	21	31	28	37	30	46	43	39	34	44	34	26	34	35	31	31	27																			
Yardheads	25	57	39	61	40	46	36	33	27	42	33	32	27	32	50	28	18	31	36	45	40	37	33	29	34	22	28	29	18																			
Links Place	-	-	-	-	-	-	-	5	25	32	18	20	3	22	16	18	19	28	22	15	15	-	-	-	-	-	-	-	-																			
St. Thomas'	12	6	22	24	18	14	20	24	12	20	17	17	12	11	20	19	18	14	19	14	26	17	24	13	18	13	17	11	22																			
No: Fort St:	47	50	68	75	87	34	68	58	73	62	77	61	41	50	62	44	46	56	47	46	48	41	36	27	25	26	20	30	26																			
Bonn: Road	63	46	66	77	69	49	78	64	46	62	80	68	46	46	65	46	36	65	62	54	41	40	43	40	52	45	41	31	33																			
Lorn Street	54	31	54	72	47	53	62	62	41	34	41	41	22	33	53	50	50	52	54	48	54	44	45	34	82	62	54	38	35																			
TOTALS	584	485	638	786	649	525	691	657	597	606	600	597	366	483	561	506	490	573	548	518	547	525	498	408	535	513	479	460	409																			

TABLE XIII. - Colds

Name of School	1901					1902					1903					1904														
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan												
Trinity Acad:	133	7211027	5259245351348293222215168	32118234227221297191214130129114	61	73201244273149																								
Leth Academy	65	12	45135175111125222115	70	72	40	18	34146120158119139120	76	61	59	23	58159143150100																	
Victoria	166	96104105147127	84123116	81	72	78	43	42	78118113107	66	76	68	79	99	42	40	51	66	81	52										
Couper Street	103	70133208231254227	312224213158124	86116209175224246169201182173168137174225210205115																										
Gt: Junc: St:	131	60	62134204102162211125128106101	48144159160115178107	96	62	77	92	56	71112	90107	71																		
Lochend Road	71	19	74232198178179316133130	90	64	23	80137190153143	95123	91	65	62	25	57147130	96108																
Yardheads	9	7	29	58	99	57	75104	59	45	34	42	13	23	62	56	46	75	42	51	47	19	20	20	25	24	53	54	49	44	
Links Place	103	74115179202119182186164135114	89	60148109131113156122140113	86112	76143162138132128																								
St. Thomas'	10	3	17	33	32	35	47	53	44	43	16	23	17	23	27	31	39	31	27	26	24	14	14	14	17	16	22	15	44	17
No: Fort St:	116	63	7920424515621729112218114	66	41	74131151150178123	91	81	81	59	42	60	78103108	90	89															
Bonn: Rd.	108	33	59160136145163200146116	80	59	37	52104138	88149114	88	73	52	44	27	55	92102102	76														
Lorn Street	61	32	75185155107156227146119107	94	45	70149188168179143175143103109	68155158171146116																							
TOTALS	1076	541	900	1909	2083	1696	1948	2593	1687	1420	1178	948	461	924	1545	1635	1588	1858	1338	1401	1090	917	935	617	944	1485	1481	1475	1105	

TABLE XIV. - Sore Hands or Feet.

Name of School,	1901												1902												1903												1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan								
Trinity Acad:	5	3	7	5	13	7	12	9	10	2	1	3	1	1	9	3	-	11	1	5	5	7	6	3	5	11	2	4	-								
Leith Academy	2	3	11	8	8	5	4	12	17	10	7	4	4	6	3	5	7	8	14	8	13	6	11	4	11	15	13	15	9								
Victoria	14	23	17	15	22	12	24	19	15	20	10	20	5	9	26	13	7	14	10	13	12	12	12	20	13	13	9	11	15								
Couper Street	42	46	38	45	30	28	46	54	33	21	34	38	21	41	50	38	32	42	32	33	23	21	38	27	31	32	26	34	33								
Gt: Junc: St:	7	17	17	13	19	10	14	17	9	18	11	14	7	18	7	5	19	28	15	8	7	12	14	5	10	10	11	-	14								
Lochend Road	19	12	22	18	17	14	25	9	14	11	23	14	-	15	22	9	8	14	19	20	-	30	14	14	18	15	18	17	19								
Yardheads	20	12	23	30	25	28	38	36	21	21	10	19	8	43	33	21	21	31	19	23	20	25	39	28	27	37	28	26	20								
Links Place	27	18	29	21	18	23	23	28	15	21	13	16	15	15	21	9	15	18	15	15	16	24	23	19	18	17	14	21	16								
St. Thomas'	11	10	16	15	15	8	3	13	7	18	19	14	12	19	16	13	12	13	15	18	11	13	20	19	20	28	14	13	10								
No: Fort St:	21	27	44	46	40	29	40	52	27	20	37	30	18	27	33	23	20	39	22	20	19	22	22	13	32	34	29	16	16								
Bonn: Road	44	35	30	36	33	21	18	40	30	19	26	23	15	41	30	19	17	29	22	23	22	24	20	25	37	22	24	19	19								
Lorn Street	24	23	14	14	26	3	17	25	21	25	20	8	5	12	24	14	4	14	8	15	9	3	11	7	8	7	10	8	9								
TOTALS	236	229	268	266	266	193	264	314	219	142	211	203	111	247	274	172	162	261	192	201	157	199	229	184	230	241	198	189	180								





TABLE XVI. - Sickness.

Name of School	1901												1902												1903												1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan							
Trinity Acad:	-	45	81	96	68	66	64	74	77	122	73	116	63	61	94	91	70	83	77	72	95	91	111	79	89	78	84	63	86								
Leith Academy	59	75	93	120	95	92	129	113	116	147	113	98	31	96	115	136	104	122	113	95	107	98	128	54	105	98	90	128	94								
Victoria	-	-	-	67	67	42	32	-	28	18	32	27	16	49	43	37	35	32	35	46	30	46	30	51	51	57	32	37	52								
Couper Street	27	54	99	76	68	75	68	73	54	84	82	80	50	110	111	85	76	107	105	132	147	127	135	143	146	150	142	162	143								
Gt: Junc: St:	-	-	517	65	27	30	43	68	68	-	23	67	41	24	-	43	39	55	57	44	66	58	23	47	48	44	47	46	51								
Lochend Road	111	105	129	147	117	114	137	143	139	138	143	103	114	136	119	123	110	121	104	93	122	108	157	110	123	123	100	114	90								
Yardheads	105	85	120	160	156	97	132	134	124	136	102	86	67	85	125	103	94	96	92	93	80	117	93	53	100	93	81	96	89								
Links Place	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
St. Thomas'	61	45	46	48	35	12	-	-	-	15	4	8	3	38	22	12	17	32	18	18	14	15	17	20	30	16	20	8	15								
No: Fort St:	169	143	151	184	124	114	160	167	130	149	171	128	79	107	139	136	84	147	132	99	108	122	104	60	105	97	94	70	79								
Bonn: Road	76	114	148	162	109	89	97	113	124	118	126	122	90	95	129	111	65	97	96	88	107	105	107	110	112	104	94	90	83								
Lorn Street	130	90	113	145	119	114	126	141	121	138	145	121	86	119	99	106	88	96	76	100	112	124	124	77	133	143	138	134	113								
TOTALS	738	756	1037	1268	985	845	988	1026	981	1065	1014	956	640	920	996	983	782	966	905	880	988	1111	1027	804	1039	1003	922	948	895								

TABLE XVII. - Eruptions.

Name of School	1901												1902												1903												1904
	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Sept	Oct	Nov	Dec	Jan								
Trinity Acad:	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
Leth Academy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							
Victoria	9	12	11	10	4	13	-	10	3	3	4	2	-	-	-	-	8	9	13	12	18	21	16	10	11	11	6	8	-	3	12	4	6	-	-		
Couper Street	4	4	3	5	9	16	14	15	12	11	9	11	8	9	13	12	18	7	10	6	11	14	11	6	2	7	4	10	9	10	10	12					
Gt: Junc: St:	-	-	5	9	9	16	-	-	-	-	9	4	1	4	7	15	7	9	10	6	11	14	11	-	9	12	8	9	10								
Lochend Road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Yardheads	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Links Place	-	16	-	8	12	11	12	8	20	19	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
St. Thomas'	5	10	1	4	7	6	9	10	14	6	6	12	5	3	7	7	3	3	7	9	11	15	17	16	12	16	11	9	5	2							
No: Fort St:	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-								
Bonn: Road	-	-	-	-	-	5	-	-	-	24	-	10	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-								
Lorn Street	-	-	-	-	-	-	1	3	3	20	15	12	1	-	-	2	10	6	6	6	4	3	7	4	-	-	3	-	-								
TOTALS	18	42	20	36	42	68	37	47	53	83	54	52	15	31	41	60	61	73	59	44	43	47	38	38	48	49	46	33	38								

TABLE A.

