[Report 1925] / Medical Officer of Health and School Medical Officer of Health, Swindon Borough.

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Borough of Swindon.
EDUCATION COMMITTEE.

Annual Report

FOR THE YEAR 1925

OF THE

School Medical Officer,

DUNSTAN BREWER, M.R.C.S., L.R.C.P., D.P.H.

John Drew, (Printers) Ltd., 51, Bridge Street, Swindon.

BOROUGH OF SWINDON

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School Medical Officer—DUNSTAN BREWER, M.R.C.S., L.R.C.P., D.P.H.

Assistant School Medical Officer—MARION DRAPER, M.B., Ch.B., D.P.H.
Temporary Assistant School Medical Officer--VIOLET REDMAN KING, M.B., Ch.B.

Specialist Ophthalmic Surgeon.
OLIVER BEAKLEY PRATT, M.A., M.B., B.Ch., D.O., M.R.C.S., L.R.C.P.

Dental Surgeons.—W. KENYON BERRIE, L.D.S., R.F.P.S.G.
JOHN HUTTON MITCHELL, L.D.S., R.F.P.S.G.

Head Clerk—S. MANSFIELD DEE.
Assistant Clerks—Miss G. L. NORRIS.
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School Nurses—

Miss A. M. HOARE.
2 years Certificate of Hospital Training.
Certificate of Central Midwives Board.
Certificate of the Royal Sanitary Institute.

Miss I. D. SAMPSON.
3 years Certificate of Hospital Training.
Certificate for Tuberculosis (Royal Chest Hospital, London).
Queen's Nurse.
Certificate of Central Midwives Board.

Miss E. M. PILCHER.
3 years Certificate of Hospital Training.
School Nurses and Health Visitors and Tuberculosis Certificate.
Certificate of the Royal Sanitary Institute.

Miss L. M. GRIFFIN.
3 years Certificate of Hospital Training.
Certificate of Central Midwives Board.

BOROUGH OF SWINDON.

EDUCATION COMMITTEE.

Area	4,265 Acres
Number of Elementary Schools	14
Number of School Departments	30
Recognised Accommodation	10,300
Number of Children on Register	9,015
Average Attendance	7,707

Number of Secondary Schools	2
Number of Scholars on Roll :—	
Victoria Road	497
Euclid Street	306

To the Chairman and Members of the Education Committee of the Borough of Swindon.

LADIES AND GENTLEMEN,

I have pleasure in presenting the Report upon Medical Inspection and Treatment of School Children in the Borough for the year 1925.

The year 1925 saw considerable changes in the Staff of the School Medical Department. Owing to the illness of Dr. Draper, Dr. Violet Redman King was appointed temporarily as locum tenens on 8th May, 1925 and when Dr. Draper returned to duty, the services of Dr. King were retained in order to reduce the arrears of work which had been accumulating. Dr. Draper finally left the service on the 21st November, 1925, and Dr. King was retained temporarily to the end of the year.

In the late autumn, owing to the great increase of the medical work of the borough and the difficulties which had arisen in connection with it, the Education Committee, acting in co-operation with the Health Committee, considered the reconstruction of the full-time medical staff and decided that this should consist of a chief medical officer and two assistants, one of either sex, allotting the time of these officers in the following manner :— One tenth of the time of the chief medical officer to be devoted to the School Medical Service ; six tenths to Public Health Service ; and three tenths to the Infectious Diseases Hospital.

Six elevenths of the time of the male assistant medical officer of health to be devoted to the School Medical Service and five elevenths to Public Health work.

Eight elevenths of the time of the female assistant medical officer of health to be devoted to the School Medical Service and three elevenths to Public Health work.

It was considered that with this arrangement it would be possible to carry out the full programme of medical inspection and treatment which the Education Committee had developed.

A second dentist, Mr. John H. Mitchell, was appointed and commenced duty on the 1st October, 1925. Mr. Mitchell, at present, is devoting the whole of his time to the School Medical Service in order to bring up to date the dental work in the secondary schools, which up to the present has been in abeyance. When the school dental work has been brought up to date, it is anticipated that it will not be necessary to utilize the full time of both dentists for school work alone.

Mr. Philip Brooks, F.R.C.S., who had been ophthalmic surgeon to the Education Department for some years, terminated his engagement at the end of 1924, and Mr. Oliver B. Pratt, M.A., M.B., D.O., appointed in his place, commenced duty on the 1st February, 1925. An extra junior clerk was appointed in May, 1925.

When the two permanent assistant medical officers are appointed, the staff of the department should be able to maintain the high level of efficiency at which the Education Department aims.

The work of the School Medical Service in 1925 was carried out under extraordinary difficulties, but feeling certain that these were temporary and that a solution for them would be forthcoming before long, a determined effort was made to maintain the integrity of the service, so that though it should prove impossible to sustain the high point of efficiency which had ruled for the major part of 1924, no activity of the School Medical Service was allowed to lapse or to sink into a condition of stagnation from which revival would be difficult.

It will be seen from the statistical tables that the work done in 1925 was in every particular greater in quantity than had obtained in any previous year and at the end of the year there were few arrears of work of an essential nature, though it had been found necessary to postpone to a future date some of the more difficult investigations that should have been done in the year under review.

Scarlet Fever, Measles and Whooping Cough were all highly prevalent in 1925, the two former diseases in an unusually virulent form, causing not only a high rate of mortality, but a long and grave list of after effects, the cure of which will fall upon the School Medical Department. Cases requiring operation for tonsils and adenoids, treatment for chronic glandular conditions and serious diseases of the ear, call for attention at the present moment more insistently than has been the case for some years past and when the staff to be appointed settles down, its first duty will be the clearing up of these cases. The work in connection with mental defection had fallen into arrears and on the return of Dr. Draper after her illness an attempt was made to bring this work fully up to date. Some progress was made in this direction towards the end of 1925, but it was impossible to get very far, so that here too we have an onerous duty awaiting to be discharged.

The Scheme of Medical Inspection and Treatment of School Children has been dealt with so fully in past annual reports that it is unnecessary to give a detailed description of matters which have long been standardised. The scheme of routine inspection is that required by the Board of Education, but in addition to the minimum requirements of the Board, many further points are investigated, for the increase of theoretical knowledge which the past ten years have furnished, shows us clearly that an inspection of such a scope as appeared sufficient in the early years of school inspection is utterly inadequate if our children are to receive the benefits which modern science can give them.

The routine inspection of secondary school children is of a comprehensive character, including inquiry into their physiological efficiency. Though this adds considerably to the time required for the inspection of each child, the saving is much greater than the cost, for it is possible to form an accurate opinion of the state of health and physical destiny of each child and to get along with the prevention of disease which is threatening, at a time when prevention is not only possible but is comparatively simple. For some years it has been the desire of the school medical officer to give the elementary school children a routine examination equally valuable, but time and numbers have so far stood in the way. It is however proposed to introduce into the inspection of the elementary school children some of the factors which have been found of such great practical value in dealing with the older children in the secondary schools.

The difficulty of judging efficiency in children is greatly enhanced by our lack of standards and anthropometrical details. Modern medicine requires very definite evidence to work upon and the reason why so many promising lines of treatment prove disappointing is that diagnosis is often based upon " rule of thumb " methods or mere guess work, and not upon accurately measured scientific evidence. Two examples of this difficulty may be quoted. First is the question of nutrition. Whether a child is well or badly nourished is generally decided upon evidence which, as it is presented, is utterly untrustworthy. No doubt the tale of the scale is of considerable importance and that the weight of a child should vary with his size is obvious. But the only evidence of size which is generally available, is that of height, and since the variation of height in man is chiefly dependent upon the length of the legs, it follows that the correct relationship between weight and height is a very inconstant one. The state of nutrition is a matter of extreme importance and it is necessary that it should be estimated upon sound and reliable data. Generally it is nothing better than a guess which is as likely to be wrong as right. Another point, also connected with nutrition, which requires a nicety of

estimation is that of the condition of the blood. A fair number of children are reported as being anaemic on medical inspection, but most of these prove not to be anaemic on a detailed examination, whereas anaemias of various kinds are met with in children and these, though generally the first signs of commencing disease and affording most reliable evidence upon which preventive measures can be instituted, cannot be discovered except by special and somewhat elaborate examination. There is no disease and scarcely any tendency to disease which does not produce changes in the constitution of the blood, so that the accurate differentiation of the anaemias of childhood is fundamental. As we cannot proceed upon guess work, but must settle the facts upon a basis as nearly mathematically accurate as possible, investigation into methods of estimating nutrition and the constitution of the blood has become essential to future progress. It is not only vital for the prevention of diseases in childhood, but so far as we have been able to gather, is of equal importance in the suppression of the diseases of adult life.

The maintenance of health rather than the suppression of disease is the aim of modern medicine and in order to achieve this aim it is necessary to have some idea as to what constitutes health and what variations of physiological phenomena are compatible with full vigour. The child is an organism in a state of continuous development, ceaselessly carrying out physiological functions which vary, not only from year to year, but from minute to minute. Nothing is constant. What is normal at one time and in one state of activity, is abnormal at another, and the decision whether a child is physically fit can only be arrived at by a knowledge of how he re-acts to the various impulses which call for physiological activity. The ordinary medical examination which is based entirely upon anatomical details tells us little about vital activity. Anatomical changes are not disease, but are the result of disease and their presence tells us no more than that the body is, or has been, subjected to unfavourable conditions which it has not been able to resist. Such evidence is insufficient for preventive medicine. We must search much deeper to discover disease or the liability to disease before it has produced any change from which complete recovery cannot ensue. The estimation of the physiological re-actions will give us what we require, but these are difficult to obtain and still more difficult to interpret and series of observations are required to furnish evidence which is reliable. It is neither by inspection nor by treatment alone, but by continual supervision that the aim of school medicine can be attained.

MEDICAL INSPECTION.

As has been stated, the Board's schedule has been adhered to, except that during 1925 it was not possible to carry out the routine inspections twice at each school.

FINDINGS OF MEDICAL INSPECTIONS.

The schedule of statistics at the end of this Report will show the nature and extent of the findings of medical inspection. There is, in general, but slight difference between the figures for this year and those that preceded it, but there are some matters which require some explanation. Thus, the unusual number of cases of squint, namely 129, or roughly 4% of the children examined, is due to the inclusion of all cases of divergence of the visual axes. These cases were referred to the Ophthalmic Department where they were further examined and, as was to be expected, the majority was found to be normal.

Defective hearing and ear disease also appear to be excessive. This, to some extent is genuine as Scarlet Fever and Measles produced a great amount of ear disease during 1925; but much of it is due to the heightening of the standard adopted.

Enlargement of the Thyroid is undoubtedly less in evidence than it has been in recent years.

The uncleanliness of the children has improved considerably more than the figures indicate, for though the number of individual children found with nits in their hair is not very different from what it was last year, there has been a notable and welcome decrease in really dirty cases. The cleansing of children's heads at the Clinic has been more vigorously pursued with a result which is satisfactory from all points of view and with remarkably little difficulty with the children's parents.

INFECTIOUS DISEASES.

The control of infectious disease among school children is intimately bound up with the general public health of the borough and as the same staff is employed in the School Medical Department and the Public Health Department, it is impossible to separate that part of the prevention of infection which normally belongs to the School Department. School closure has never been utilized in Swindon, but the supervision of the schools in times of epidemic has always been carried out rigorously. The procedure in Swindon follows closely the suggestions of the Board's Memorandum on Closure and Exclusions from School.

FOLLOWING UP.

The following up of children suffering from physical defects has always received close attention in Swindon and it is rare for a defect requiring treatment not to receive appropriate treatment where such is available.

MEDICAL TREATMENT.

The operative treatment of tonsils and adenoids is carried out at the local hospitals and a fee of £1 : 11 : 6 is paid for each case where the operation is performed with the sanction of the Education Authority.

Orthopaedic treatment is carried out by a voluntary clinic established under the auspices of the Wilts County Council. Arrangements are made for the hospital treatment of orthopaedic cases in Combe Park Hospital, Bath.