Name of School	Scarlet Fever	Measles	Whooping Cough	Mumps	Chicken-pox	Diphtheria	Sore Throat	Ring-Worm	Itch	Affections of ears & eyes	Diseases of respiratory organs	Aches - Teeth limbs, etc.	Colds	Sore hands - or feet	Consumption	Sickness	Eruptions
Trinity Acad:	6.6	2.7	10.4	7.2	5.0	2.2	1.2	.6	-	24.8	14.0	16.5	517.4	8.5	-	103.5	-
Leith Academy	2.3	10.2	6.5	.7	4.2	.8	-	.6	-	22.3	.6	.4	135.8	12.0	.4	158.7	-
Victoria	.6	15.9	11.2	7.0	1.2	.3	14.6	1.2	1.4	37.4	3.8	75.2	181.9	30.2	.1	70.5	9.5
Couper Street	2.0	8.8	9.1	1.1	3.0	1.0	17.7	3.1	1.6	27.5	3.7	95.4	148.0	27.1	.4	74.0	8.4
Gt: Junc: St:	3.0	8.7	5.8	1.5	2.3	2.3	-	.7	2.0	23.0	17.5	70.4	161.2	11.4	1.5	84.8	8.8
Lochend Road	2.3	9.2	3.5	8.4	4.3	.7	-	1.1	1.9	22.8	10.0	39.2	117.4	14.0	-	132.3	-
Yardheads	1.2	7.9	9.7	.9	2.0	1.4	18.4	7.4	-	30.2	6.6	45.8	62.3	32.5	-	135.2	-
Links Place	1.2	13.4	4.3	3.7	-	-	44.4	6.0	-	49.8	-	22.2	250.5	35.9	-	-	23.2
St. Thomas'	1.8	7.1	15.3	.8	1.4	-	-	2.4	4.0	65.3	1.8	80.6	129.1	63.0	2.2	80.3	24.2
No: Fort St:	2.5	1.3	2.7	2.7	3.5	1.0	-	4.1	-	33.3	10.1	53.9	125.9	28.9	.1	125.7	-
Bonn: Road	4.4	1.3	5.8	.9	3.6	3.1	20.4	.7	12.9	40.2	6.4	76.8	134.7	34.7	.1	148.8	2.8
Lorn Street	3.2	9.6	4.1	5.5	3.5	1.7	-	10.1	1.3	15.4	2.6	54.8	152.5	15.1	-	130.6	5.4
TOTALS	2.7	8.7	6.5	3.4	3.1	1.3	9.2	3.3	2.0	29.5	6.6	62.1	152.0	25.8	.3	96.4	5.2

This Table is obtained by taking the average yearly numbers of absentees for the two complete years beginning September 1901 and ending July 1903, calculating the percentage of these on the average daily attendance for the year. The numbers for colds in Trinity Academy appear very large, but this means that each child on an average has been absent a fraction over three times.

TABLE B.

Name of School	Scarlet Fever	Measles	Whooping Cough	Mumps	Chicken-pox	Diphtheria	Sore Throat	Ringworm	Itch	Affections of Ears and Eyes	Diseases of respiratory organs	Aches - Teeth Limbs, etc.	Colds	Sore Hands and Feet	Consumption	Sickness	Eruptions
Trinity Acad:	.5	1.1	.7	.5	.5	.1	7	-	-	2.0	1.3	2.8	26.5	.7	-	11.2	-
Leith Academy	.3	1.3	.5	.1	.3	-	-	-	-	2.1	.1	3.8	13.5	1.1	.3	14.0	-
Victoria	-	1.2	.8	.5	.1	-	1.1	.1	.1	3.2	.2	6.8	16.1	2.7	-	6.3	.9
Couper Street	.1	.6	.9	.1	.2	-	1.6	.2	.1	2.5	.3	8.7	12.8	2.4	-	7.1	.7
Gt: Junc: St:	.2	.6	.5	.2	.1	.1	-	-	.1	1.8	1.5	6.2	13.8	1.5	.1	6.8	.8
Lochend Road	.2	.6	.5	.6	.3	-	-	-	.2	2.0	.7	3.4	9.5	1.3	-	11.3	-
Yardheads	.1	.5	.6	.1	.1	.1	1.4	.6	-	2.6	.5	4.0	1.6	2.9	-	11.9	-
Links Place	.1	.9	.4	.2	-	-	4.0	.5	-	4.2	-	1.5	22.4	3.2	-	-	2.1
St. Thomas'	.1	.6	1.2	-	.2	-	-	.1	.3	5.8	.1	6.9	10.6	5.8	.2	8.2	2.4
No: Fort St:	.2	.2	.4	.2	.3	-	.1	.3	-	5.5	.8	4.4	10.6	2.5	-	11.0	-
Bonn: Road	.3	.9	.5	.3	.3	-	1.8	.11.1	3.4	4	.4	6.6	11.9	3.2	-	13.1	.1
Lorn Street	.3	.8	.3	.5	.2	.2	-	.7	-	.4	.2	5.0	13.5	1.3	-	12.1	.3
TOTALS	.2	.7	.6	.3	.2	.1	.8	.2	.1	2.5	.5	5.4	13.2	2.1	-	8.8	.4

This Table is obtained by taking the average monthly numbers of absentees for the whole period (June 1901 to January 1904) calculating the percentage on the average daily attendance for the year.

SCARLET FEVER: (See Table I.)

This shows the absenteeism from school from June 1891 to January 1894. Table A. shows an average percentage of 2.7 over all the schools. During that time, there has not been any very extensive epidemic of the disease, but the cases that have occurred go to prove that, it is not so infectious a complaint, nor does it spread so quickly as Measles, Whooping Cough, and some others. It has not the same tendency to adhere to the individual schools, nor to spread through the children in a school, in the same way as measles, or whooping cough, but seems to become more generally distributed over all. I believe that milk supply has far more to do with the spread of its infection than the contact of the pupils in school. The careful exclusion of individuals attacked, and of the members of the family who have been in contact, is usually sufficient to enable the disease to be controlled. General closing of the school does not, as a rule, seem to be necessary.

MEASLES: (See Table II.)

This Table, as well as others, extends over the same period as the above. Table A. shows an average/

average percentage of 8.7 over the whole, with a considerable variation in the different schools, viz., 1.3 in Bonnington Road and North Fort Street, and 15.9 in Victoria. It shows this disease to be much more infectious than Scarlet Fever, and to spread much more rapidly, even although the period of incubation in the one case is usually three days, while that of the other is twelve to fourteen. This is due, no doubt, to the latter being much more infectious during the early or incubation stage. That the aggregation of pupils in school is a great source of infection, cannot, I think, be disputed. This is seen, for example, if we take Leith Academy. It draws its pupils from all parts of the town. This school would therefore be a reflex of the incidence of this disease throughout the burgh, did not the intercourse of the children in school play an important part in its spread. In the month of April and May, 1902, Measles was introduced into the school - one case occurring. The disease suddenly spread, and, in June and July there were 36 and 32 cases respectively. When we compare this school with Trinity Academy, which also draws its pupils from all parts of the burgh, we have only 7 for June and 6 for July. Then again, if we/

we take Victoria school, we find in December 1902, that there were two cases and next month, January 1903, there were fifty-six cases and in February, seventy-five. Now, the schools contiguous to it, are Trinity Academy and North Fort Street. In Trinity Academy, no cases occurred in January, 4 occurred in February and 1 in March, and in North Fort Street, it did not appear until one month later, viz., January, and the following month, there were 16 cases and then it gradually declined. In every case it seemed to be introduced into the school, and then through the intercourse of the children quickly spread to the other pupils attending. In no case during the whole period was it thought necessary to close any of the schools. It is interesting, however, to note what took place on the breaking up of the schools for the Summer vacation. In July 1901, at the time of their being closed, for five or six weeks, the total number of cases was 185; when they were re-opened again on the 1st or 2nd of September and during the month, one case only is recorded. In July 1902, there were 81 cases. These were again diminished by more than a half, viz., 36, after the opening of the schools in the month of September, two schools are largely responsible for this number, viz., Couper Street with 13 and Links Place with/

with 17, leaving 5 to be accounted for among the other ten schools. On careful examination, one is, I think, justified in believing that had these two schools been again closed for a time, the disease would have been stamped out, instead of which, it <sup>was</sup> only partially checked, to break out with renewed vigour in the months of February and March, when there were 251 and 298 cases. Again, in July 1903, before the closing of the schools, there were 32 cases, and after the re-opening in September, there was only one case. Closing of the schools must, therefore, be regarded as having a great controlling effect upon measles. It would not, however, be necessary at all times to close the whole school in a country district where the children were drawn from three or four hamlets a good distance apart. It would only be necessary to exclude those coming from the infected hamlet.

WHOOPING COUGH: (See Table III.)

This disease is generally looked upon by the public as one which, amongst school children, results in little mortality, and also, an illness which everyone contracts at some period of life, the first attack giving immunity from the second.

No/



No doubt, it is true, that among older children with good health, an attack is usually not fatal, still such is not the case with infants and delicate children, or with those having a predisposition to pulmonary disease of any kind. When the death rate from this disease is compared with that of Small-pox, Measles, Scarlet Fever, and Diphtheria, it will be seen that it is not so harmless as is commonly supposed. This is well shown in the following table (Saunders's Year Book of Medicine and Surgery) copied from the advance sheet published by the Registrar General's Office for the year 1904, p. 599.

DEATH RATE PER MILLION LIVING FROM DIFFERENT INFECTIOUS DISEASES.

In England and London in 1901, and in Germany and in Berlin, Paris, Hamburg, and Munich in 1900.

Diseases	1901 England	1901 London	1900 Germany	1900 Berlin	1900 Paris	1900 Hamburg	1900 Munich
Small-pox	10	5	9	---	105	---	---
Measles	276	434	228	279	351	142	838
Scarlet Fever	133	113	242	325	76	129	10
Whooping Cough	313	355	342	197	81	146	102
Diphtheria	273	285	381	284	134	163	224

The gravity of this disease is here strikingly shown.

When/

When Table III. is examined, it will be seen that it is undoubtedly mainly spread by the intercourse of the children in school. It is evident that it is largely restricted to individual schools. In this respect, it resembles Measles and differs from Scarlet Fever. This fact is apparent if we take Trinity Academy in the months of December and January 1902. (The children here are drawn from all over Leith). There are 21 and 34 cases respectively in this school, the gross totals for all the schools being 30 and 39, leaving only 9 in December and 5 in January, to be accounted for in the other eleven schools. Then again, if we take January 1903 and compare Couper Street school with Lochend Road, it will be seen that there are 29 cases in each. These two schools are situated at opposite sides of the town, Yardheads, the school supplying the area between them, has only 1. for the same period; Lorn Street, which is most closely connected with Lochend Road, has only 3 cases, and North Fort Street, which is most closely connected with Couper Street, has 4 cases. The intimate relation between whooping cough and measles can be readily seen. The effect of closing the schools during the August holidays is also very marked. In July 1901, Immediately before the/

the holidays, it is interesting to note that the total number of cases amounts to 149; on re-opening in September, the numbers are found to be reduced to 21, then there is a gradual increase until July 1902, when we have 101 cases, and in September 1902, we again find a decrease, only 33 cases being recorded. This is followed by more or less of a rise until January 1903, when the highest number, 127, is reached, then there is a gradual decline to 41 cases, when the schools are closed, and on again re-opening in September, there are found to be only 13 cases.

Considering the fatal results of this disease, and the fact, that it greatly endangers public health, it will be quite evident, that a child with whooping cough should not be allowed to attend school. A period of quarantine for two months from the beginning of the attack should therefore be enforced. "Contacts" should also be excluded.

MUMPS: (See Table IV.)

This disease varies very considerably in the different schools. According to Table A. it will be seen that the average absenteeism from it over all/

all schools is 3.4,, the highest in Lorn Street, 10.1, and lowest in Leith Academy, .7. Then, when we compare the two Academies, both being alike as to the source from which they draw their pupils, viz., the whole burgh, it will be seen that there is a great difference, eg., .7 in the one case and 7.2 in the other. Like Measles, and Whooping Cough, the associating and intercourse of the children in school would appear to be the chief factor in the spread of the disease. It is introduced into a particular school, and then spreads to the other children in that School. In some schools, there have been two epidemics during the period under consideration. It is a disease which is not of very serious moment, deaths never occurring from it among healthy individuals, unless there are other complications. C. B. Sylvester (Amer. Med., August 23rd, 1902) records a case which was followed by nephritis in a student of 17 years of age. The parotid swelling subsided within twenty-four hours, but was succeeded by renal tenderness, suppression of urine, delirium, and apparently, the beginning of convulsions. After the renal secretion had been established, the symptoms grew less and soon disappeared. The attack/

attack was followed later on by orchitis. Children suffering from Mumps should be excluded from school - three weeks being a safe time.

CHICKEN-POX: (See Table V.)

This complaint is usually mild, and does not cause much inconvenience. I have, however, seen some cases so bad as to cause it to be mistaken for Small-pox, and sent to the Small-pox hospital. The reverse of this has also been known to take place where a mild case of Small-pox has been regarded as a case of Chicken-pox. Table A. shows a general absenteeism of 6.5 from this disease.

Children suffering from it should be excluded from school for three weeks.

DIPHTHERIA: (See Table VI.)

Two schools show no cases of this disease. The highest record is in Bonnington Road, which shows, according to Table A., 3.1 per cent; the next highest is Trinity Academy with 2.2. We find in this latter school a point well worthy of notice. When we compare Table VI. Diphtheria, with Table VIII. Sore Throat, it will be seen that one case of/

of Diphtheria is recorded in September 1902. During the month of October, no case is recorded, but 14 cases of Sore Throat <sup>where</sup> ~~where~~ for months, before and after, not a single case of Sore Throat has occurred. This point can hardly be emphasized too much and affords a striking instance of the need of medical inspection, and, where there is any doubt as to the nature of the disease, of careful bacteriological examination.

Osler, quoting from (Park and Bute) gives a striking case where the schools were the cause of the spread of this disease (The Principles and Practice of Medicine, p. 139, Fourth Edition) "At times in a certain area of the city, from which several schools drew their scholars, all the cases of diphtheria would occur (as investigation showed) in families whose children attended one school, the children from the other schools being for the time exempt." Osler also points out (page 138) that, "While other infectious diseases have diminished within the past decade, diphtheria has increased, particularly in cities."

When it is proved that a child is suffering from this disease, all pupils from the same household should, I think, be excluded from school, and should/

should not be allowed to return except with a medical certificate stating that it is safe for them to do so, and that they will not be a source of infection to others. It has been proved that the diphtheria bacillus is often present in the throat weeks subsequent to seeming recovery; it therefore becomes evident that a safe period of time must be imposed before re-admission to school. Three weeks after the membrane has entirely disappeared must, I think, be regarded as the shortest time, unless culture tests have been made, and show that the throat is free from the bacilli. In my opinion, the above is the right position to take up; still, one has to recognise that there is at present a great diversity of opinion on this matter, as may be gathered from the conclusions arrived at by a committee of the Massachusetts Association of Boards of Health (Journal of Mass: Assoc: of Boards of Health, July 1902). These were:-

1. It is impracticable to isolate well persons infected with diphtheria bacilli, if such persons have not, so far as is known, been recently exposed to the disease. If it happens that such cases come to the knowledge of the health officer, it would, however, be wise to give instructions in regard to caring for the secretions, thus placing a part of the responsibility of the case upon the infected person himself.

2. It is not advisable, as a matter of caution, to isolate from the public all the well persons in infected families, schools, and institutions. Since the number of persons among the general public who are infected with diphtheria bacilli and who pass unrecognised and unrestrained, may at any one time be greater than the number of infected persons in diphtheria families, it does not seem to be expedient to place restrictions upon the latter except when it can be done without causing much friction or hardship, or unless the danger in any particular instance can be shown to be very considerable."

Following up the same line, Graham-Smith concludes  
(Jour: of Hyg:, New York, April 1903, p. 253):-

1. Diphtheria bacilli have been found in a considerable proportion of persons who have come in contact with cases of diphtheria, or with other infected persons.
2. Such persons have been shown to be a grave danger to public health, especially when frequenting schools or institutions, and to constitute the usual channel by which the disease is spread.
3. Very satisfactory results have followed on the isolation of convalescents from the disease and of infected "contacts" where two or more consecutive negative examinations have been required before release.
4. Carefully conducted investigations among healthy persons, who have not at a recent date been in contact with diphtheria cases or infected "contacts", have shown that virulent diphtheria bacilli are very seldom (3 examples among 1511 persons) present in the mouths of the normal population. This fact renders the discovery and isolation of infected persons a practicable possibility, and offers/



offers a fair prospect of discovering and isolating the majority of them in any outbreak.

5. Diphtheria bacilli are usually distinguishable on morphologic and cultural grounds, but whenever possible, it is desirable that their virulence should be tested.
6. The bacillus of Hofmann is innocuous to man, and is a very common organism in the mouths of the poorer classes. The distribution of this bacillus points to the conclusion that it is carried from mouth to mouth in the same way as the diphtheria bacillus, and therefore its widespread prevalence in schools attended by poorer children is significant, as showing how widely spread and uncontrollable an outbreak of diphtheria may become unless measures are early taken to deal with infected contacts."

SORE THROAT: (See Table VII.)

This complaint should always be looked upon with very grave suspicion, because in many instances, it will be found to be a case of undetected or undiagnosed diphtheria, or Scarlet Fever, and great judgment should therefore be exercised in re-admitting such to school.

A point of great interest, and worthy of note, is that it is confined to six schools and if we exclude Trinity Academy with its 14 cases in October 1902, occurring after the case of Diphtheria, above referred to, then the schools with one exception/

ception, will be found to belong to that class ventilated with Tobin's tubes and open windows, and having open fire-places for heating purposes. The other is Couper Street, which belongs to that class, in which water pipes are used for heating and ventilation is obtained by the assistance of an up-cast shaft leading to the roof, with a large Bunsen burner for the purpose of extracting the vitiated air. After tabulating these results, I was so struck with this, that I called upon the headmaster, and in a conversation I had with him, he informed me that the burners were only lighted very exceptionally, on foggy days, as he did not think they were required!

Another point worthy of note is that in North Fort Street School, after having 15 cases in June and July 1901, it disappeared for two years, and did not return until October and November 1903, when there occurred 4 cases followed by 13. Consequently, for this school, it does not appear in Table A. at all, as that Table is made up from statistics extending from September 1901, the beginning of the Session to July 1903, being the two fully completed years. The question here at once arises, were these cases not of the nature of diphtheria? ~~so that this point might have been decided/~~

~~ecided.~~ And one desires very much that there had been a bacteriological examination, *so that this point might have been decided.*

RINGWORM: )See Table VIII.)

Table VIII. shows the annual average of this disease to be 3.3. When the different schools are compared, it will be seen to vary considerably; for example, in Lorn Street, it will be found to be highest with 10.1 per cent., and lowest in the two Academies, viz., .6 in each. Dr W. Allan Jamieson (Diseases of the Skin, 3rd Edition, p. 549) says that "Children under the age of 10 are more liable to the disease than when older" .... They seldom acquire it after 13." It (p. 522) "seems most rife in Britain ..... In the London Schools it has become a great evil with which it seems hardly possible to cope ..... it is undoubtedly rare in Germany and Austria."

The exchange of caps and bonnets is a common source of spreading the disease, also the lavatory towels used in common by the pupils, where it is prevalent in the school. Ringworm of the scalp is a most obstinate disease to cure, therefore children should be warned by their teachers of the danger of exchanging caps, or otherwise coming in contact/

contact with infected pupils. All children so affected should be excluded from school, and not admitted until certified as being free from contagion. This should be done with the greatest of care, as children are often sent back nominally cured when, for example, the hair on the head has begun to grow, with the result that the disease breaks out again, and is conveyed to other children. The best test of a cure, is probably the old one, which has been revived of late, - to drop a little chloroform on the scalp, which after evaporation is examined with the aid of a lens, when it is seen to become white along with the diseased hairs, which have a chalky appearance, the healthy hairs retaining their natural colour. These doubtful ones, can then be extracted and placed under the microscope for confirmation.

ITCH: (See Table IX.)

It will be seen that this skin disease only occurs in certain schools. The greatest number of cases are found in Bonnington Road school, where it appears to have become more or less endemic.

Table A. shows that the percentage here is 12.9/

12.9, which is practically equal to that of all the others taken together, viz. 12.2. The general average of all the schools is 2.0. The use in schools of towels common to all the children, at any time, is a bad thing, but when itch has made its appearance, should be strictly prohibited. Children suffering from this complaint should on no account be allowed to mix with others, as it is very contagious, and they should not be re-admitted to school until certified cured. Care should also be taken to ascertain that all clothes have been thoroughly disinfected.

AFFECTIONS OF EYES AND EARS: (See Table X.)

It is unfortunate that separate returns have not been made of these two affections, as the information would then have been much more definite and valuable regarding them. Table A. shows the percentage to vary considerably in the different schools, ranging from 16.4 in Lorn Street to 49.8 in Links Place, the average of all the schools being 29.5. In this case the two Academies show very little difference, Trinity Academy being 24.8 and Leith 22.3.