Tuberculous cases are dealt with by the tuberculosis officer to the County Council. The remaining defects are dealt with by the staff of the Education Authority at the various clinics.

The scheme for treatment in Swindon covers the ground satisfactorily, but one or two matters require some further development. There is a clinic for the treatment of nose, throat and ear diseases; an ionisation clinic for the treatment of chronic discharges of the ears which resist ordinary forms of treatment; and, as has been stated, an arrangement for the operative treatment of tonsils and adenoids. But there is not at present any means of dealing with nasal cases requiring operation and for ear cases which resist ionisation and are only amenable to radical surgical treatment. A scheme which is urgently needed, for dealing with these matters is in contemplation. Chronic nasal and aural diseases, if uncured in childhood, generally persist throughout life and, the latter especially, give rise frequently to fatal complications before very long. The number of cases of ear disease which resist ordinary treatment and ionisation is not very great, probably an average of about ten cases per annum would require to be dealt with, so that a scheme for disposing of these should prove neither difficult nor expensive.

OPEN-AIR EDUCATION.

There is no Open-air School in Swindon, though the question of providing one has been before the Education Committee for some time. It is very urgently needed.

PHYSICAL TRAINING.

A method for obtaining physical training, particularly for cases of minor deformities, is very much needed. Attempts have been made to obtain remedial exercises, but, up to the present, the result has been unsatisfactory.

PROVISION OF MEALS.

The Education (Provision of Meals) Acts of 1906 and 1914, were in force in the borough throughout the year. The scheme for carrying out this work remains similar to what was in vogue last year. It is extremely simple, easy to administer and very cheap, but efficient for dealing with local needs.

SCHOOL BATHS.

There are no school baths in Swindon, nor indeed are there any public baths. The Great Western Railway Medical Fund Society possesses private baths and swimming baths which, for all practical purposes, are open to the public. The swimming instruction of the scholars is carried out in these baths.

CO-OPERATION OF PARENTS.

The co-operation of parents, teachers, and school attendance officers with the School Medical Department is complete and no difficulties arise in connection with the subject. Voluntary bodies are rare in Swindon, but there is a fund—The Curry Memorial Trust Fund—which supplies spectacles, surgical appliances etc., to children in needy circumstances, which affords considerable help.

BLIND, DEAF, DEFECTIVE & EPILEPTIC CHILDREN.

Blind and deaf children and epileptics of a severe grade are sent to special schools or institutions in other parts of the country, as there are no local means for dealing with them. There is a school with twenty places for mentally defective children. Up to the present this school has been used mainly for low grade cases, but it is in process of re-organisation. It is suitable for high grade cases and it is intended in future to use it for these only. The majority of high grade mental defectives are at present attending the elementary schools. Arrangements for the supervision of mentally defectives who are not in the special school are at present under consideration.

There is a voluntary association for mental welfare for the County of Wiltshire which has a local branch in Swindon. As soon as the new assistant medical officers are appointed the whole subject of mental defection in Swindon will be reconsidered.

SECONDARY SCHOOLS.

Though kept separate from the elementary schools for statistical and administrative reasons, the inspection and treatment in the secondary schools is similar in all details to that of the elementary schools, with the exception of course that as the scholars belong to a different age group, they present somewhat different problems for solution.

EMPLOYMENT OF CHILDREN AND YOUNG PERSONS

There is no employment of young children in Swindon. The Juvenile Employment Committee looks after children and young persons and this Committee is in constant touch with the School Medical Department. Since practically all the children in Swindon are known to the Medical Department, which possesses life records of them during their childhood, co-operation is comparatively simple.

SPECIAL INQUIRIES.

The Report of the special inquiry into thyroid disease of Swindon children is appended. An inquiry into the blood conditions of childhood, with special bearing upon the connection of blood changes with tonsils and adenoids, glandular enlargements and the anaemias, has been in progress for some years and though it has to halt from time to time owing to pressure of other work, it is gradually taking form and will be ready for publication within a year or two, We have got so far as to be able to use our observations as part of the foundation upon which the prevention of disease in Swindon is based.

An inquiry into the anthropometrical details of the Swindon children is urgently required and it may be possible to proceed with this in the course of the coming year. Investigations into the physiological re-actions and of efficiency testing in children, are proceeding.

CONCLUSION.

School Medical Inspection is the basis of modern preventive medicine and it is upon this foundation that the machinery for applying for the benefit of mankind the products of physiological and pathological research can be erected. The science of medicine has, of recent years, progressed with greater rapidity than that of any department of human learning, but, at present, most of our knowledge remains unused, for though much effort is given to the discovery of biological truth, very little indeed is done to apply the truth when it has been discovered, causing a steadily increasing gap between the theory and practice of physiology. Most of us pass our lives in the persistent (and generally successful) endeavour to destroy our physiological efficiency, not because we do not

know what is right, but because we fail to apply our knowledge for our own benefit. To lead the adult population into healthy methods of living is a hopeless task; to maintain physiological integrity in organs which are already wrecked is impossible, but it is very different when dealing with children, particularly if we can start before systematic perversion has started its damaging career. It is true that starting with the school child we are somewhat late, but child welfare enables us to get to work from the very beginning of life, so there seems no reason why the rising generations should have to live in the condition of chronic disease which, up to the present, we have considered, but quite erroneously, to be the lot of mankind. It is true that the application of modern biological knowledge is extremely difficult. The actual prevention of disease is, however, generally simple enough where we know the causes of disease, the methods of detecting them, and the process by which they first interfere with health. In childhood when it is possible to explore the ground which lies between health and disease, the principles of biology can be applied. The child from the moment of its conception is fighting against adverse circumstances which tend to destroy it. Vitality steadily diminishes from birth, until, in the course of time, it is overborne and extinguished by the enemies which assail it. No power of man can increase the potential vitality, but it is within our power to safeguard it and by protecting it, to enable it to resist destruction for a comparatively long period. The majority of human diseases are infections and it is not improbable that in their origin all of them are. Infection is a struggle between a host and parasites which live upon him. It is a biological warfare going on eternally, consisting of alternate pitched battles and periods of armed truce, and it is upon the proper management of the periods of truce that the results of the battles depend. It has been pointed out that the child will maintain apparent health when, in reality, he is suffering from progressive disease which must eventually kill him; but it is possible by working out the factors which are causing him to fail, to so influence matters that apparent health is converted into true physiological health. Unless the development of school medicine keeps pace with the development of theoretical biology it can never achieve its object, but if it uses all knowledge as it becomes available there is no reason to doubt that it will eventually lead to the production of a race which is comparatively free from the destructive influences of disease. There is, unfortunately, but little inducement to develop the practice of physiology, but there are always amongst us those, who feeling that there is no sport like an obstacle race, are determined to force a rational system of living upon us in spite of prejudices, superstitions, and vested interests which keep us grovelling in disease.

DUNSTAN BREWER,
School Medical Officer.

March, 1926.

APPENDIX I.

REPORT OF THE SCHOOL DENTAL SURGEON.

To the Chairman and Members of the Education Committee.

LADIES AND GENTLEMEN,

I have pleasure in presenting the Annual Report on Dental Inspection and Treatment for the year 1925.

Dental Inspection was carried out in all the Elementary Schools in the Borough. 14 Schools comprising 30 departments. To the end of the year treatment has been carried out for 12 schools comprising 24 departments.

The work has been steadily progressing during the year, and it is very encouraging to note the increased interest taken in Oral Hygiene. 1075 parents attended at the schools during the inspections. The value of this cannot be estimated as undoubtedly it fosters co-operation with the dentist regarding the dental welfare of the child, which is going to be a great factor for the future. The vast importance of more dental inspection and treatment, especially the extension of this to children attending the secondary schools, was emphasised by the Chief School Medical Officer last year. This led to the appointment of a second dental surgeon, Mr. John H. Mitchell, L.D.S., R.F.P.S., in October, when it was decided to carry this into effect.

When we get the new scheme into full working order, the children of Swindon will be in the unique position of having a dental service available for them from their earliest years, right up to the time they leave school. This is the ideal aimed at, and as time goes on, it is to be hoped that it will be realised, by everyone taking full advantage of the clinics at their disposal.

ELEMENTARY SCHOOLS.

3256 appointments were made, 2909 or 89.3% were kept. 1134 teeth were filled and 1800 teeth were extracted.

In practically every case a local anaesthetic was used. Nitrous Oxide was used in 13 cases, and was administered by the School Medical Officer.

2 cases were X-rayed prior to treatment. This is only the commencement of a branch of dental surgery which will become an invaluable adjunct to the work.

The dental nurse was present on all occasions, and rendered valuable assistance. With the increasing work, a second nurse would be an advantage as the clerical work takes up valuable time which could be better utilised in surgical work.

The procedure of treating all children who accept up to the age of 9 years, and following them up till they leave school has been adhered to. This practice is being continued as it is the only way to give the benefits of dental treatment to the ones most desirous of it in a given period, (*i.e.*, once each year).

ROUTINE INSPECTION.

4538	Children	were	inspected in the Schools.
21.4% or 974	,,	,,	found free from Caries.
2.2% or 101	,,	,,	found to require no treatment.
60.6% or 2754	,,	,,	recommended for treatment to end year.
60.8% or 1677	,,		recommended for treatment, attended the Clinic.

The total number of individual children including 'special' cases who attended the Clinic was 1829 who made 2909 attendances.

1236 of these were rendered dentally fit as the result of treatment at the Clinic.

The last half hour in the morning session (11.30 to 12) continues to be kept for Special and Casual cases, (*i.e.*, those cases requiring treatment, and who have not a definite appointment.)

SECONDARY SCHOOLS.

Towards the end of the year a complete inspection was made of the scholars in the two secondary schools (Victoria Road and Euclid Street).

751 were examined and 613 or 81.6% were found to require treatment. About 50% of them had some previous conservative treatment.

An opportunity is being given to all those who require treatment to have it done at the School Clinic, and this is being proceeded with now. A striking feature of the inspection is the marked tendency towards irregularity in many of the mouths. The upper arch is narrow so that there is insufficient room for the canines to erupt properly, and in the lower arch there is a very crowded

condition especially in the premolar region, the 1st or 2nd premolar usually being displaced. 7.9% of the mouths examined had this tendency.

A detailed chart of the general condition with reference to caries is appended.

The dentist takes this opportunity of acknowledging the help given by school teachers and members of the medical staff in encouraging interest in the dental welfare of the child, which is of so great importance. A great deal of good is done in this direction which helps towards the success of the scheme.

W. KENYON BERRIE, L.D.S., R.F.P.S.
School Dental Surgeon.

February, 1926.

APPENDIX II.

REPORT OF THE OPHTHALMIC SURGEON.

To the Chairman and Members of the Education Committee.

LADIES AND GENTLEMEN,

I beg to submit the Annual Report of the Ophthalmic Department for the year 1925.

On taking over charge of this department in February, I had the advantage of finding a well-organised Clinic with a complete and accessible record of cases. For this I am indebted to my predecessor Mr. Brooks and to the clerical staff. In no branch of medical work are accurate case records of more value than in Ophthalmology and in this respect the arrangements could hardly be improved.

In almost every case the keenest interest has been shown by parents in treatment of defects in their children's eyes, and my thanks are due to the Nursing Staff for their tact and skill in helping to foster this feeling of confidence in the work.

In the latter part of the year an alteration was made in the arrangements for supplying glasses which has resulted in a high standard of workmanship and material being attained.

In the course of the year I have treated by operation and otherwise a number of children at the Oxford Eye Hospital. I do not propose to give a detailed analysis of cases dealt with at the Clinic as these appear to agree fairly closely with the types treated in former years and also in other districts.

It is gratifying to note that the supreme importance of treating defects in their earliest stages is being realised by parents and it is to be hoped that by further co-operation between the Infant Welfare Centres and the School Clinics such conditions as squint and gross defects of vision may be brought under treatment at an even earlier age than has been the case hitherto.

OLIVER B. PRATT,
M.A., M.B., D.O., M.R.C.S., L.R.C.P.
Ophthalmic Surgeon.

March, 1926.

APPENDIX III.