Among/

Among the 600 children in Edinburgh, and the 600 in Aberdeen, attending school, examined at the instigation of the "Royal Commission on Physical Training" (Scotland), the following percentages were found. (Report, p. 27, Para. 137.)

	Aberdeen Schools	Edinburgh Schools
Diseases of refraction of eyes interfering with vision .....	23.9	31.6
Diseases of eyes and eyelids .....	12.2	15.5
Diseases of ears causing defective hearing .....	14.0	42.4

DISEASE OF THE RESPIRATORY ORGANS: (See Table XI.)

The absenteeism from this disease, like many of the others, varies in the different schools. The general average is found to be in Table A. 6.6. Great Junction Street is the highest - 17.5. When the two Academies are compared, the difference is seen to be very marked, viz., 14.0 in Trinity and .6 in Leith. This condition corresponds to that which obtained with regard to colds, and the same reasons I have <sup>there</sup> ~~already~~ given in explanation thereof, hold good here. <sup>page 60 and 61</sup> There is no doubt many children/

children attend school suffering from serious lung disease and considering that they have to take part in vigorous physical exercise, it must be considered a very grave matter.

According to the "Report of the Royal Commission" (p. 26), the following percentages of children attending school are given as suffering from lung disease, Aberdeen 1.8, Edinburgh 3.0.

ACHES - TEETH AND LIMBS (See Table XII.)

The exact absenteeism, unfortunately, cannot be given for toothache, because the return for this includes aches of the limbs, as well as of the teeth. It will be seen from the table, that the month of January 1902, shows the largest number, viz., 691, absent from this cause. Table A. shows 62.1 as the average percentage for all the schools. It may, therefore, be taken for granted that a very large porportion of these were due to disease of the teeth. The Report of the Royal Commission already mentioned shows (pp. 90 and 105) that among the children attending school, only 5 per cent. in Edinburgh, and 12 per cent. in Aberdeen brushed their teeth daily.

R. Denison Pedley, L.D.S., Eng., F.R.C.S., Edin., (The Diseases of Children's Teeth, their Prevention and Treatment, p. 143, 144) gives the following condition of 3,800 boys and girls whose ages range from three years to 16 years in Industrial Schools.

"Temporary Teeth - There were 3,187 temporary teeth which required filling among 1,786 children whose ages varied from 3 to 10 years. De-ducting/



Deducting the number of children whose dentitions were sound, that is, whose teeth were free from caries, viz., 326 - 1,460 had 3,187 saveable teeth. The number of teeth, or the remains of them requiring extraction, was 2,491. ¶

¶ Permanent Teeth: It will be seen that 3,511 permanent teeth required filling, and 1,506 were so caries as to require extraction. Between the ages of 6 and 12 there were 2,178 teeth which required filling, and these, for the most part, were 6-year, or first permanent molars. "

Age	No.	Temporary Teeth requiring		Permanent Teeth requiring		Tempo- rary Total	Perm- anent Total	Un- sound Teeth	Sound Dentitions
		Filling	Extracting	Filling	Extracting				
3	37	57				57		57	29
4	110	290	5			295		295	41
5	160	411	35	18		446	18	464	44
6	222	561	114	57		675	57	732	27
7	282	633	202	157		835	175	1010	41
8	201	366	221	163	2	587	165	752	28
9	340	468	302	365	8	770	373	1143	46
10	434	401	334	435	68	735	503	1238	79
11	434		478	439	117	478	556	1034	110
12	501		385	544	321	385	865	1250	129
13	477		236	513	337	236	850	1086	130
14	359		128	457	374	128	831	959	86
15	212		40	291	247	40	538	578	43
16	31		11	54	32	11	86	97	4
	3800	3187	2491	3511	1506	5678	5017	10795	828

For a number of years, it has been my duty, as a volunteer, to examine the recruits entering the No. 5, V.B. The Royal Scots. These were young men, as a rule of the artisan class, mostly from 18 to 24 years of age. The condition of the teeth and gums were, in a very large proportion of cases, deplorable. Unfortunately, I did not take any statistical record. Considering their ages and the state of the mouth, it was evident that the caries of the teeth had started during school life in a large number of cases. This so impressed me that I raised the question in the Leith School Board, March 4th, 1901 (Minutes p. 484) by moving "that the children in the schools be trained in proper methods of cleaning, preserving, and keeping the teeth." No good resulted, as the seriousness of the matter was not properly appreciated, and this want of appreciation is far too universal, so much so, that the foundations of permanent ill-health are being laid in many instances by neglect of the teeth during school life. It is the great cause of indigestion, anaemia, and many other troubles. Dr William Hunter (Progressive Pernicious Anaemia, 1901, p. 235) has advanced the view that it is a special infectious disease associated often with infection of the alimentary tract and frequently with oral sepsis.

Of the men who volunteered for active service in the three service companies sent out by the Royal Scots during the recent war, it was found on examination that disease of the teeth was by far and away the principal cause for rejection.

COLDS - (See Table XIII.)

I do not desire to attach too much importance to this Table, which, no doubt, comprises a large number of undiagnosed diseases and which are allowed to run their course, being often most improperly treated or cared for.

The smallest percentage (Table A.) 62.3, will be seen to occur in Yardheads School. This seems the more remarkable, when the fact is taken into consideration that this school supplies accommodation for one of the poorest districts of Leith - it might almost be described as an Arab school - the children are very poorly clothed, some of them going about in all weathers without stockings or boots. Many of them also being poorly fed. Under these conditions, one would expect a different result. In this respect, it compares very favourably with the two fee-paying schools, viz., Trinity Academy with 317.4, and Leith Academy with 135.8.

The/

The children in these two schools are of a better class, consequently better cared for and better fed. Being drawn from all over Leith, they should practically be the same. One would, therefore, expect them to be in the matter of absenteeism more on a level. The difference, however, can, I think, be explained by the heating and ventilating arrangements of the two buildings. Leith Academy is ventilated on the Key System; as already mentioned, the windows are kept always shut. Trinity Academy by water pipes (low pressure) ventilated by Tobin's tubes and open windows, the latter arranged on the French method, which open inwards, with the result that the draughts come in at the lower part of the windows as well as the top, and in consequence the children are often sitting directly in a draught.

Under the headings of General Causes, Sickness and Eruptions, there are, no doubt, included a variety of different diseases, which are practically undiagnosed, and consequently allowed to go on without proper treatment. For accurate statistical purposes, however, these may be regarded as of little positive value, and therefore need not here receive further consideration. Still, the/

the matter is most important and in connection with this, it is interesting to note what (The Royal Commission on Physical Training, Scotland, Report p. 27, para. 145) says: "Of ailing children in the Edinburgh schools, there is, even if only half the number of these reported be computed, a total of 10,500, and in Aberdeen 5,708, all of whom are in need of medical attention.

#### SCHOOL FURNITURE:

From a hygienic point of view, the school desk and seat has hitherto been far too much neglected, especially with regard to sound principles of construction. This is a most important matter, and all the more so, when it is considered how many hours a day each pupil spends at it. The desk should be so constructed, that the child sits in the best hygienic position, and one having the least injurious effects physically with regard to its posture. The child should be taught to sit in a position, both easy and graceful. The old desks (Lawrie's patent) which were constructed for eight pupils, have been practically condemned by H.M. Inspector; this, although an advance in the right direction, was done not in the interests of hygiene, but in that of Education, to enable the teacher/

teacher to get at each pupil individually, as the desks were arranged with gangways (1 foot 4 inches between each row). It is, however, much to be regretted that single desks were not then enforced, as they ought to have been, instead of duals, because such single desks would have tended to prevent the spread of disease, as well as the school-room from being over-crowded, and would have rendered control by the teacher much easier. These dual desks, in the great majority of schools, are so constructed, that they force the children to adopt positions which tend to curve the spine to the left, and cause the child to stoop forward, with the result that the chest is contracted, the heart and lungs compressed, the abdominal viscera cramped, this latter condition also favouring curvature of the spine backwards. When the child has finished its school life, the position and shape of the bones in many cases has been altered, resulting often in permanent disfigurement. In regard to this matter, many of the teachers give little or no attention. As an example of this, not long ago, in the month of February, I went into a school and saw a class writing; every child was sitting with the right shoulder very much raised and the body/

body correspondingly twisted. I mentioned the fact to the headmaster. He spoke to the teacher; after doing so, he informed me that the desks were for pupils two standards in advance of those using them. That was practically for children two years older. They had been sitting at these desks from the beginning of the session, viz., September. On another occasion, shortly afterwards, I went into another school and found a class sitting at a series of mixed desks - that is, desks belonging to several different standards - this of itself was not so bad; in fact, it would have been excellent, if the children had been properly arranged - the larger children at the larger desks. They, however, sat as they came, many of the bigger children at the smaller desks. With a knowledge of the principles for the proper seating of a child, a great deal could be done to improve matters by a judicious selection of desks. Children vary in size in different classes. They also vary in size at different ages. Professor Browditch, after examining about 25,000 boys and girls of Boston, has shown (The Growth of Children studied by Galton's Method of Percentile Grades, Twenty-Second Annual Report of the State Board of Health of Massachusetts, 1890, pp.479-522) the amount of variation in height at different ages. The following figures are taken from his Report, the ages of the children given is that of their last birthday.

	inches	inches		inches
<u>Six years</u>	(Boys .... 40.66	to 47.13,	difference	5.6
	) (Girls ... 40.57	to 47.36,	"	6.79
<u>Eleven</u>	(Boys .... 49.47	to 57.50,	"	8.03
	) (Girls ... 49.33	to 59.96,	"	8.63
<u>Fifteen</u>	(Boys .... 56.55	to 67.90,	"	11.35
	) (Girls ... 57.39	to 65.00,	"	7.61

This shows an absolute necessity for provision being made whereby the desks and seats may be adjusted to suit the variations in heights of the different children. In the light of these figures, it will here be interesting to note what the Code of the Board of Education, says on the matter. Article 35 (a) provides that all new premises must conform generally to Schedule VII. Rule 14 in that Schedule says: "Benches and desks graduated according to the ages of children should be provided for all the scholars". In the light of the above figures, this must be regarded as wrong in principle and should, therefore, be changed and brought more into conformity with facts. Hitherto, it has been quite the custom for a boy a foot taller than another boy, to sit at a desk the same height; in fact, I have seen a condition nearly similar to this, where both boys sat at the same dual desk. The average/



average sitting heights of boys and girls is not the same, that for boys being proportionately less than that for girls. These facts being taken into consideration, it becomes evident that to get a suitable desk and seat, recourse must be had to some mechanical contrivance which will permit of its being raised or lowered to suit each pupil. Eulenberg (Schulges und heitslehre, Vol. I., p.271, 1900.) mentions the fact that Barnard was the first in the United States to establish the use of moveable desks and seats; and he quotes Frausack of Vienna, as giving the following advantages of movable desks and seats:-

1. Each scholar can be furnished with a seat adjusted to his individual needs.
2. The seat may be moved, and thus conveniently adapted to writing, drawing, or other school exercises.
3. In the school-room the floors may be cleaned more easily and thoroughly than with fixed seats.
4. The cost is less.
5. By the use of movable desks and seats, the provision of separate rooms for drawing, and for sewing, or other work for girls, may be dispensed with.
6. The use of such seats, prevents overcrowding and provides a comfortable seat for each scholar, and last, such seats and desks allow freer use of the class-rooms for gymnastic exercises.

Even/

Even this, however, unless certain other factors are taken into consideration, is not enough. The desk must be so constructed as not to cause the pupil to adopt wrong positions, which may ultimately become deformities, nor must it favour short sightedness. When it is considered that children attend school from the age of five to fourteen years, - the most important period of their growth - from five to six hours a day, it will be apparent how essential it is that the proper construction of desks should be carefully considered and only those used which are found to be perfectly satisfactory from a hygienic point of view. At present, this is far from being the case. Desks are wanted; an order is passed by the School Board for the number required and there the matter ends. In order, then, to lay down certain definite hygienic principles for the proper construction of desks, it is necessary to bear in mind certain simple physiological and anatomical facts. When the child sits, the two ischial tuberosities should rest equally upon the desk seat, the body should be in an erect position, the arms hanging down by the sides of the thighs, the head should be poised in such a position, that a line dropped through its centre of gravity and that of the trunk, falls vertically/

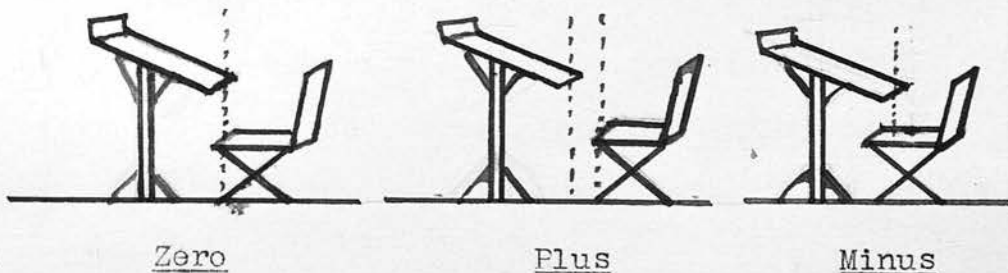
vertically through a point in the <sup>Centre</sup>~~centre~~ of a line drawn transversely between the two centre points of support of the two ischial tuberosities. The thighs should be in a horizontal position, the legs vertical, the feet resting on the floor, ~~on~~ or a properly constructed foot rest attached to the desk. In this attitude it will be found that the position of the body is symmetrical and the most economic, so far as muscular energy is concerned, as well as the most conducive to correct carriage and physical beauty. The attitude of ease and grace should always be cultivated, and never in school life, lost sight of.

The requirements of school work, however, are such that the above position cannot always be maintained. Writing, reading, drawing and slate exercises require a desk for their performance. Improperly constructed desks lead to deformity of position and short-sightedness in the pupils, on the performance of these exercises. Now, the posture deviating least from that already indicated above, and coinciding with the following principles, will be found to be the correct one. Sitting in the above attitude with the head properly poised, it will be found that the eyes are directed forward and downwards at about an angle of  $45^{\circ}$  to the horizon.

If/

If kept looking in a horizontal direction, a somewhat greater muscular strain will be required to raise and keep them in that position, e.g., it will be found that one can only look with an effort at a near object, if it be higher than the eyes. On the contrary, one can look with ease at an object equally distant, if it be below the eyes. So far then, as sight (reading) is concerned, the proper position would be at a point about 12 inches distant where the axes of vision converge, the desk here cutting the line of vision at right angles, (which also will be at an angle of  $45^{\circ}$ .) This, theoretically, is the proper position, and for the purposes of reading, can easily be given effect to. In writing, however, it will be found, that with conditions such as these, the ink would not flow properly from the pen and it would also be irksome to place and keep the arms in such a position. The desk must therefore be arranged at an angle of  $12^{\circ}$ , or not more than  $15^{\circ}$  to the horizon. It must also be devised so that the arms can be easily and comfortably put upon it, the elbows when so placed must not be further away from the sides than from 3 to 4 inches, otherwise the arms with the shoulders would be raised too/

too high and an improper position consequently assumed. The two following most important definitions are given by Janke (Grundriss der Schulhygiene, p. 111) with regard to the measurements of school seats and desks. The difference is the vertical distance from the inner edge of the desk to the seat, or to the extended edge of the seat. This distance must be such that the edge of the desk shall be about opposite the navel, so that the pupil, when sitting erect, may place the arm upon the desk to write, with the elbow bent a little at one side and in front of the pupil. The distance is the horizontal interval between the front edge of the seat and a vertical line let fall from the edge of the desk. If this line coincide with the edge of the seat, the distance is called a zero distance; if the line falls in front of the edge of the seat, it is a plus distance; if behind it, a minus distance. This, therefore, gives three kinds of desks.



Taking into consideration the principles which I have already laid down, with the proper attitude for reading, it will be evident that in writing the desk, which will entail the least alteration from that position, will be the right one, and a minus desk will be found to fulfil these conditions most closely. If the desk used be a plus desk, the head and body will then require to be thrown forward. The spine will be curved, the thorax, lungs, heart, and abdominal viscera more or less cramped. Full and free expansion of the lungs will be restricted. The lower part of the abdominal wall becomes folded up and the viscera displaced and their functions consequently interfered with; there will also be a greater expense of muscular energy in holding the head and body up in this position, because they are not well adjusted, and as a result, greater fatigue will be produced; also when the head bends forward with the body, the distance between the eyes and the desk will be such as to conduce to short-sightedness. Too low a desk will produce practically the same result with regard to position. Therefore the minus desk arranged so that the edge of the desk just touches the front part of the abdomen, without /

without pressing on it will enable the child to sit in the most symmetrical attitude, whilst engaged in writing exercises, and the weight of the body will be found to fall through a line joining the ischial tuberosities. A fixed minus distance such as this at all times, however, would oblige the pupil to remain in a posture, which would ultimately become tiresome, as certain muscles would be constantly in use, whilst others would be quite inactive; freedom of movement would be limited, both rising up and sitting down would be difficult and awkward. The desk should therefore be hinged, so that it can be lifted up and folded back; when in this position it should cut the axis of vision at right angles, and should be at a distance from the eye of 12 inches. When the child is sitting erect, a book can then be placed upon it, and the proper conditions thus obtained for reading. Such a desk would admit of the most perfect attitude, both in reading and writing as is possible to arrive at. Professor Browditch's table already given shows the considerable variety in the height of boys and girls at the same age. It would therefore be necessary, if these correct principles are to be complied with, e.g., the thighs horizontal, legs vertical/

vertical, body and head erect - that the desk and seat should be made movable, so that both desk and seat may be adjusted to the pupil's height. The seat also should be made to lift up, in order that more freedom may be obtained. When in position, it should be slightly concave, the deepest part of the curve being where the two ischial tuberosities rest; the curve in the seat keeps the child from sliding forward when leaning his back against the rest, and so prevents his getting into a bad position. The seat should have a back rest extending as high as the lower angles of the scapulae.

It is not my intention in this thesis to enter fully or at length into the controversy which has been going on for a number of years with regard to handwriting, whether it should be slanting  $52^{\circ}$  according to the old Spencerian style, or vertical script. Suffice it to say that twenty years ago it was found in Germany that there was an increased tendency to curvature of the spine as the children passed through the various years of school life, and about four times greater amongst girls than amongst boys. Careful investigations were made, and it was found that the positions taken up by children, during writing exercises tended to produce curvature/



ure of the spine with other deformities. Any one can satisfy himself as to the truth of this by going into a school with zero or plus desks, and standing at the back of a class during the writing exercises, and carefully noting the posture which each child assumes. These injurious effects attracted much attention and produced the works of Bernard, Schreber, Gast, Passavant, Guillaume, Coindt, Fabruer, Cohn, and Heinemann. In 1878, attention was drawn to this matter by Dr N. Liebrich in this country in connection with the London schools, in a paper which he published on "School Life, its Influence on Sight and Figure." (Churchhill). Without referring specially to the child's attitude in writing, he says - p. 16 - "If one observes the position which the upper part of the body assumes, we find that the lumbar vertebrae are bent forwards, those of the chest towards the left and those of the neck with an inclination to the right. At the same time, the lower part of the right shoulder blade stands too far off from the ribs, and is elevated too much towards the right, and the shoulder joint is raised and pushed forwards" - p. 27 - "The development of Scholiosis has been statistically proved to be simultaneous with the school time of children." On p. 16, he quotes/

quotes "Eulenberg, the Orthopaedic surgeon, as stating that 90 per cent. of curvature of the spine which do not arise from a special disease, are developed during school life."