THYROID DISEASE IN CHILDREN.

An Inquiry into the Thyroid Diseases affecting Children of the Borough of Swindon.

By

DUNSTAN BREWER

Medical Officer of Health and
School Medical Officer.

Swindon,
September, 1925.

Five years ago a member of the Education Committee of Swindon called our attention to the large number of girls who, because of the presence of goitre, were refused work at the tobacco factory, and we were asked to investigate the matter to see if anything could be done to reduce the number of girls who were unemployable upon this count.

We had previously noted that enlargement of the thyroid gland was very frequent amongst the school children of Swindon, but having accepted the then generally prevalent view that simple goitre was common in certain districts and dependent upon drinking water derived from chalk or limestone sources, we imagined that the condition to be investigated was merely simple goitre, of no particular consequence except as regards its appearance, and that such frequency as existed was to be expected in a district where the drinking water was abnormally hard. But it was soon perceived that matters were by no means so simple. An unusual proportion of the children in Swindon presented obvious enlargement of the thyroid gland, seldom of great importance from the point of view of appearance, but accompanied in many instances with physiological disturbances which might or might not be of clinical importance but which certainly called for investigation.

The literature dealing with the subject of thyroid enlargement is extensive, but to a great extent poor in scientific evidence, and in many directions conflicting ; and the preliminary observations made in Swindon added to rather than mitigated the existing differences of thought and opinion.

We therefore decided to investigate the matter thoroughly ; to start completely afresh ; to discard all pre-conceived notions and ideas, and to note, but not to be influenced by, the findings of others who were working in a similar field.

The more the subject was investigated so much the more did it become obvious that it was a matter of a high degree of complexity and that it would require systematic and frequent observations spread over a number of years to obtain any data that would stand criticism. As the evidence became extensive, certain important factors bearing upon the conditions of enlargement of the thyroid began to be elucidated and the mass of evidence collected having now reached a state when it is possible to draw conclusions from it, the time is ripe for collecting and arranging this mass of evidence and to offer the results of the inquiry to the consideration of the profession at large.

The main object of this paper is to present evidence ; the conclusions drawn from that evidence being of secondary impor-

tance, and only so far worthy of consideration as they are proved by the evidence presented. As, however, many of the conclusions are not in accordance with opinions generally held (and in some cases are diametrically opposed to them) it will be necessary to state clearly the nature of the evidence presented; the precise method by which it was obtained, and the fallacies to which such evidence is liable. It is also necessary to explain clearly what meaning is to be attached to the expression "Hyperthyroidism" so that it is fully understood that where this term is used it is employed exclusively in the sense in which it is defined.

In presenting this evidence we have abandoned altogether our earlier observations; for these were crude and incapable of standardisation. The evidence which is given relates only to cases seen during the past five years. These cases are 424 in number and follow in unbroken succession.

THE COLLECTION OF EVIDENCE.

The bulk of the cases which are investigated consists of every case of obvious enlargement of the neck, met with in the course of routine school inspection. They are selected only upon the count of visual inspection and are presented for investigation with no other information except that they are cases which the school inspector considered to have obvious enlargement of the thyroid at the time they were medically inspected in school. Of the children referred on this acount about 90 per cent present themselves for investigation, and if necessary for treatment. There is no reason to suppose that the 90 per cent which present themselves differ in any important detail from the 10 per cent which do not so present themselves, *i.e.*, there is no reason to believe that it is only the more important or more obvious cases that are investigated.

Another series of cases investigated was drawn from a complete survey of the pupils in the secondary schools. These cases, though few in number (49) are of special interest as they throw a light upon the development of thyroid disease in late puberty and adolescence and admit of much closer observation than any other series of cases.

Of thyroid enlargements in late adolescence and adult life we have little evidence to offer—such little as we have being drawn from the ante-natal and maternity clinics. Yet little as it is, it is suggestive, as in many cases the previous history of the patients is known with accuracy, so enabling us to draw conclusions as to the fate of children who develop thyroid disease in childhood and the remote results of treatment.

Some evidence—fragmentary it is true—but of great significance is obtained from the practice of the fever hospital. In Swindon fever hospital infections of all kinds and at all ages are treated and the influence of thyroid disease upon infection—perhaps the most important point in the whole story—can be studied. It happens frequently that patients admitted to hospital with scarlet fever, pneumonia or puerperal sepsis have been known previously and their records are available—so that it is possible to determine the difference between the progress of infection in those in whom the thyroid is normal and those in whom it is not.

The preliminary investigation of a case referred for observation consists in a visual inspection of the neck and measurement of its circumference, expressed in inches; an investigation into the presence or absence of tremor; an investigation into the pulse rate at rest and after a standard exertion; an investigation into the systolic blood pressure; an investigation into the presence or absence of ocular signs and symptoms; and a more diffuse investigation into the presence or absence of general symptoms of disturbed health, of mental action and of menstrual functions. The cases are followed throughout their school career and as far into adolescence as is possible. They are re-examined at intervals varying from once a week to once in three months according to the presence or absence of symptoms. Those cases where all symptoms have ceased and the thyroid gland is no longer obviously enlarged visually or by palpation are pronounced cured; but such cured cases are still kept under periodical investigation.

Methods of Obtaining the Evidence and Definitions of the Terms Used in Recording It.

1. Visual Inspection of the Neck.

The thyroid is described as "Obvious" "Not obvious" "Greatly enlarged," "Generally enlarged," when it presents a normal shape, *i.e.*, two pyramids of which the right is the larger, connected by an isthmus; "Centrally enlarged" "Irregularly enlarged," "Tumour" etc.

2. Measurement of the Thyroid.

The only measurement given is the circumference of the neck. The thyroid, of course, is only one of the smaller component parts which make up the total mass of the neck. Moreover it is not the only structure in the neck which is liable to vary in size for, of course, the neck grows during childhood, and though it increases in size throughout childhood, puberty and adolescence, it does so in a somewhat irregular manner; remaining stationary for long periods and showing marked increases in growth from time

to time. It is difficult to guage the circumference of a cone-like structure like the neck without fixed points for measurement, and there are no points in the neck which are absolutely constant in position. But it is found in practice that the circumference of the neck can be taken from two points, *i.e.*, the hollow above the vertebra prominens behind and the lower edge of the cricoid cartilage in front, which in the same individual will give a reading which does not vary more than $\frac{1}{8}$in. ; *i.e.*, the circumference of the neck measured by a tape with these two fixed points will, in the hands of different observers or by the same observer at different times on the same day, give results which agree with each other within $\frac{1}{8}$in. It is this measurement which is always used, and the measurements are recorded in inches and $\frac{1}{8}$ths of an inch.

In a series of these measurements upon the same individual at intervals over a number of years it is found that the measurement will vary from time to time. There will be a general but somewhat irregular increase due to the growth of the neck ; there may be a slight increase or diminution due to variation in the amount of fat in the subcutaneous tissues, and there will be a variation both upwards and downwards due to the varying size of the thyroid gland. The accurate measuring of the thyroid gland itself by this method is, of course, much hampered by the other varying factors ; but if the number of observations are sufficiently large and made sufficiently frequent it is possible to determine the variations in size of the thyroid with some approach to accuracy. It is found that the thyroid gland, whether normal in size or enlarged varies periodically in size in a rhythmical monthly cycle. In girls who are menstruating regularly, the variation in size of the thyroid can be timed against the menstrual function, and it is found that the thyroid gradually increases in size until it reaches its maximum one week before the onset of menstruation ; that the thyroid then subsides, quickly reaching its mimimum on the first day of the flux, and then gradually increases to reach again its maximum one week before the beginning of the next period. In girls who are not menstruating, in infants and in boys a similar rhythmical variation of the thyroid can be detected, though in these the phenomenon is less marked, and, of course, cannot be timed against any physiological function. In menstruating girls in whom the thyroid is normal the alteration in the circumference of the neck between the minimum and the maximum does not exceed 3/16ths of an inch, but in children in whom the thyroid is enlarged the monthly variation may reach $\frac{1}{2}$ an inch, and in extreme cases $\frac{5}{8}$ of an inch. Since $\frac{5}{8}$ difference in the circumference of the neck in the same child may make the difference between a normal neck and an obviously enlarged thyroid neck on inspection it is of extreme importance in estimating

the influence of remedial agents upon thyroid enlargement that the the neck should be measured at frequent intervals. When one comes to recording these measurements of the neck taken over a considerable period of time in a growing girl one finds a difficulty in that though the thyroid itself may be steadily decreasing in size the neck itself has been increasing steadily, so one cannot escape from the use of words which are incapable of scientific standardisation. For instance, a girl at the age of 11 may have a neck of 12in. circumference, with an obvious thyroid enlargement. The same girl at the age of 14 may have a neck of 12½in. circumference with the thyroid not visible or definitely palpable.

The symptons of physiological disturbance which may be present in cases of enlargement of the thyroid are grouped together under the name of hyperthyroidism. This term will be used here to designate a group of symptoms and for that purpose only. The word is objectionable in that it pre-supposes a cause for these symptoms, obviously suggesting that these symptoms are due to increase of the thyroid secretion, but we find no evidence to offer one way or the other as to whether or not these symptoms are dependent upon increased activity of the gland. They may be due to diminished activity, or, what is more probable, to perverted function, or indeed they may not be due either in whole or in part to thyroid secretion at all, but to other causes, the thyroid enlargement being merely concomitent. The symptoms so grouped together under this term are three in number ; first, tremor, second, alterations in the pulse rate, and third, alterations in the blood pressure. To these may be added some more indefinite signs, such as nervousness, irritability, bad temper, sleeplessness, inability to fix the attention, incapacity for prolonged exertion, and what is of greatest importance, failure to react normally to infective processes. The symptoms met with must be described in some detail.

1. Tremor.

Tremors of various kinds are met with in school children under varying conditions, but there is a special variety of tremor which is met with only in hyperthyroidism. This tremor is fine, rapid and regular. It may generally be elicited by asking the child to hold out her hands with the fingers extended. If it is not apparent it may become manifest by asking the child to stand on tiptoe, by forcibly protruding the tongue and by shutting the eyes tightly. Four degrees of tremor are recognised : 1 tremor obvious on extension of the hands ; 2 tremor obvious on extension of the hands and standing on tiptoe ; 3 tremor obvious on extension of the hands, standing on tiptoe and protrusion of the tongue, and 4 tremor only observable when in addition the eyes are tightly closed. The tremor is most obvious in the finger tips, but if marked it is seen in the tongue, lips and eyelids.

2. Alterations in the Pulse Rate.

Before deciding that any pathological condition produces alteration in the pulse rate in children it is essential to know what is the normal pulse rate and what are its physiological variations. These matters could not be presumed and had to be determined, and a very large amount of work had to be done to settle them even tentatively. Altogether some tens of thousands of children were examined to determine what is the normal pulse rate of children at rest ; what is the normal pulse rate after exertion, and how and in what time the pulse rate varies from the rest to the exertion rate and back again. Briefly stated the results of observation of the pulse rate in children are as follows :—

1. Though the pulse rate at rest varies greatly in individual children, it does not vary in the same child, if conditions are constant, *e.g.*, a child with a pulse rate of 100 will have a pulse rate throughout childhood of 100 unless disturbed by illness or exertion or emotion. It will not become slower as the child grows older until a time occurs sometimes in late puberty, more frequently in early adolescence, when the pulse rate together with the other characters of the vascular mechanism change over to those of the adult state. This change occurs somewhat suddenly, generally within a few months. Until this change occurs there is little variation of the pulse rate from 5 years old upwards. If the pulse rate of a child is taken frequently over a long period of time under standard conditions, the greatest variation which is met with is 8 beats per minute. Thus in the child with a pulse of 100—the pulse will always be between 96 and 104 so long as the conditions are standard and the child is in perfect health.

2. The pulse of the child at rest is seldom absolutely regular in frequency—or indeed in any other character, so it should be counted for at least three minutes before its average rate is determined.