Since the publication of the above by Dr Liebrich, little notice has been taken of the subject in this country. In America, however, on the contrary, in 1892, this question attracted much attention and investigation and tests were made which fully confirmed the above statements and considerably extended our knowledge on this point as may be gathered from a most valuable paper Dr E. Mosher on the "Habitual Position of School Children", (Educational Review, New York, March 1897, pp. 261-273.) The observations taken along with the experiments, and tests made also undoubtedly prove that for good posture and freedom, vertical script is the best and is also the most economic so far as muscular energy is concerned. If we reflect upon this question for a moment, it will become self-evident. A pupil sitting properly at a minus desk, in a vertical and symmetrical position, the desk just reaching to the ventral surface of the body, and being at the proper level, the arms hanging down by the sides, the child is required to write; having taken the pen, the arms are flexed at the elbows/

elbows, and laid upon the desk with the ulnar side lowermost - just as they have been raised from the side when hanging down - the hand is placed upon the desk with the object of writing on it. It rests principally upon the metacarpal bone of the little finger and the pisiform bone; the pen is placed in position on the paper with the end pointed somewhat away from the shoulder; the point or nib is in the plane which cuts the axis of vision about 12 inches - not less than 10 from the eye, at the point where the line of vision of the one eye intersects the line of vision of the other, this being the point at which the axes of vision converge and may be described as the fine point for writing. The hand being placed in this position, it will be found that the fingers holding the pen on being moved the least up or down, whilst the pen is touching the paper, will produce a vertical stroke, and the muscles thus brought into play, will be practically almost all that are required for the purpose. It, therefore, becomes evident, that the minimum of muscular energy on the part of the pupil, will be required for this style of writing. Teachers have made objection on the ground that this style ultimately develops back-handed writing, but it will be found that this is not due to/

to the system, but to the fault of the desk which throws the elbow too far away from the side, and places the hand in such a position that the movements become back-handed. If this method be compared with the old Spencerian slanting style, the benefits will be at once obvious, and especially when we take into consideration the old form of desk, which is practically in use in all the schools, with very few exceptions. When the child sits down on the seat even if the height be properly arranged, it will be found that the desk is too far in front of him. When he raises his arms for the purpose of putting them on the desk, he has to stoop forward. The line of weight of the body is consequently thrown forwards, in front of the centre of the line joining the ischial tuberosities; the elbows are resting on the desk; the thighs come to rest on the front edge of the seat and are thus brought in to assist in supporting the body - this pressure on the thighs may become injurious. In addition to this, you have three different actions with the different groups of muscles brought into play:-

1. That to rotate the radius round the ulna, so that the pen may be made to point in the direction of the shoulder.
2. The muscular action for the purpose of seizing and holding the pen, and,
- 3./

3. That for moving it in the act of writing. The variety of complicated muscular actions brought into play, apart from the bad hygienic position, is much greater and consequently the fatigue brought about must be correspondingly greater. The training and co-ordination of the various muscular actions required to bring into play these movements, are often a long way in advance of the development of the child. On the other hand, with vertical writing, you have the most natural and easy position possible, and the co-ordinated action of the group of muscles for rotating the radius round the ulna, are not required to be put into action - the position with the radius and ulna lying vertical, is a natural and easy one for the child. Unconsciously it will be found he drifts into this attitude and has to be continuously corrected for it by the teacher. I have been told that in some schools, at the suggestion of the Inspector, the children are regularly put through a form of pen drill for the purpose of enabling them to overcome this difficulty. Every teacher is well aware that this is one of the hardest tasks he has to confute. The reason for this is to be found in the fact that when a child begins school life, the greater number of/  
of/

of movements which it makes are large and free; the muscles have not attained that stage of co-ordination capable of guiding a fine point, such as that of a pen, or sharp pencil. A pen or pencil is given a pupil, and certain linear forms, are placed before him and he is requested to make them as best he may; the movements for the necessary production of this act are not alone brought into action, but a large number of other muscles, which are superfluous in the co-ordination act, and it is their action, which bothers the child and makes his attempts crude and painful; and it will be seen that he cannot control this energy. The movements demanded of him, therefore, become too fine, and the adjustments required of him are too delicate. We get not only awkward and uncertain movements of the hands, but a strain and rigidity of tension follow, in the muscles of the arm and fingers, which soon become tiresome in the extreme and this difficulty is aggravated by the fact that the movements often required, have not been naturally developed. Then there is the fixation of the eyes upon the point of the pen or pencil; this also becomes a factor in the production of this rigid tension. In relation to this subject, it is interesting to note that Mosso was the first to point/

point out that there exists between the periphery and the brain centre such an intimate relation, that patients who have lost the muscle sense, can contract the muscles of the hands round an object, and keep them contracted, so long as they keep looking at it. The training of this muscle sense no doubt, has a great bearing upon learning to write, as can readily be imagined when one considers that sight must, in a beginner, come more largely into play in holding the pen. It, therefore, naturally follows that fine pointed instruments, either pen or pencil should not be allowed. To begin with, the point of the instrument should be so large and blunt - crayons are the best - that the child does not require to fix his eye upon it, and it should move freely without friction, and resort should, at first, be had to large movements and gradually as the muscular control is <sup>2</sup>developed <sup>1</sup>further, the size and length of the letters can be reduced. In teaching writing, the aim should be from first to last freedom of movement. The co-ordination of the muscles should not be unduly hastened, but allowed to develop naturally. If hastened, you have not only great muscular strain, but a powerful tendency for the eyes to be brought too close to the paper, and a position of near-sightedness <sup>acquired</sup>~~taken~~, which, as time goes/

goes on, becomes confirmed. At first nicety and exactness of form should not be held up as the ideal. All these, while ultimately necessary, should as far as possible, be subordinate to -

1. A symmetrical position, and
2. Ease and grace of movement.

These having been attained, precision of movement can readily be acquired afterwards. The movements should be those of the arm until nearly the seventh year, those of the fingers should be largely, if not entirely, prohibited. When the child has acquired ease with the arm in writing large characters, the finger manipulation will come naturally and easily, almost unconsciously. Sound physiological and anatomical reasons can readily be adduced for this theory. The lens of a child's eye is more nearly spherical than that of the adult (Grey's Anatomy, 8th Edition, p. 586): this condition causes the child to bring the object nearer to the eyes, or if the object is on the desk, the eyes are brought nearer to the object, which again causes the child to adopt a wrong position, viz., stooping forwards. At this early age using small characters very much aggravates this condition. This can be verified by any one going into the infant department of a school and seeing/



seeing a class of infants about six years old engaged in a slate exercise. It will be observed that the slate is brought much closer to the eye than ten inches - often as near as from five to six. It is well known that such conditions as the above cause an increase in the convergence of the optical axes, which ultimately results in a tendency to squint; then with this, there is produced a congestion of the eye-ball and surrounding tissues, intra-ocular pressure is increased; this causes softening of the coats of the eye, permitting an elongation of the optical axis, which brings about a myopia. I have seen the children in the infant department of some schools (Trinity Academy) taught to write on paper with pens and sharp pointed pencils; these children would not be more than six years of age. I was told that this was advised and encouraged by H.M. Inspector. Now, this is decidedly wrong and should be prohibited. There is, undoubtedly, too much written work given in the early years of a child's life, and this in many cases is simply for the purpose of keeping the child employed. Until the age of ten years, as little writing as possible should be given. Another practice, which is very reprehensible, but which is coming more and more into vogue in many schools, and which is no doubt due to what is believed to be the/

the over-crowded condition of the school curriculum, is that of giving out home exercises which are required to be written out by the pupil, often in very imperfect gas, or lamp-light. Imperfect light by itself will cause a child to adopt a too near position. I am inclined to maintain that home exercises should be withheld from all children under 11 years of age, because when given before that age, it will be found that the child gets into the habit of adopting a much nearer point of vision than 10 inches, and this in the end invariably leads to a permanent injury to the eye-sight, resulting ultimately in a condition of myopia.

A point of great importance, and one which should always be carefully attended to, is that the paper to be written upon, be directly in front of the child. If placed to the side, it will often be found that the distance of both eyes from the writing point, is not the same, consequently were both eyes used, one must accommodate more than the other. This does not, however, take place, but what happens, is, that for vision one eye alone is focused, the other being neglected becomes functionless.] [Vertical script favours the best postures. It involves the smallest strain on the eyes; it necessitates the least outlay of muscular/

ar energy and consequently causes less fatigue.

Now, from what has already been stated, it will readily be admitted that for all writing exercises, the proper desk is the minus one, but on enquiry, and investigation, one finds that this desk is only conspicuous by its absence from the schools. I have examined the desks in the Leith schools and find that nearly all are plus desks, with a small proportion of zero or neutral, and in only one school, Lorn Street, has the minus desk been introduced, and there only partially throughout the school. In Edinburgh, I have examined several schools and found practically the same thing existing, and in Dundee a similar state of things is found.

It therefore comes to this, whether the fact be realised or not, that the vast proportion of children attending school are compelled to sit at desks which cause them to assume postures which have a tendency to produce curvature of the spine and other bad effects.

PHYSICAL CULTURE:

If we reflect on the school life of a child and consider that it is more or less a departure from Nature, under which condition the child spends its time in freedom in the open air, it is evident that a system of well regulated physical culture in school is necessary, more particularly when we take into consideration its posture and attitude during school hours, and the ever increasing demands which are being made upon its time. Nor must the home conditions, and general surroundings of a very large number of the children be forgotten, because from a sanitary and hygienic point of view, those of the home are often much inferior to those of the school. This question, despite the fact that a great deal has been written upon the subject of the dependence of mental development upon physical development, has not yet taken the place in school which it demands. It has recently been very fully dealt with in the ("Report of the Royal Commission on Physical Training, Scotland") and will no doubt give rise to legislation in the near future, so that little need be said on the subject here. It is interesting to note, however, the want of accurate knowledge and of statistics on the existing/

existing physical conditions in schools. The Report lays stress on this (para. 96, p. 21): "On this section of our enquiry the evidence placed before us was found to be deficient ..... owing to the great labour entailed and skill called for, when measurements and observations upon which statistics could be based, had to be made. We therefore took steps to obtain some exact evidence in detail from examinations specially, conducted, which will be seen lower down, has produced valuable information." The result was the examination of 600 children in Edinburgh, and 600 in Aberdeen: It seems to me a very great misfortune, however, that the question of school furniture, e.g., desks and seats in relation to figure and eyesight, was not here dealt with. On this subject, a series of skiographs, showing the skeletal structure of the pupils when seated at the different kinds of desks, writing, the child properly seated, also measurements of the distance between the eyes and the plane of the desks both for reading and writing, would have been very valuable and would have afforded much useful information. It would also have drawn public attention to the matter, so that School Boards and others, when dealing with it, could/

could have given it intelligent consideration. I think that a great opportunity was here lost of doing an important service to the race.

Here I may mention a point which should at all times be carefully guarded against, and which is far too common in all schools at the present time. It is fully illustrated by the following directions which one so frequently hears addressed to children in a class, by the teacher, "Children, attention" followed by, "Fold arms!" with the result that the pupils fold the arms across the chest. This contracts the thorax, interferes with chest expansion and free respiration; it puts an additional strain on the heart, which becomes constricted; it also produces displacement of these organs as well as of the liver and other abdominal viscera and may lead to enteroptosis.

#### CLEANSING AND DISINFECTION:

School Buildings, Desks, etc: It is important that this matter should be carefully attended to, as dust contains micro-organisms, which are by no means harmless and infectious disease having gained admission to a school, may thus be transmitted. In this connection, I might here state, that the habit of coughing and spitting, which in all/

all well regulated schools, is prohibited, should in all cases be absolutely forbidden. The junction of the floor with the wainscoting or surbase, should be furnished with a rounded ~~corner~~<sup>love</sup> so that cleansing and sweeping can be more thoroughly and quickly done. All corners in a school building should be rounded to prevent accumulation of dust - this is a point which ought to be insisted upon in all new schools. The class rooms should have all the corners rounded like the wards of all recently built hospitals, as dust which has been lying in a school for some time becomes much fouler than the daily accumulation. It is this which often causes a stuffy smell. Schools, for this reason, should be carefully swept at the close of every school day, and the windows, when possible, thrown open. The floors should not be swept dry; wet sawdust or some such material ought always to be used, and they should also be washed once a week with soap and water. Desks and seats should also be carefully attended to, as they become accumulators of filth from the hands, also from the dust combined with perspiration and oil from the hands of pupils. In a great number of schools, these receive no further attention than varnishing every few/

few years. The walls of the class rooms should be painted to admit of their being washed and this should be done, and the whole school cleaned about a fortnight before the opening of the school after the vacation; every corner, from attic to basement participating in this. Proper cleansing can only be rendered effective, when both the school managers and the teachers fully appreciate the importance of the matter. Special disinfection should take place after all epidemics of infectious diseases; in fact, I hold the view that it would be good to periodically disinfect all schools by spraying the class rooms with formalin 1 in 40, or carbolic acid 3 or 4 per cent., a thorough cleansing following.

Slates:

Slates should be abolished from all schools, because the contrast between the grey of the slate and the light grey of the slate pencil causes a great strain on the eyesight. All written work should be done on paper with pencil or ink, and amongst the younger children by crayons. When slates are used, on no account should spitting upon them be allowed for the purpose of cleansing; a moist sponge or rubber of some kind should always/



ways be used. During a lesson, slates are often interchanged. This should be entirely put a stop to. One can understand that a slate cleaned by being spat upon, if the child have a scarlet fever sore throat, or if diphtheria bacillus be present in the mouth, if changed, could readily convey infection to another. Slates should, therefore, be washed at least once a week in some simple disinfectant solution.

#### Lead Pencils and Slate Pencils:

These, in some schools, are used in common, distributed to the children when required, and then afterwards collected. This is a very bad practice, because the habit of putting slate or lead pencils into the mouth to wet them, creates a danger of the communication and spread of disease in this way. If in common use, they should be disinfected at the end of each day by being placed in a tightly closed receptacle, and subjected to the vapour of formalin, using 1 c.c. of formalin to 300 c.c. of air space: an exposure for 15 minutes under these conditions is sufficient to secure thorough disinfection.

#### Books:

When one considers that in many schools what are/

what are known as the second and third sets of readers are often the property of the school board and are retained in the schools, and are collected at the end of each lesson, put away and brought out the next day, each pupil receiving a different book to that used the previous day, it will readily be seen how they may become a medium for the spread of disease. The habit of wetting the finger to turn over the leaves should be prohibited.

Krausz (*Zeitschr. f. Hyg. und Infectious-Krankheit*, 33, 1901) soiled the leaves of books with cultures of different pathogenic germs. He found that the cholera germ lost its vitality in less than 48 hours, the diphtheria bacillus in 28 days, the staphylococcus in 31 days; that of typhoid fever survived 40 or 50 days and once to 95 days. That of tuberculosis remained doubtful after 103 days. He found it possible to disinfect books by means of steam without serious injury. The pages were not changed, but the covers were slightly injured. The time of exposure to steam was 40 minutes. Books should undoubtedly be disinfected from time to time. A good method devised by Elmer G. Horton at the Laboratory of Hygiene of the University of Pennsylvania in 1896, is to have the books placed/

placed in a tight receptacle large enough for the books to be placed on end, spread open, and exposed to formalin vapour, 1 c.c. to 300 c.c. of air space; this proportion must be rigidly adhered to, in which case the books are not injured in any way. Care should be taken that the operator expose his face as little as possible to the rising vapour, as it produces slight irritation of the nose and eyes.

#### Crayons:

In recent years the practice has become very prevalent to use coloured crayons. If these are made by dipping the ordinary school crayon in aniline dyes, they do not perhaps become more injurious than the white. To get extra brilliancy of colour, pigments are used containing arsenic or sulphite of Mercury and other injurious material. In the use of these there is shown a disregard for the pupils' health, and further, it carries danger with it. The dust of these adheres to the erasers in common use at the black boards, and in this way particles become scattered about, and inhaled by the pupils.

#### WEIGHT AND HEIGHT OF CHILDREN:

These should be taken periodically - twice a year/

year, and a record of each kept. This could be so arranged as not in the least to interfere with the school work or organisation, as the teacher could have the class weighed and measured, as the scholars enter the school. The information thus gained, would be of infinite value, in giving warning as to the insidious onset of disease. Any increase in growth, beyond 2 or 3 inches a year, involves an undue strain on the system, and the child often becomes dull and apathetic, the powers of mental application being diminished. Such knowledge would also assist in enabling measures to be taken to prevent over pressure.

Stoppage of increase in weight, especially if accompanied by increase in height, should lead at once to medical examination, because if this be the case, it must be due to either, first, insufficient food; second, excessive expenditure of energy in mental work, or third, to the onset of some disease, e.g., tuberculosis, which often first shows itself in this way. Under such circumstances, attendance at school should be at once stopped and the parents communicated with, so that the child may be put under proper medical supervision.

MEDICAL/

MEDICAL EXAMINATION OF CHILDREN:

All children, on admission to school, should be examined to see if they are in a fit state of health properly to take part in the work of the school, also that they do not suffer from any physical deformities such as might result in injury to the pupil, in consequence of taking part in physical exercises, etc., from which such pupils ought to be exempted. The opportunity might also be taken at this time to see that the child has been vaccinated, as even with the present regulations in Scotland, a certain small proportion of children do escape in consequence of the difficulty of not always being able to trace them.

Evidence of vaccination, or other protection, is required in a large number of American cities and States before a child is admitted to school, see Report of U.S. Commissioners of Education, 1899, 1900, p. 2581.

All children should be medically examined, at least twice throughout the year, defects as to eyesight and hearing being carefully looked for, so that children may not be prevented from acquiring full benefit from tuition by "artificial stupidity". In all cases, when anything is found amiss, parents/

parents should at once be communicated with by the teacher, so that these defects may be remedied when possible, and the child properly looked after and not allowed to become worse from neglect, as is too often the case at present .

#### WINDOWS AND LIGHTING:

There is perhaps no matter in school equipment so deceptive as the adequate lighting of school rooms. Light diminishes with extraordinary rapidity, as one recedes from the window. The Scottish Education Department in (Rules for the Planning and Fitting up of Public Schools, p. 5., R. 9) says: "Every part and corner of a school should be fully lighted." It will, however, be found in practice, that this instruction is in many cases only very inadequately complied with; sufficient care is not given to the following two points, viz., the height of the wall of the building opposite and the depth of the class room from the window lighting it. The building requirements of the Department do not enable them to judge of the nature and height of the buildings opposite (Rules p. 3, I.) "A Block plan of the Site .... 20 feet to an inch. This must indicate -

(a)/

- (a) Position of School Buildings.
- (b) Out buildings.
- (c) Play-ground.
- (d) Drains.
- (e) Entrances.
- (f) Boundary Walls;
- (g) Roads,
- (h) The points of the Compass.
- (i) The levels of the Ground.

N.B. For the approval of site alone, the plan should show (g), (h) and (i)." From these, it will be seen that no indication is given of the height of the walls of buildings opposite. With regard to the former, they have no means of judging, and with regard to the latter, although they have a rule which says (P. 4, R. 2), "The proper width for a class room is from 18 to 22 feet", they unfortunately, in the interests of the children, have not always insisted upon this, as I hope to show immediately.

Then again, the light from the north, although steadier than that from the south, is not as bright, and does not penetrate so far into a class-room. It is also felt to be more depressing; the depressing effect of a dull day, with absence/

absence of sunshine, is felt and admitted by everybody; no one is able to work so continuously and well in a dull and badly lighted room; children are probably more influenced by this than adults. The most essential light is that which falls directly from the sky upon the scholars' place. It is therefore necessary that every child when seated at work in school, should be in such a position that he can see a piece of the sky. No child should ever be placed in such a position that a line dropped from the roof or top of the building opposite, and passing downwards at an angle through the highest transparent point in the school window, will, when continued, fall below the level of the eyes of the pupil when seated at the desk. In rooms with southern exposure and clear sky line, the area of transparent glass window surface should be equal to that of  $1/6$ th of the floor space, and in rooms with a northern exposure with clear sky line, the area should be equal to  $1/4$ th of the floor space. These conditions are not always fulfilled, and probably one of the reasons is that the Department, having laid down certain minimum regulations, the Local Authorities having complied with these, very often consider/



consider that they have done their duty in the matter. It is seldom that the Departmental requests are regarded as being only a minimum demand.