3. The normal limits of pulse frequency in childhood may be fixed provisionally as 80-110, though exceptionally somewhat higher or lower rates are met with in children who are otherwise normal. In disease any rate below the maximum exertion rate may be registered. Disease of the vascular apparatus—and most other diseases as well—alter the pulse rate, but they may either increase or diminish it. Tuberculosis generally, and valvular disease frequently, slows the pulse rate.

4. On exertion the pulse frequency increases. This increase is definite. There is a point beyond which the heart cannot beat. This point differs in different children but is constant in the same child. In children put through a standard exertion the pulse

usually rises very quickly to the maximum rate and remains there during the exertion and for a short time afterwards. The passage from the rest rate to the exertion rate is effected with great rapidity. When exhaustion supervenes or the child is stimulated to an exertion beyond him the pulse reaches its maximum rate, and then becomes irregular and fails, collapse resulting.

5. The exertion rate in children is generally about 25 per cent above the rest rate. The normal limits of the exertion rate in children are provisionally fixed at 100 to 150 beats per minute, and the augmentation above the rest rate at 20-50 beats per minute.

6. On cessation of exertion the pulse returns quickly and somewhat suddenly to the rest rate—normally within 40 seconds. The return is sudden and frequently accompanied by marked irregularity or dropped beats.

7. Exceptionally, *e.g.*, in severe infection the heart may beat at a rate above the maximum exertion rate for a short time, but in our experience such cases end fatally.

8. The pulse rate varies with the position of the child, being on the average about 4 beats per minute less in the sitting than in the standing position and 8 beats less in the recumbent than in the standing position. In our observations the pulse is always taken in the standing position.

9. The standard exertion through which the child is put to estimate the exertion rate of the pulse is twelve jumps completed in ten seconds. This is not always sufficient to call forth the maximum exertion rate and is not strictly standard either in physical or physiological measure, for the amount of effort required varies greatly with the way the jumps are performed, and is much influenced by training.

In hyperthyroidism these reactions are altered. When the condition is marked the frequency of the pulse does not vary with exertion. It maintains constantly the exertion rate, and the result of standard exercises upon its frequency is nil, until exhaustion supervenes, which it does rapidly, when the pulse becomes irregular. One finds therefore, that the characteristic of the pulse in hyperthyroidism is that it beats always at its maximum rapidity ; or, put in other words, whereas the normal child has two pulse rates, one for rest and the other for exertion, the hyperthyroid child has one rate only, which is that of exertion. In states of infection where fever is present the pulse of the normal child beats at its exertion rate ; that of the hyperthyroid child remains the same as it was before disease set in. It is worth

remarking that in children suffering from infective processes such as Pneumonia, if the pulse rate throughout the disease does not exceed the child's normal exertion rate no fear of cardiac failure need be anticipated. For this reason a knowledge of the rest and exertion rates of every child is worth recording as a knowledge of them is of very great value in the prognosis of infectious disease.

In cases of hyperthyroidism which are not marked, or in cases that are recovering the full reaction of total failure to react to exertion will not be met with; but it is found that the increase produced by exertion is generally very much less than it is in the normal child. Very uncommonly in cases of hyperthyroidism it is found that exertion instead of increasing actually diminishes the pulse frequency. The explanation of this is that very slight exertion causes collapse, the heart failing at once and missing beats.

3. Blood Pressure.

The only record of the blood pressure which is recorded is the maximum systolic pressure. This is estimated by Barton's sphygmomanometer and is the mean between that pressure under which the pulse is imperceptible and that under which the pulse can just be felt. This method is open to many errors—but the errors will be common to all observations so that though the individual readings will be only approximately accurate they are capable of fairly accurate comparison.

The findings in connection with the blood pressure in children may be summarized thus :—

1. The blood pressure varies widely in different children, and in the same child at different times.

2. In boys the blood pressure falls through early puberty subsequently rising somewhat briskly in late puberty and adolescence

3. In girls the rise of pressure occurs at an earlier age than in boys, (there are no data to decide whether the fall in pressure in early puberty does or does not occur in girls).

4. The normal maximum limit may be provisionally fixed at 130m.m.—it is about 10m.m. higher in boys than in girls.

5. Both boys and girls who get through a somewhat rigid medical inspection and pass without comment generally have a blood pressure between 115 and 125.

6. The blood pressure varies with position and it is the position of the head relative to the heart which counts. The pressure

is the same in the standing and sitting position ; it drops considerably in the recumbent position and still further when the head is lowered. The differences between the pressure in the upright position and in that with the head below the level of the heart is very considerable—40m.m. or more has been observed frequently.

7. The blood pressure rises on exertion but quickly falls again to normal, but in exercises requiring prolonged muscular contractions without relaxations it rises steadily and does not fall again until the exertion is over.

8. The blood pressure in children with myopia which is progressive is high.

9. The blood pressure varies with the time of day ; being lowest in early morning gradually rising until evening. All our observations were made between 9 a.m. and 9 p.m. A child examined in the evening may be expected to have a pressure of 5—7 m.m. above the morning level.

In enlargements of the thyroid the blood pressure is low when no signs of disordered function are present, but if symptoms are present the blood pressure is high, generally very high. The pressure in such cases varies with the severity of the other symptoms.

One finds, therefore, that the signs of hyperthyroidism are the presence of a tremor, a pulse rate that is not influenced by exertion, and a high blood pressure. The other signs met with in the hyperthyroid condition are not capable of accurate measurement, and little further attention will be paid to them.

EX-OPHTHALMIC GOITRE.

It is well known that cases of ex-ophthalmic goitre are rare in childhood, and if only elementary school children under the age of 14 are investigated, even the earlier and minor manifestations of that condition will be infrequently met with ; but if the investigation includes the secondary school children from the ages of 14 to 18, cases presenting early signs of ex-ophthalmos are by no means rare. Ex-ophthalmic goitre may be defined as enlargement of the thyroid gland, plus hyperthyroidism, plus ocular symptoms. Where children are watched carefully over a long period, it will, of course, never occur that marked ex-ophthalmos will put in an appearance without warning. If ocular symptoms are carefully looked for in children with enlarged thyroids it will be found not infrequently that where signs of hyperthyroidism are marked, two and possibly three signs of commencing ex-ophthalmos may be detected. The first to come and the last to go, is Von Graff's sign. The second is Stellwag's sign, but Stellwag's

sign is occasionally fallacious in that there is a congenital form of ex-ophthalmos in which a rim of schlerotic is visible completely surrounding the cornea. This condition has nothing to do with thyroidism and is apparently of no clinical importance.

Myopia is an important sign in hyperthyroidism. The connection between myopia and signs of hyperthyroidism will be apparent from the following rates per thousand secondary school children. Of all children 124 have myopia and 152 have hyperthyroidism, but of the children with hyperthyroidism 260 have myopia and of the children with myopia 260 have hyperthyroidism. In other words myopia is twice as common in hyperthyroid children as it is in average children.

Nor is this all, for the myopia connected with hyperthyroidism is peculiar in its course. The defect tends to increase with the increase of the other symptoms of hyperthyroidism, to diminish when they diminish and to become abolished when the case is cured. It can be shown that both hyperthyroidism and myopia are connected with high blood pressure in children. To explain this connection figures alone will not avail us. Where myopia is connected with hyperthyroidism and both are advancing the pressure is high but subsequently sinks as the condition yields to treatment. The ordinary low grades of myopia which are common in school children are not connected with a permanent increase in blood pressure. Cases of high degree, especially if progressing, generally are. Attention has recently been called by some authorities to the existence of myopia in children which is not permanent, but which tends towards cure. In our experience these are always hyperthyroid cases.

Another sign sometimes seen is ptosis.

In thyroid children with ophthalmic signs falling of the hair is frequent, but so far we have not met with this symptom unless ophthalmic signs were present.

The symptoms of hyperthyroidism vary from time to time in the same case, and like the alterations in the size of the thyroid gland itself the symptoms vary in severity in a definite monthly cycle. They are most marked at that period of the cycle when the thyroid gland is smallest, least marked when the gland is largest. It is obviously of the greatest importance to bear this in mind when estimating the progress of the case or the action of remedial agents upon it.

The cases of enlarged thyroid gland which are investigated at the clinic at Swindon are arranged in several groups according

to the findings of the first investigation. These groups are :—

(1) **O.** These are cases in which the enlargement is so slight that it will not interfere with the child's employment, causes no apparent disfigurement, and no symptoms are present.

(2) **S.** or simple enlargement of the gland, whatever its size may be, but in which no symptoms are present.

(3) **H.** or cases presenting symptoms of hyperthyroidism.

(4) **E.** or cases showing in addition signs suggestive of ex-ophthalmic goitre.

(5) **T.** Cases of irregular enlargement and tumour. None of these ever showed signs of hyperthyroidism, and are amenable only to surgery.

6. **L.** Cases in which enlargement of the thyroid is present, but is obviously part of some other disease.

There is no hard and fast line between these groups, many cases presenting few or slight symptoms might be classed as S or H or those with grave signs H or E. In fact perfect gradation can be shown from the healthy condition to fully developed ex-ophthalmic goitre.

The cases, after being arranged and ticketed are followed for as long a period as possible, generally many months, sometimes several years. Of course, a fair number of cases are lost sight of. From time to time, however, cases which have ceased to attend, either because they have been lost sight of or because they have been discharged cured, are hunted up and in the majority of cases can be found and their condition recorded.

In the following up of these thyroid cases the first fact that becomes apparent is that whatever type they may have been when first seen, they will vary from one group and back again during the time that they are being watched. Thus it is quite common to see untreated cases go from O to S, from S. to H., and occasionally from H. to E, and treated cases go backwards from E. to H., from H. to S., and S. to O. In many cases which have been seen with more than usual frequency changes from one type to the other are frequent. Thus in one case which started with simple enlargement of a very severe degree, there was a gradual improvement under treatment ; on treatment being omitted, hyperthyroidism developed which, in its turn, yielded to treatment, which again on omission of treatment developed first hyperthyroidism and then signs of ex-ophthamic goitre, which yielded to treatment, and again returned on omission of treatment, and eventually on the resumption of treatment and continuation of the same for a very long period cleared up completely, the thyroid eventually becoming not obvious on inspection. The same phenomena have been observed in many other cases, so that we conclude that

simple enlargement of the thyroid, enlargement of the thyroid with hyperthyroidism and ex-ophthalmic goitre are essentially the same disease. It is not suggested that simple enlargement of the thyroid necessarily progresses towards ex-ophthalmic goitre, or necessarily develops signs of hyperthyroidism ; indeed there is evidence that some other factors must come into play to translate simple goitre into the hyperthyroid or ex-ophthalmic condition ; but it is maintained that enlargement of the thyroid without symptoms is the first stage in all cases, and that if the simple enlargement can be, as it undoubtedly can be, prevented from progressing, hpyerthyroidism and ex-ophthalmic goitre in children will not occur. It must be remembered that we are dealing only with children, and offer no evidence one way or the other whether ex-ophthalmic goitre in late adolescence and adult life does or does not arise as an acute disease de novo.

A second point is that thyroid enlargement is much more frequent amongst girls than amongst boys, but there is a tendency for it to be seen more frequently in boys than formerly, so that at present the difference in the two sexes is much less marked than it was. Thirdly, the enlargement of the thyroid is generally detected in children over the age of 12 and is progressively less common as the age descends ; but here again it is becoming more common in the younger children.

Enlargement of the thyroid in the younger children is almost always simple, signs of hyperthyroidism being rare before the age of 12. After that age the percentage of cases of enlarged thyroid exhibiting signs of hyperthyroidism steadily increases.

The incidence of enlarged thyroid amongst school children had been steadily and rapidly increasing for some years, but it is now showing signs of decrease.

So far we have considered children who have been presented for examination and treatment because of obvious enlargement of the thyroid. In these cases there is little or no reliable history so that we cannot say how or when the symptoms originated. We do, however, possess the means amongst a certain selected class, namely secondary school children, of determining the time of onset and early symptoms of thyroid disease during puberty. These children are examined periodically and on each inspection signs of enlargement of the thyroid and symptoms of hyperthyroidism are looked for specially upon every inspection. It is found that a certain number of children develop thyroidism during puberty ; in other words there are certain children in whom, on one inspection, enlargement of the thyroid or signs of disordered action are definitely not present, but in whom, on a subsequent examination, such signs and symptoms are definitely present.

Amongst 320 boys, 24, and amongst 252 girls, 25, were found to have developed thyroid disease between two specified dates; the first date being generally in their 12th year of life and the second date somewhere between their 14th and 16th. From these figures we may say roughly that among children of twelve years old in Swindon free from thyroid enlargement or symptoms 10 per cent of the girls and slightly less than 8 per cent of the boys, will develope thyroid disease during puberty, so the difference between the two sexes is not very great. Simple enlargement commencing in puberty is generally followed very quickly by symptoms; thus among the 24 cases noticed in the boys, three only did not exhibit obvious symptoms and even in these their physiological reactions were not quite normal. Among the 25 girls who developed enlargement of the thyroid, five showed simple enlargement without symptoms. Among the 49 cases noted, three girls and one boy had definite signs of exophthalmic goitre; 34 had developed definite tremor; 41 had systolic blood pressure above the provisional normal figure of 130 and in 15 the pressure exceeded 150. It is to be noted that the blood pressure is generally higher in boys than it is in girls, both in normal and abnormal conditions. In 9 boys and 13 girls the cardiac reactions had altered for the worse; in 3 girls no information is available upon this point; in 9 boys and in 5 girls the cardiac reactions had improved; and in 6 boys and 4 girls they had remained constant. In this connection we would draw attention to what we have remarked before, that the normal cardiac reactions in childhood are constant, and do not vary with the age of the child, but that at some period in late puberty or adolescence the reactions normal for the child, change somewhat abruptly to what are normal for the adult. This change very rarely occurs during elementary school life, but occurs not infrequently in late secondary school life.

CAUSES OF THYROID ENLARGEMENT IN CHILDREN.

There is general agreement that thyroid disease in children is dependent upon some failure of iodine metabolism for every observer who has investigated the condition from any angle is led to the conclusion that failure of iodine metabolism is the root of thyroid disease. Such failure might arise either from inability to obtain iodine in a state in which it can be utilised, or from incapacity of the thyroid gland to deal with the iodine supplied. In other words thyroid enlargement is either a deficiency disease due to defficiency of assimilable iodine, or else it is a primary disease of the thyroid gland itself. The former is more likely to be correct because thyroid enlargement is met with not as an occasional condition, but as affecting a very considerable proportion of the population; and it is far more likely that a considerable proportion of the population has been exposed to a special deficiency in diet than that one of the vital organs should fail in such large numbers. One

may, therefore, as a preliminary presume that thyroid enlargement is a deficiency disease, and that it results from failure of exhibition of a diet containing sufficient iodine in a form in which it can be utilised; and that the condition should be capable of gradual cure by the exhibition of iodine in an assimilable form. The facts found on investigation support these premises. Assuming that thyroid enlargement is due to deficiency in the diet, it becomes necessary for us to prove that such a defiicency does or has existed in the diet of the individuals, and to prove that return to a diet containing sufficient usable iodine can cure the condition. Enlargement of the thyroid is met with indifferently in children who have been breast fed or artificially fed. One feels reluctant to admit the possibility of deficiency in a breast-fed infant, at all events on an extensive scale, so that one may provisionally exclude the suckling age, as that age at which the causes of the disease come into action. It is in the next age, that of the toddler, where one apparently finds the causes which lead to thyroid enlargement. By the courtesy of Dr. Smallman of the Ministry of Health we have been supplied with a table showing the iodine content of the usual articles of diet, and we find in the diet generally exhibited to the toddler there is little, if any, iodine content. We have also found that the exhibition of a diet containing articles rich in iodine will prevent the progression of thyroid enlargement in young children, and that it will cure the minor degrees of enlargement met with in older children. The articles of diet which are richest in iodine are the vegetables belonging to the natural order cruciferae. These all contain abundant iodine, which we may presume is in an assimilable state, at all events when the vegetables are in a raw condition. We have little evidence whether they retain their iodine in a usable form after they are cooked, particularly if they have been boiled in water such as we have in Swindon, which is of a high degree of hardness, alkaline in reaction, and is chlorinated before use. There is, however, no objection, and upon other grounds there is much reason, for giving these vegetables in the living state, and where ever this form of treatment is adopted the raw vegetables are always used for the purpose. An experiment is now being made here of adding to the diet of the toddler raw vegetables of the order cruciferae, and in course of time it will be possible to see whether or not such children are free from thyroid disease. It is too early to draw conclusions from children who have been so fed, but the point that minor cases of thyroid enlargement can be cured by this treatment is fairly well attested. It is probable that man obtains iodine from sources other than the cruciferous vegetables. It is certain that carnivorous animals must obtain their iodine from an animal source and the only animal source from which they can obtain it is the thyroid gland itself. It is noteworthy that carnivorous animals always commence by eating out the throats of their victims. We have noticed

that stoats and weasels, after killing their prey, always commence their feed by eating out the tissues of the throat. Man seldom eats the thyroid glands of animals, and so far as we know, the rest of the animal body does not contain iodine in any quantity. It is probable that iodine is obtainable from the water supply, and it was proved many years ago that iodine was absent from water obtained from limestone rocks at high altitudes far removed from the sea, and the prevalence of giotre in inland limestone districts has been explained on these grounds. The water of Swindon, according to the analyst, does not in its natural condition exhibit any trace of iodine. Of recent years the water in Swindon has been chlorinated and it is quite reasonable to suppose that the process of adding free chlorine to the water would render useless any iodine compound that it might contain, and might also destroy the iodine content of any food substance that was boiled in it. So that here locally we have to consider whether the chlorination of the water is not one of the causes of the increased prevalence of thyroid disease in children. Our observations are against this because many of the children attending the Swindon schools live in districts where the water is not chlorinated, and they suffer from thyroid enlargement just as much as the Swindon children.

In the diet of children older than the toddler there is less marked deficiency of the iodine content, but it still appears that a very large number of school children consume very little iodine-containing foods.

One may presume the essential pathology of enlargement of the thyroid and hyperthyroidism to be as follows :—Deficiency of the iodine content in the foodstuffs during the toddler stage causes hyperthrophy of the thyroid to attempt to overcome its difficulties. If later iodine in sufficient quantities is obtainable, gradual re-assertion of the thyroid will occur, and where the iodine is insufficient in the food, exhibition of an iodine compound will help the re-assertion ; so that if the deficiency has been limited to early childhood, though the thyroid may enlarge, it will tend later to diminish and symptoms of hyperthyroidism will not occur. But should the deficiency be very long continued, particularly if it is continued into early puberty the thyroid apparently loses its power to return to the normal and after iodine is exhibited in sufficient quantities symptoms of hyperthyroidism develop. We have stated before that there is reason to believe that hyperthyroidism is not due to mere increased activity of the gland, but to a perverted function. The treble symptoms of tremor, loss of the cardiac reaction to exertion and persistent increase of the blood pressure cannot be brought about experimentally by the exhibition of thyroid extract. Some approach to this condition is obtainable experimentally, but even when the exhibition

of thyroid extract is pushed to the limit of safety the cardiac reaction is never abolished; whereas in the condition of hyperthyroidism it may be abolished for months without producing any distress except on severe exertion. Therefore hyperthyroidism cannot be cured by the mere exhibition of iodine, at all events not in a crystalloid condition. For the production of the symptoms of ex-ophthalmic goitre in a case of hyperthyroidism some other factor is necessary, and the only factor that we have been able to discover is the increased mental exertion and anxiety which occur at puberty as a result of study for examinations. It appears that it is the disturbed sleep, and possibly its insufficiency, to which children are liable when they have an examination in front of them which is the real determining factor; for sleeplessness is always a precursor of the development of ophthalmic signs. As regards other factors which might be presumed to interfere with thyroid activity our observations are negative. Children with enlarged thyroids or hyperthyroidism suffer slightly more than other children from diseased teeth, but the changes in the cellular content of the blood suggestive of haemolysis, commonly found in children with foul mouths, have not been found in hyperthyroid children. The combination of enlarged thyroid with enlarged or diseased tonsils is exceptional, for in 300 consecutive children with thyroid enlargement operation for tonsils or adenoids was only advised in one. We have never seen enlargement of the thyroid, nor hyperthyroidism, nor the symptoms of exophthalmic goitre develop either in the course of or as a result of acute infection.

PREVENTION.

Enlargement of the thyroid gland in Swindon is a widespread, and until recently, an increasingly prevalent condition. In some parts of the world its prevalence is so great that preventive methods applicable to the whole population have been considered. Thus the addition of salts or iodine to the public water supply and the addition of iodine salts to ordinary table salt have been both advocated and utilised, and we gather from the evidence, with considerable success. But there are obvious objections to applying such artificial means to a whole population, and it would seem that the same net results could be obtained by slight modifications of the ordinary dietary. At least, the addition of raw vegetables of the order cruciferae and certain other orders to the diet of all children, and especially toddlers, is not open to objection and might result in the elimination of thyroid troubles; so this slight modification of the dietary is well worth a trial. In children in whom enlargement of the thyroid is becoming obvious the addition to the dietary of raw turnip, radish or onion twice a week seems a reasonable means of procedure, and is one that is adopted in Swindon for the minor cases which require treatment.

TREATMENT.

Starting on the presumption that thyroid enlargement was dependent upon derangement of iodine metabolism and that the treatment of enlarged thyroid by painting the neck with iodine had been used for generations the first batch of cases that came under our notice were treated by this method. They improved slightly and slowly. Since it seemed probable that the improvement from this treatment resulted from absorption of some iodine compound, the painting of the neck was abandoned in favour of painting the armpits with tincture of iodine on the preseumption that any local influences would be thereby abolished and that absorption would be more rapid. A batch of cases treated by this method improved somewhat more rapidly than by the former method. A third batch was treated by potassium iodide given by the mouth. Cases so treated did not alter in the very least, so it was presumed that iodine in this crystalloid form was inert, and the substance known as Collosal Iodine was utilised instead. This last method of treatment produced amelioration in all cases and in most cases with great rapidity, and has remained the standard method of treatment to the present time. The results obtained elsewhere by the use of potassium iodide were, however, not to be dismissed, so that a more prolonged investigation into the action of this salt upon thyroid cases was undertaken, and it was found necessary to modify somewhat the opinion originally expressed that potassium iodide was in this connection inert; for it was found later that cases of simple enlargement without signs of hyperthyroidism did improve under potassium iodide alone, though cases with hyperthyroidism did not improve in any particular except as regards the blood pressure, which was slightly reduced by the use of potassium iodide. The explanation of the contrary results obtained by the two series of observations was that in the earlier batch of cases only children showing signs of hyperthyroidism were included, and the results of the second series of observations confirms the result that hyperthyroidism will not yield to potassium iodide. It has been stated that the use of potassium iodide in hyperthyroidism increases the severity of the symptoms. This is not our experience. We have never seen such a result. Collosal Iodine is the substance which is now used in all cases of hyperthyroidism and in most cases of simple enlargement, and the results obtained have been highly satisfactory. Precisely what this Collosal Iodine is seems somewhat doubtful. The only thing certain about it is that it is an organic compound containing a small quantity of iodine. The quantity given is 1 drachm, either twice a week or daily according to the severity of the symptoms. In addition to these forms of treatment several cases of simple enlargement where the deformity was considerable have been treated by various electrical methods. Since the number of cases treated is small and the results obtained generally

inconclusive, it is unnecessary to say much about them except that the two largest goitres that we have seen in Swindon were treated by Farradism; in both cases the goitre disappeared entirely. Such evidence proves nothing, but suggests the advisability of further research in this method. Cases which are resistent to other forms of treatment are treated temporarily by thyroid extract. This treatment is to some extent dangerous and must be watched with the greatest care. It generally increases the severity of the symptoms, but it is found that some cases become more amenable to treatment with Collosal Iodine after a few days treatment with thyroid. In those cases where ex-ophthalmic goitre is threatened complete rest is essential, and is generally successful.