The case of Bonnington Road School in Leith is a striking instance of what I have just stated. It is over twenty years since this school was built, and the plans were originally approved of for 700 pupils; it was added to in 1888, and in 1893, and now accommodates 1,056 pupils. It is a two-storey building, standing back a very little distance from the street. It faces practically north and south. On the north side Bonnington Road passes; opposite, there is a large malt warehouse which completely overshadows the school with its great dead wall, and shuts out the sky from the pupils sitting on the furthest side of the class room from the windows on the ground floor, making the light here very bad. The south side is quite open, looking on to a nursery garden. I tried to get a photometric instrument for the purpose of testing the light in the various class rooms, but could not find one suitable, as I found all these instruments were practically made for use in a dark room. With these, I found I would have to darken the class rooms, allowing only one beam/

beam of light to pass to the instrument. This I found to be impracticable, especially when the children were assembled. On the 30th of March, I made the following experiment with a photometer, which registered from  $1^{\circ}$  to  $18^{\circ}$  by means of the illumination of discs. The day was clear, with bright sunshine. The hour was 11.45 a.m. The first test I made was on the sun's direct rays. I found the discs fully illuminated up to  $18^{\circ}$  and it might probably have registered more had it been of greater range.

SOUTHERN EXPOSURE - (Clear Outlook):

Ground Floor - Class Room I.

At 3 ft. from the window	= $15^{\circ}$
at 18 ft. " " "	= $14^{\circ}$

Second Floor - Class Room II.

At 3 ft. from the window	= $15^{\circ}$
At 18 ft. " " "	= $14^{\circ}$

NORTHERN EXPOSURE - (Facing high warehouse wall).

Ground Floor - Class Room III.

At 3 ft. from the window	= $12^{\circ}$
At 27 ft. " " "	= $30$

Ground Floor - Class Room IV.

At 3 ft. from the window	= $12^{\circ}$
At 22 ft. " " "	= $4^{\circ}$

Ground Floor - Class Room V.

At 3 ft. from the window	= $12^{\circ}$
At 22 ft. " " "	= $5^{\circ}$

Second/

Second Floor - Class Room VI.

At 3 ft. from the window	= 13°
At 27 ft. " " "	= 9°

Class Room VI. is right over Class Room III., which is on the Ground Floor - size, lighting, etc., being the same. The difference in the lighting, especially at the greatest distance from the window, is very marked in the two cases.

Being on the look-out for a more delicate instrument than the above. I was almost baffled until three days ago, when I accidentally came across "Wynn's Exposure Meter" for light. At once the thought struck me that this would be suitable for my purpose. It is an instrument with sensitive paper which, on being exposed to the light, darkens; placed alongside of the sensitive paper are standard tints for comparison.

In brilliant sunlight, I found it took from two to three seconds to darken the sensitive paper to the required tint.

On a clear bright day, I made the following tests:-

SOUTHERN EXPOSURE: (Clear Outlook)

<u>Ground Floor - Class Room I.</u>	Mins. Secs.	
At 3 ft. from the window time expos.	0	20
At 18 ft. " " " " "	3	15

Second/

Second Floor - Class Room II. Mins. Secs.

At 3 ft. from the window time expos.	0	22
At 18 ft. " " " " "	2	5

NORTHERN EXPOSURE - (Facing warehouse wall)Ground Floor - Class Room III. Mins. Secs.

At 3 ft. from the window	2	15
At 27 ft. " " "	25	0

Ground Floor - Class Room IV.

At 3 ft. from the window	1	40
At 22 ft. " " "	11	15

Ground Floor - Class Room V.

At 3 ft. from the window	1	35
At 22 ft. " " "	10	40

Second Floor - Class Room VI.

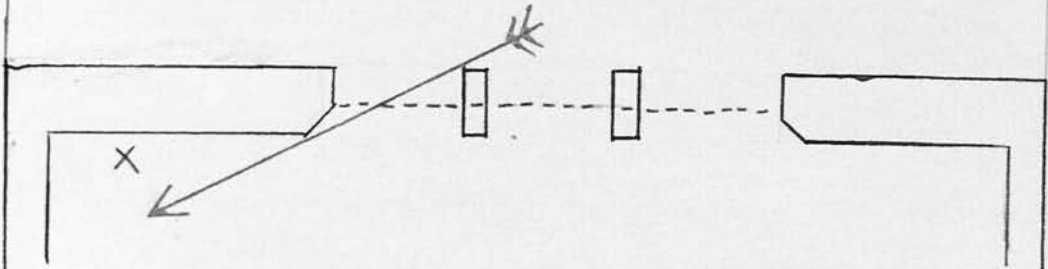
At 3 ft. from the window		30
At 27 ft. " " "	3	45

Second Floor - Class Room VII.

At 3 ft. from the window		33
At 22 ft. " " "	2	50

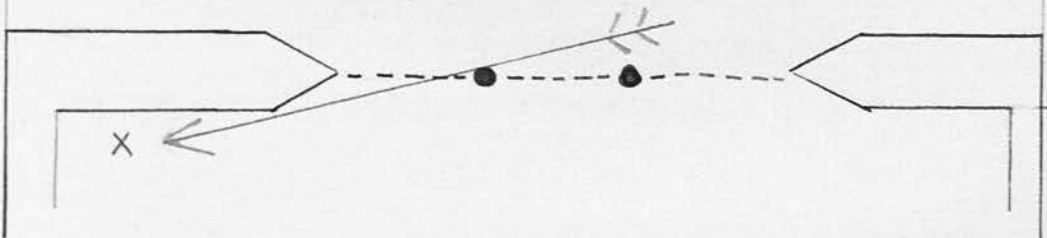
In Room II. with a southern exposure, I made an experiment in a dark corner. I placed the instrument on a desk <sup>where</sup> ~~which~~ the child sat at a point 3 feet 9 in. to the left of the window and 1 foot 3 ins. from the wall. The time required for exposure was 20 minutes. This room was lighted from one side only. Whilst waiting, I sat down in the seat by the instrument and looked at the window. It had two piers, these were not bevelled and the result/

result is shown by the diagram given:-



The arrow shows the direction of the light.

The windows should be set with the least possible space between them and the piers should be as small as possible and all corners should be bevelled.



Class Room III. was undoubtedly too dark. I found that two rows of pupils sitting next the wall furthest from the window had no sky view. It was also striking to note the point of vision taken up by them when compared with the two rows next the window. I measured, with a rule, the distances, and found that the average of the 12 next the wall was  $2\frac{1}{2}$  inches less than that of the 12 next the window, showing clearly that badly lighted rooms are a cause of short vision and myopia. In the other rooms on the ground floor on the/

on the north side, several of the children were without direct sky light, but not so bad as Room III.

Class Room VI. on the Second Floor is the one immediately above III. Here, as will be seen, the light is good, as is also that of Room VII., which is the one immediately above V.

#### HYGIENIC TRAINING FOR TEACHERS:

Considering that in all these matters the greatest care and attention, as well as correct knowledge, are required on the part of the teacher supervising the children, one asks, but how may this best be accomplished? It at once becomes evident that the teacher should have a good sound training in, and knowledge of, all hygienic matters pertaining to schools and the school life of children. Such a course could easily be arranged during the two years of the teacher's training college career, by means of University Classes. The first year might consist in a sound training in Anatomy and Physiology, also eye structure and functions. The teacher should be taught to test in a simple way, the child's eyesight by Snellen's test; another good test is to be able to distinguish/

guish at 10 feet distance a row of squares, 1 m.m. with a space 1 m.m. intervening, instead of a continuous line.

The hearing might be tested by the ticking of a watch. Children often attend school with one or other of these defects, and sometimes both. I have seen a child punished for taking down a sum wrongly from the blackboard when he could not distinguish between the figures, 3, 5, 6, and 8, from where he sat in the class room. I have also heard a child answer wrongly from imperfect hearing. Such children often come to be regarded as dull, stupid, and mentally deficient, when the mistakes they make are really due to physical defect, which often, with proper treatment, could be remedied. The parents should, in the above cases, always be informed.

During the teacher's second year of training, a course of pedagogic hygiene might be included, as well as a knowledge of School Sanitation, ventilation and heating. This would not only enable him to exercise an intelligent control over the hygienic arrangements of the school and children generally, but he would then also be able to give the pupils sound instruction in broad, hygienic/

hygienic principles, which would be of great value to them in after life, when they had grown up to be men and women.

In the course of one's daily visits, the want of such knowledge is constantly in evidence. Apart altogether from the question of health, although this should always be the most important consideration, better educational work will be done when sound, healthy conditions are carefully attended to, and secured.

STATE DEPARTMENT OF HYGIENE:

From what I have said, it is quite evident that there is claimant need for some great change in the regulation and control of the hygienic matters of all schools. It ought to be removed from the control of the Education Department, and placed under that of some expert body. One naturally desires that this body should be a State Department of Hygiene, exercising its functions through the Medical Officer of Health in conjunction with the present Medical Officers of the Local Government Board; they, of course, would naturally be transferred to this Department, and should/



should examine the schools periodically. In addition to these, local medical men, working along with the Medical Officer, would require to be appointed to the different schools, (~~these~~<sup>these</sup> appointments might be in the hands of School Boards, and subject to them, but also controlled to some extent by the Department) so that the headmaster of the school might be able to call upon them to decide in difficult cases, whether or not a child, or children, should be excluded from school. They could also undertake the periodic inspection of all scholars, as well as the examination of all the pupils on their first admission to school. That such inspection and examination is necessary, is now pretty generally admitted, and from what I have already stated, is proved to be absolutely necessary. Failing the establishment of a State Department, what should be done, is to place the above management in the hands of the Public Health Department of the Local Government Board, when the Medical Officer of the Local Government Board and the Medical Officer of Health in conjunction with local medical men, appointed as above indicated, would be able to overtake all the work which would be/

be necessary. If this were done, I believe the result would be a great improvement in the general health and physique of all the children and ultimately of the race.

When one considers the functions and work of the Public Health Department, what it ought to do in exercising control over State Hygiene and the ever widening field before it, one comes to the conclusion that such a Department as I have described should be established without delay.

April 29<sup>th</sup> 1904