Children that develop enlargement of the thyroid and symptoms of disordered action during secondary school life generally yield very rapidly to treatment. This is particularly true of the enlargement of the gland itself which usually shrinks with great rapidity on the exhibition of iodine in organic compound. The most rapid diminution is achieved by the inclusion of watercress or raw turnip in the dietary. Collosal Iodine also produces rapid diminution; Iodide of potassium only in those cases where symptoms are absent. The symptoms also yield to the same treatment, but they are somewhat more tardy in disappearing and are very apt to recur if the treatment is suspended. In cases of severe hyperthyroidism, particularly if the signs of exophthalmic goitre are present, mental rest is essential, else the symptoms will not yield. Apparently it is rest from mental anxiety that is essential. It has been observed that children working for an examination are particularly prone to develop the higher grades of hyperthyroidism, and that the symptoms will not yield until the examination is over. The success or otherwise of the pupil at the examination appears to be immaterial. There is no evidence that physical exertion plays any part in the process except in so far that in the higher degrees of hyperthyroidism exertion is impossible. Where symptoms are slow to yield with the ordinary treatment the exhibition of thyroid extract very often renders the condition more amenable to treatment, but it must be used with caution as some cases are, as might be expected, rendered much worse by its exhibition. From no other form of treatment except that described above have we ever observed any improvement. Digitalis will, of course, slow the heart both in rest and in exertion, but its action is merely temporary and passes away when the drug is discontinued.

We have given a fair trial to other forms of treatment which on theoretical grounds promised success, especially to treatment by various extracts of the endocrine glands other than the thyroid but we have never seen the smallest reaction follow their use.

When we consider the cases of children in whom thyroid enlargement had been noted on a previous date and who came up for inspection some years afterwards, we find a state of affairs which gives us good grounds for hope. We find that such children as have been treated when the enlargement was first noticed had generally recovered completely and exhibited no sign or symptoms of thyroidism. Even in cases where the condition had been extreme either from great enlargement or from the presence of symptoms of severe hyperthyroidism and of exophthalmic goitre, we find, on later routine inspection, no sign or symptom of what had gone before. This indeed is not always so, but it is generally so. On the other hand in those children where treatment had not been carried out one finds almost invariably an increase both in the signs and in the symptoms.

Results of Treatment.

Of the 424 cases 139 are definitely completely cured and have remained normal for periods varying from three years downwards. The remainder are still under observation or have been lost sight of. Every case improved except four which were surgical cases.

The Significance of Hyperthyroidism.

The enlargement of the thyroid gland of itself seldom produces any greater disadvantage than unsightliness. When large and irregular it may be greatly disfiguring but seldom produces any symptoms of pressure on important structures. In Swindon great enlargement of the gland is rare, and it is worth recalling that in the very few cases where symptoms of pressure have been recorded the enlargement was not marked. Children with hyperthyroidism are not ill in the ordinary sense ; they do not feel ill and they do not complain ; nor unless the neck is unsightly or interferes with employment do their parents complain for them. It might therefore be asked why we should worry about a condition which is apparently trivial. But it is found that the condition is not trivial ; that it underlies a considerable amount of fatality and of a much greater amount of inefficiency. The mildest cases certainly do not suggest anything very serious but no one questions the grave importance of ex-ophthalmic goitre and the chief purport of this paper is to show that ex-ophthalmic goitre is the end result of progressive thyroid disease. Here it will be asked at once how is it that so many cases of hyperthyroidism in Swindon are recorded and yet so few deaths from ex-ophthalmic goitre appear in the registrar's returns. The answer requires to be very carefully considered. The majority of deaths that occur from ex-ophthalmic goitre are not notified under that disease but under the superimposed disease which has finished the patient's career. Where a fatal infection occurs, as it frequently does, in a case of hyper-

thyroidism which has not progressed to the production of exophthalmos, the existence of previous hyperthyroidism is seldom known as the symptoms of fever will mask those due to the thyroid condition. The opportunity of connecting these two conditions is, however, presented to the writer who deals with the thyroid condition of children and also with the same children when they suffer from acute infections. Here the influence of hyperthyroidism upon the process of infection can be watched and this effect is disastrous, for it is found that children with hyperthyroidism will not react normally, do not develop leucocytosis and either die in the acute stage from failure of immunity or recover only after a prolonged and complicated illness.

The symptoms of hyperthyroidism mask those due to infection to such an extent that it is extremely difficult to make a prognosis in the infections in childhood unless the reactions of the same children in health are known beforehand. An example will serve to illustrate this. A girl of 13 was admitted into the Swindon Isolation Hospital with acute pneumonia. Clinically the condition was very severe, the pulse being 160 and the white corpuscles count being only 15,000. A pseudo-crisis occurred on the 7th day but the pulse was still 160 and the white corpuscles count still 15,000. She was expected to die during the process of the crisis, but she did not, though the crisis was never completed. Two days afterwards an empyema was diagnosed and treated. Her condition was very bad, and though she improved on draining the pleura the pulse remained at 160. After a long period of anxiety considerable portions of lung tissue sloughed and came away with the discharge. There was no difficulty in recognising the portions of actual lung tissue. Eventually however, she recovered, but the pulse remained at 160. Two years later she was seen and was then in apparently perfect health, but she had the symptoms of severe hyperthyroidism, and her pulse rate was 160 uninfluenced by exertion. Looking up her record it was found that previous to being taken ill she had the same condition of hyperthyroidism with a pulse of 160 ulaltered by exertion.

The hyperthyroid condition also interferes materially with efficiency. On the physical side children with high pressure or whose pulse will not re-act normally to exertion are incapable of the amount of physical exercises which are essential to childhood. On the mental side they are liable to long periods of overstrain in which their education is merely marking time ; they are inclined to break down completely in early adolescence or more particularly after they have left school and entered the world, and they are liable to attacks of mental failure, particularly in connection with examinations. They are also liable to long periods of sleeplessness, to irritability, to bad temper, to tearfullness and

various other so-called hysterical symptoms and to menstrual disturbance.

It will be apparent that we have only paid attention to such clinical phenomena as are obtainable under the circumstances in which this inquiry was made. We have said nothing on the question of metabolism, for information upon this subject was not obtained. As regards the cytological condition of the blood no fixed or suggestive deviations from normal were detected.

Many of the conclusions suggested are common ground but many run contrary to generally received opinions, and the latter must, of course, be justified by evidence before they can be held even tentatively. That thyroid enlargement is common in school children and that apparently of late years it has increased very much in prevalence is admitted on all hands, but generally it is held that this enlargement is either not connected with any form of physiological disturbance or else is akin to and connected with the condition of hypothyroidism, myxoedema and cretinism. As regards the first of these it would seem in Swindon that some of the minor or earliest cases occasionally show cardiac reactions suggestive of hypothyroidism, but such cases are rare and always either return to normal or step over the boundary into hyperthyroidism. Of myxoedema, or anything approaching it, we have seen nothing in Swindon, and as regards cretinism, the only undisputed cretin in Swindon was born 20 years ago, and among children born during the past 16 years there are only two in which a diagnosis of cretinism in a mild and modified form could be entertained. Whether the discrepancies between results in Swindon and those obtained from elsewhere are due to local factors or are fictitious due to different lines of investigation, remains to be settled.

From the evidence presented one is forced to the conclusion that ex-ophthalmic goitre is only an exaggerated form of the ordinary hyperthyroidism which is frequent in children. This certainly runs counter to received opinions which look upon ex-ophthalmic goitre, sometimes termed "toxic goitre" as a disease having no connection with the ordinary enlargement of the thyroid gland. Here again it is possible that this discrepancy is apparent and not real for it must be admitted that it is difficult to find evidence bearing upon the early stage of development of ex-ophthalmic goitre. It is quite true that the number of cases in which the development of this disease in children in Swindon has been observed, *i.e.*, 17 is scarcely sufficient to do more than suggest a line of inquiry.

The main value that is attached to the evidence p esented lies in the comparatively prolonged length of time over which the patients have been watched and the frequent measurements that have been made. This evidence certainly suggests that there is a common cause for thyroid disease ; in all probability failure of ingestion of iodine in assimilable form. Put in other words failure of iodine intake renders the thyroid mechanism liable to break down and whether the resultant is a mere slight increase in size of the gland ; the inhibition of its activity ; or an increased or perverted action, depends upon other factors acting upon the gland whose integrity has been damaged through nutritional causes. If this is so, then the exhibition of iodine in an assimilable form should, by the prevention of the primary injury to the thyroid, sweep away all varieties of the commoner thyroid diseases. If so, the routine exhibition of such vegetables as watercress or swede in the diet of childhood should free the child population from thyroid enlargements. If it does so the conclusions which we have drawn may stand as probably accurate. If it fails to do so these conclusions are probably erroneous. The experiment is now being made in Swindon but though the full result cannot become apparent until the year 1940, so far as we have gone it promises success from two points ; firstly that the cases of minor thyroid enlargement which have received no treatment except the addition of watercress, swede or turnip to the regular dietery have without exception returned to normal ; and secondly, that no normal children to whom such diet has been exhibited have so far developed any evidence of thyroid enlargement or disease, but here it must be admitted that these children are far too young for this evidence to be allowed to stand at present.

POSTSCRIPT.

The above Report was finished six months ago, and since that time the observations of the cases dealt with have been continued and some new cases and new matter have come to light. Since the body of the Report was finished 31 further cases have been discharged as cured and only 20 new cases added to the list. These 20 cases are tabulated as follows :—

O.	6
S.	9
H.	4
E.	1

Considering the exceptionally large number of children that have been examined during the past six months the number with enlarged thyroid is extremely small. It is certain that amongst the elementary school children in Swindon thyroid disease is rapidly declining. To what extent this is due to the special measures that have been taken cannot, of course, at present be

determined. There is on the other hand no evidence that the development of thyroid disease in puberty and early adolescence is on the wane. If it should be that the methods adopted are proving successful one would scarcely expect any improvement in the puberty class to become manifested until later.

REVIEW.

The inquiry now being finished it is opportune to review what has been found and compare it with the findings of others who have been working in the same field. It is unnecessary to refer to those points where all inquirers are agreed, but many discrepancies even amounting to apparent contradictions are manifested between the results of the inquiry at Swindon and those which have been prosecuted elsewhere. The great point of difference and the only one which seems irreconcilable is that bearing upon the genesis of ex-ophthalmic goitre. But in reviewing the very extensive literature on the subject which has been published during the past few years, I can find nothing which is contradictory to my statement. The majority of inquirers into thyroid disease of children either do not mention ex-ophthalmic goitre or deliberately exclude it upon the grounds (which I submit to be a mere assumption and believe to be an erroneous one) that ex-ophthalmic goitre has no connection with the enlargements of the thyroid that are met with in young persons. A great number of authors have limited their inquiries to the conditions ruling in the elementary school age, and where this is so, ex-ophthalmic goitre will have been met with so rarely that it could take no place in the inquiry.

The connection between thyroid disease and myopia does not appear to have been sought for by the investigators into thyroid disease, but several ophthalmologists, particularly Edridge Green, have recently called attention to myopia in children which was not progressive and which tended towards cure. No pretence is made that the small amount of evidence that I have been able to collect up to the present is sufficient to support a proposition of such importance as that indicated in the text, but it is sufficient to stimulate a line of inquiry in this direction.

The fact, which I submit cannot be doubted, that the thyroid enlargements in Swindon are generally associated with symptoms which for lack of a better term are misnamed hyperthyroidism, seems contradictory to the general findings in this country. In Europe and America enlargement of the thyroid is generally reported as being associated with the group of symptoms designated as hypothyroidism. One finds, however, on reviewing the literature that the majority of observers give no evidence of

any kind as to what physiological disturbances, if any, were associated with the thyroid cases that they studied, and that many others simply state that the enlargements are associated with hypothyroidism without producing any evidence or even explaining what they mean by the term. Some of the Continental inquirers, however, give evidence on this point, and from these it appears that enlargement of the thyroid in some parts of the world is associated with hyperthyroidism and in others with hypothyroidism. Thus in Norway and in some parts of Switzerland conditions very similar to what obtains in Swindon are recorded ; whereas, in America and in some Cantons of Switzerland the reverse condition obtains. But I believe we shall find that the main element in all is a primary damage to the gland, and whether this eventuates in one or other departures from normal action depends upon extraneous circumstances.

The work of MacCarrison is in no way contradicted by my observations. Indeed the two lines of inquiry, if studied together, will be found to run parallel.

The relation of goitre to infections is apparently commanding a great deal of attention from various observers. Llewellyn Jones Llewellyn's observations fit in closely with mine, though he approaches the subject in relation to rheumatism, whilst I have been chiefly concerned with pneumonia, scarlet fever and puerperal sepsis.

My objections to communal treatment, particularly by adding iodine to the public water supply, but also to a less extent to the general distribution of iodized salt or chocolates, are discussed in a paper which was published in the " Medical Officer " and quoted at full length by Sir Augustus Housten in his Nineteenth Report to the Metropolitan Water Board.

TABLE 1.

TABLE SHOWING THE YEAR OF BIRTH OF CHILDREN WITH ENLARGED THYROID.

		1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	Total	Totals
O.	B.	....	....	1	....	7	5	2	....	1	3	....	1	....	....	20	64
	G.	....	....	2	2	10	15	4	2	3	5	....	....	....	1	44	
S.	B.	....	....	2	5	8	7	4	5	4	4	....	1	....	....	40	144
	G.	1	2	13	20	15	15	14	8	6	6	2	1	....	1	104	
H.	B.	....	....	4	13	11	10	1	....	3	....	....	....	....	....	42	185
	G.	5	4	8	44	39	25	7	4	2	2	1	1	1	....	143	
T.	B.	....	....	....	1	....	1	1	....	....	....	....	....	....	....	3	8
	G.	....	....	....	....	....	....	1	....	3	....	1	....	....	....	5	
E.	B.	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	17
	G.	....	3	2	4	4	3	....	....	....	....	....	....	....	....	16	
L.	B.	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1	6
	G.	....	....	....	....	2	....	....	1	1	....	1	....	....	....	5	
Totals	B.	....	....	8	19	26	24	8	5	8	7	....	2	....	....	107	424
	G.	6	9	25	70	70	58	26	15	15	13	5	2	1	2	317	

It is only for the children born between 1909 and 1913 that the figures are at all complete. Due allowance must be made for the possibility of children born 1911 and forward developing thyroid disease in puberty, but if full allowance is made for this it will be seen that there is a marked decline since 1910. There is reason to believe, though this table cannot show it, that thyroid disease in children was increasing steadily up to those born in 1909-10, since when it has declined. In 1908 Swindon experienced a period of very severe depression. The influence of this upon the health of children born in 1908-9-10 can be traced in many directions. Possibly it may have had some influence on the prevalence of thyroid disease. There does not seem to be any evidence to support the supposition that the privations and the terrors of the war had any influence upon thyroid disease.

TABLE 2.

Group.	M.	F.	Total.
O.	20	44	64
S.	40	104	144
H.	42	143	185
T.	3	5	8
E.	1	16	17
L.	1	5	6
		Total Cases	424

This shows the grouping of the various cases of enlargement of the thyroid which were dealt with. This is cast up from the results of the first investigation. As has been noted in the context, variations from one group to another occur in a great number of instances.

TABLE 3.

TABLE SHOWING DISTRIBUTION OF "TREMOR" IN CHILDREN WITH ENLARGED THYROIDS.

(The numbers are percentages cast to the nearest unit).

		O.	S.	H.	E.
Tremor	1	1	2	31	54
	2	....	3	22	11
	3	....	2	6	11
	4	....	4	6	18
All Tremor	....	1	11	65	94
No Tremor	....	99	89	35	6

The case in Group O with tremor 1 is unique. Perhaps those cases in Group S with tremor ought really to have been grouped in H, and perhaps those in H with no tremor should have been grouped with S, but the grouping was based upon the consideration of all the factors taken together. It was mentioned in the text that this grouping is more or less artificial.

TABLE 4. **TABLE OF THE PULSE RATE OF CHILDREN AGED 11—17 YEARS.**

		REST.						EXERTION.						
		All Children		Children with enlarged thyroids.					All children		Children with enlarged thyroids.			
		Boys	Girls	O.	S.	H.	E.		Boys	Girls	O.	S.	H.	E.
Below physio-logical limits.	Below 80	24	9	8	6	2	....	Below 80	1	....	....	....	1	....
								80—89	5	....	6	2	....	....
								90—99	8	2	10	8	2	....
Within physio-logical limits.	80— 89	31	59	30	26	9	—	100—109	20	9	24	22	14	12
	90— 99	17	26	22	26	10	....	110—119	16	18	26	18	10	6
	100—109	14	4	28	31	23	38	120—129	15	22	24	32	27	12
								130—139	14	24	8	10	18	35
								140—149	15	20	2	6	16	17
	110—119	6	1	12	10	15	....	150—159	3	3	....	2	7	....
	120—129	5	1	....	1	22	8	160—169	2	2	....	....	3	12
	130—139	2	....	....	....	11	16	170—179	1	....	....	....	1	....
	140—149	1	....	....	....	4	30	Above 180	....	....	....	....	1	6
	150—159	....	....	....	....	2	8							
	Above 160	....	....	....	....	2	....							
Total within assumed physiological limits		62	89	80	83	42	38		80	93	84	88	85	82
Total below assumed physiological limits		24	9	8	6	2	....		14	2	16	10	3	....
Total above assumed physiological limits		14	2	12	11	56	62		6	5	....	2	12	18

Tables 4 and 5. These are self explanatory. In table 5 the figures for all boys are not given as they were incomplete. The figure for all girls is, however, the more useful one for comparison with the thyroid cases as so much the greater proportion of the latter are girls. The numbers are percentages cast to the nearest unit.

TABLE 5.

TABLE OF AUGMENTATION IN THE RATE OF THE PULSE UPON A STANDARD EXERTION IN SCHOOL CHILDREN AGED 11—17 (ALL FIGURES CAST IN % TO NEAREST UNIT).

	All Girls	Children with Enlarged Thyroids.			
		O.	S.	H.	E.
—8	....	....	....	1	....
—4	....	....	....	1	....
0	....	....	....	28	49
4	....	....	1	6	17
8	....	8	7	11	....
12	1	24	12	8	11
13—19	1	19	21	7	6
20—29	15	38	44	19	11
30—39	40	19	10	11	6
40—49	30	....	4	5	....
50—59	3	1	1	2	....
60—69	8	....	....	1	....
70—79	1	....	....	....	....
Above 80	1	....	....	....	....
Total within physiological limits	85	57	58	35	17
Total below physiological limits	2	51	41	62	83
Total above physiological limits	13	1	1	3	....

TABLE 6.

TABLE OF MAXIMUM SYSTOLIC BLOOD PRESSURES. (All figures cast in % to nearest unit)

	All Boys aged.							All Girls aged.					Children with Myopia aged 11-17		Children with enlarged thyroids aged 11-17.					
															Class O.		Class S.		Class H.		Class E.	
	11–2	12–3	13–4	14–5	15–6	16–7	11–17	13–4	14–5	15–6	16–7	13–17	Boys	Girls	B	G	B	G	B	G	B	G
			*	*			*						*					*			*	
90—99	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	....	5	4	....	....	....	....
100—109	2	1	4	1	1	....	2	2	2	3	....	2	....	....	30	9	....	8	5	9	....	....
110—119	7	9	18	21	12	4	12	32	12	8	10	15	6	13	30	46	36	27	5	6	....	9
120—129	26	37	28	33	26	14	27	36	45	41	34	39	21	37	10	32	30	32	5	12	....	....
130—139	48	23	36	22	22	18	27	18	27	27	31	26	34	30	10	9	24	18	30	28	....	20
140—149	15	24	11	13	24	26	19	10	9	16	23	14	25	13	10	4	....	6	35	25	....	46
150—159	2	5	3	8	10	24	9	2	5	3	2	3	6	7	....	....	5	4	5	15	....	25
160—169	....	1	....	2	5	14	4	....	....	2	....	1	6	....	....	....	....	....	15	2	100	....
Above 170	....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	3	....	....
Total below 130	35	47	50	55	39	18	41	70	59	52	44	56	27	50	80	87	71	71	15	27	....	9
Total above 130	65	53	50	45	61	82	59	30	41	48	56	44	73	50	20	13	29	29	85	73	100	91

In the columns marked with a * the numbers dealt with are too small to be reliable.

TABLE 7.

TABLE OF MAXIMUM SYSTOLIC BLOOD PRESSURE IN CHILDREN.

		Average Pressure	Mean Pressure
All Boys		145	135
All Girls		130	125
Boys with Myopia		138	138
Girls with Myopia		131	130
Boys with enlarged thyroid	O.	116	114
,, ,, ,,	S.	124	122
,, ,, ,,	H.	141	144
,, ,, ,,	E.	165	165
Girls with enlarged thyroid	O.	120	116
,, ,, ,,	S.	121	123
,, ,, ,,	H.	137	133
,, ,, ,,	E.	143	144

Tables 6 and 7. In the columns of all boys aged 13-14, aged 14-15, all boys with myopia aged 11-17 and of Class E (ex-ophthalmic goitre) the number of observations upon which these figures are cast are not sufficient to ensure freedom from gross error. In the other groups the numbers were sufficiently large, though it will be clear from the figures that in order to reduce the error to anything approaching Zero observations of hundreds of thousands would be required.

ELEMENTARY EDUCATION.

Statistical Tables.

TABLE I.—RETURN OF MEDICAL INSPECTIONS.

A. ROUTINE MEDICAL INSPECTIONS.

Number of Code Group Inspections.

Entrants	1102
Intermediates	989
Leavers	979
TOTAL	3070

Number of other Routine Inspections .. Nil

B. OTHER INSPECTIONS.

Number of Special Inspections ..	1639
Number of Re-inspections ..	3569
TOTAL	5208

TABLE II.—A.—Return of Defects found by Medical Inspection in the Year ended 31st December, 1925.

Defect or Disease.		Routine Inspections — No. of Defects.		Special Inspections — No. of Defects.	
		Requiring treatment.	Requiring to be kept under observation but not requiring treatment.	Requiring treatment.	Requiring to be kept under observation but not requiring treatment
(1)		(2)	(3)	(4)	(5)
	Malnutrition	24	....	5	....
Skin	Ringworm :—				
	Scalp	18	....	107	....
	Body	9	....	36	....
	Scabies	2	....	16	....
	Impetigo	12	....	95	....
	Other Diseases (non-Tuberculous)	137	13	282	1
Eye	Blepharitis	59	....	39	....
	Conjunctivitis	5	....	20	....
	Keratitis	1	2	3	....
	Corneal Opacities	2	....	3	....
	Defective Vision	179	....	4	....
	Squint	129	3	16	....
	Other Conditions	21	2	35	1
Ear	Defective Hearing	101	46	41	7
	Otitis Media	7	2	35	2
	Other Ear Diseases	110	35	227	32
Nose and Throat	Enlarged Tonsils only	25	97	110	51
	Adenoids only	1	19	20	14
	Enlarged Tonsils and Adenoids	6	24	46	7
	Other Conditions	42	63	74	22
Glands	Enlarged Cervical and Sub-max : (non-Tuberculous)	10	42	101	30
	Enlarged Thyroid	66	....	55	....
Speech	Defective	2	7	....	1
Teeth	Dental Diseases	388	....	17	....
Heart & Circulation	Heart Disease :—				
	Organic	1	17	2	6
	Functional	3	70	2	10
	Anaemia	4	1	2	....
Lungs	Bronchitis	6	16	7	3
	Other Non-Tuberculous Diseases	5	35	15	18
Tuberculosis	Pulmonary :—				
	Definite	1	....	3	....
	Suspected	1	2	1	2
	Non-Pulmonary :—				
	Glands	....	....	5	4
	Spine	....	....	....	1
	Hip	....	....	....	....
	Other Bones and Joints	....	1	....	....
	Other Forms	1	....	1	1

TABLE II. A—(Continued).

Defect or Disease.	Routine Inspections. No. of Defects.		Special Inspections. No. of Defects.	
	Requiring treatment	Requiring to be kept under observation but not requiring treatment.	Requiring treatment.	Requiring to be kept under observation but not requiring treatment.
(1)	(2)	(3)	(4)	(5)
Nervous System — Epilepsy	....	2	2	2
Nervous System — Chorea	....	....	1	....
Nervous System — Other Conditions	24	16	28	20
Deformities. — Rickets	....	10	2	....
Deformities. — Spinal Curvature	12	18	5	4
Deformities. — Other Forms	31	20	14	8
Other Defects or Diseases	48	60	438	24

B. Number of INDIVIDUAL CHILDREN found at ROUTINE Medical Inspection to Require Treatment (Excluding Uncleanliness and Dental Diseases).

Group. (1)	Number of Children		Percentage of Children found to require treatment. (4)
	Inspected (2)	Found to require treatment (3)	
CODE GROUPS :			
Entrants	1102	236	21·4
Intermediates	989	282	28·5
Leavers	979	301	30·7
Total (Code Groups)	3070	819	26·7
Other Routine Inspections	—	—	—

TABLE III.—Return of all Exceptional Children in the Area.

			Boys	Girls	Total
Blind (including partially blind).	(i) Suitable for training in a School or Class for the totally blind.	Attending Certified Schools or Classes for the Blind	1	1	2
		Attending Public Elementary Schools	....	....	....
		At other Institutions	....	....	....
		At no School or Institution	5	....	5
	(ii) Suitable for training in a School or Class for the partially blind.	Attending Certified Schools or Classes for the Blind	....	....	....
		Attending Public Elementary Schools.	....	2	2
		At other Institutions	....	....	....
		At no School or Inscitution	1	....	1
Deaf (including deaf and dumb and partially deaf).	(i) Suitable for training in a School or Class for the totally deaf or deaf and dumb.	Attending Certified Schools or Classes for the Deaf.	3	2	5
		Attending Public Elementary Schools.	....	....	....
		At other Institutions	....	....	....
		At no School or Institution	....	....	....
	(ii) Suitable for training in a School or Class for the partially deaf.	Attending Certified Schools or Classes for the Deaf.	....	....	....
		Attending Public Elementary Schools.	3	2	5
		At other Institutions	....	....	....
		At no School or Institution	....	....	....
Mentally Defective.	Feebleminded (cases not notifiable to the Local Control Authority).	Attending Certified Schools for Mentally Defective Children.	4	6	10
		Attending Public Elementary Schools.	4	6	10
		At other Institutions	....	1	1
		At no School or Institution	5	4	9
	Notified to the Local Control Authority during the year.	Feebleminded.	...	4	4
		Imbeciles	3	2	5
		Idiots.	....	....	....
Epileptics.	Suffering from severe epilepsy	Attending Certified Special Schools for Epileptics	2	1	3
		In Institutions other than Certified Special Schools	....	....	....
		Attending Public Elementary Schools.	....	....	....
		At no School or Institution	1	1	2
	Suffering from epilepsy which is not severe.	Attending Public Elementary Schools.	5	4	9
		At no School or Institution	....	....	....

TABLE III.—(Continued).

			Boys	Girls	Total
Physically Defective.	Infectious pulmonary and glandular tuberculosis.	At Sanatoria or Sanatorium Schools approved by the Ministry of Health or the Board.	....	....	....
		At other Institutions	....	....	....
		At no School or Institution	....	....	....
	Non-infectious but active pulmonary and glandular tuberculosis.	At Sanatoria or Sanatorium Schools approved by the Ministry of Health or the Board.	....	....	....
		At Certified Residential Open Air Schools.	....	....	....
		At Certified Day Open Air Schools.	....	....	....
		At Public Elementary Schools	11	2	13
		At other Institutions	....	....	....
		At no School or Institution	....	....	....
	Delicate children (e.g., pre-or latent tuberculosis, malnutrition, debility, anaemia, etc.)	At Certified Residential Open Air Schools.	....	....	....
		At Certified Day Open Air Schools.	....	....	....
		At Public Elementary Schools.	32	47	79
		At other Institutions.	....	....	....
		At no School or Institution	3	2	5
	Active non-pulmonary tuberculosis.	At Sanatoria or Hospital Schools approved by the Ministry of Health or the Board.	....	....	....
		At Public Elementary Schools	2	....	2
		At other Institutions	....	....	....
		At no School or Institution	1	2	3
	Cripple Children (other than those with active tuberculous disease), e.g., children suffering from paralysis &c., and including those with severe heart disease.	At Certified Hospital Schools	....	....	....
		At Certified Residential Cripple Schools.	....	....	....
		At Certified Day Cripple Schools.	....	....	....
		At Public Elementary Schools	17	19	36
		At other Institutions.	....	....	....
		At no School or Institution	3	2	5

TABLE IV.—Return of Defects Treated during the Year ended 31st December, 1925.

TREATMENT TABLE.

Group I.—Minor Ailments (excluding Uncleanliness, for which see Group V).

Disease or Defect.	No. of Defects treated under Authority's Scheme.			Number of def'cts cured	No. of defects remaining under treatm't	No. of attendances at Clinic	No. of Consultations.
	From previous Year	New Cases	Total				
Contagious Skin Diseases—							
Impetigo	4	92	96	96	....	550	197
Scabies	....	16	16	16	....	187	63
Other Diseases	....	5	5	5	....	49	17
Non-Contagious Shin Diseases							
Dermatitis	1	17	18	18	....	73	37
Eczema	1	16	17	16	1	88	43
Seborrhoea	....	35	35	35	....	52	39
Alopecia	1	8	9	8	1	74	14
Abscesses	....	5	5	4	1	58	17
Boils	....	16	16	16	....	80	25
Warts	1	13	14	14	....	105	31
Herpes	....	9	9	9	....	35	15
Urticaria	....	4	4	4	....	7	7
Pruritus	....	1	1	1	....	1	1
Other Diseases	....	28	28	28	....	86	44
Ear, Nose and Throat Diseases							
Glands	....	34	34	33	1	163	73
Rhinitis	....	11	11	11	....	18	10
Tonsillitis	....	18	18	18	....	38	33
Other Diseases	....	20	20	20	....	142	49
Wounds and Injuries—							
Injuries	1	44	45	44	1	331	148
Bites and Stings	....	29	29	29	....	123	49
Burns, Scalds &c.	....	10	10	10	....	36	15
Septic Sores	....	88	88	86	2	475	146
Bruises, Cuts, &c.,	....	62	62	62	....	278	117
Others	....	32	32	32	....	129	54
External Eye Diseases—							
Foreign Body	....	6	6	6	....	19	10
Stye	....	3	3	3	....	7	5
Keratitis	....	3	3	3	....	69	26
Blepharitis	1	36	37	32	5	496	145
Conjunctivitis	....	16	16	14	2	187	68
Pink-Eye	....	6	6	6	....	231	42
Corneal Ulcer	....	1	1	1	....	18	8
Strabismus	....	9	9	9	....	40	17
Other Diseases	....	14	14	13	1	32	21

Group I.—Minor Ailments—Continued.

Disease or Defect.	No. of Defects treated under Authority's Scheme			Number of def'cts cured	No. of defects remaining under treatm't	No. of attendances at Clinic	No. of Consultations
	From previous Year	New Cases	Total				
Infectious Diseases—							
Chicken Pox	....	11	11	11	....	12	12
Measles	....	7	7	7	....	11	7
Rubella	....	11	11	11	....	23	20
Mumps	....	5	5	5	....	7	7
Whooping Cough	....	7	7	6	1	7	7
Diphtheria	....	1	1	1	....	1	1
General—							
Ill-health, &c.	....	50	50	48	2	283	111
TOTALS	10	799	809	791	18	4621	1751

Total Number of Children Treated 658

Group II. Defective Vision and Squint (excluding Minor Eye Defects treated as Minor Ailments—Group I).

Defect or Disease	Number of Defects dealt with.					
	Under the Authority's Scheme.			Submitted to refraction by private practitioner or at hospital apart from the Authority's Scheme.	Otherwise.	Total
	Old	New	Total			
(1)		(2)		(3)	(4)	(5)
Errors of Refraction (including Squint)	174	191	365	....	....	365
Other Defects or Disease of the eyes (excluding those recorded in Group I)	10	18	28	....	....	28
TOTAL	184	209	393	....	....	393

Total number of children for whom spectacles were prescribed :

(a) Under the Authority's Scheme 249
(b) Otherwise ....

Total number of children who obtained or received spectacles :

(a) Under the Authority's Scheme 230
(b) Otherwise 4

Group III.—Treatment of Defects of Nose and Throat.

NUMBER OF DEFECTS.				
Received Operative Treatment.			Received other Forms of Treatment.	Total number Treated.
Under the Authority's Scheme, in Clinic or Hospital. (1)	By Private Practitioner or Hospital, apart from the Authority's Scheme. (2)	Total. (3)	(4)	(5)
109	1	110	232	342

GROUP IV.—DENTAL DEFECTS.

(1) Number of Children who were :—

(a) Inspected by the Dentist :

Routine Age Groups	Aged 3	81	
	4	345	
	5	801	
	6	605	
	7	564	
	8	616	
	9	491	Total 4538
	10	396	
	11	311	
	12	239	
	13	67	
	14	20	
	15	2	
Specials	..	..	.. 152
	GRAND TOTAL		.. 4690

(b) Found to require treatment 3327

(c) Actually treated .. 2481

(d) Re-treated during the year as the result of periodical examination 1059

(2) Half-days devoted to { Inspection 50 / Treatment 355 } Total 405

(3) Attendances made by children for treatment 2909

(4) Fillings { Permanent teeth 590 / Temporary teeth 544 } Total 1134

(5) Extractions { Permanent teeth 167 / Temporary teeth 1633 } Total 1800

(6) Administrations of general anaesthetics for extractions 13

(7) Other operations { Permanent teeth 344 / Temporary teeth 2731 } Total 3075

GROUP V.—UNCLEANLINESS AND VERMINOUS CONDITIONS.

(i)	Average number of visits per school made during the year by the School Nurses	10
(ii)	Total number of examinations of children in the Schools by School Nurses	25621
(iii)	Number of individual children found unclean (mainly Nits in Hair)	1486
(iv)	Number of children cleansed under arrangements made by the Local Education Authority	798
(v)	Number of cases in which legal proceedings were taken—	
	(a) Under the Education Act, 1921	Nil
	(b) Under School Attendance Bye-laws	Nil

TABLE Va.—Treatment of Defects of Nose, Throat, and Ear at Special Clinic.

Number of cases referred for treatment.	Number of Consultations	Number of attendanc's for treatment	DEFECTS.									
			Tonsils considerably enlarged	Tonsils enlarged	Tonsils and Adenoids	Adenoids	Tonsillitis.	Inflam'd Turbinates.	Cervical Glands	Nasal Spurs and Deflections	Nasal Inflamation	Discharging Ears
361	930	2860	65	50	51	33	10	19	75	18	21	91

DEFECTS (CONTINUED).									No. for whom operation for Tonsils and Adenoids was advised	No. who received operative treatment for Tonsils and Adenoids	No. of other operations performed	No. of cases cured	No. of cases remaining under treatment or kept under observation	No. of cases for which no Report is available
Myringitis, Diseases and Perforation of Membranes	Drum destroyed	Tympanic Sepsis	Thickened, Scarred and Opaque Membranes	Indrawn Membranes	Deafness (Slight)	Deafness (Severe)	Wax in Ears	Other conditions						
35	4	8	46	18	42	3	62	13	113	109	1	228	116	17

TABLE V (b).—ELECTRICAL IONISATION.

Number of cases referred for treatment	Number of consultations.	Number of attendances for treatment	DEFECTS.				Number of cases cured.	Number of cases still under treatment or observation.	Number of cases for which no report is available
			Mastoid	Discharging ears	Tympanic Sepsis	Drum destroyed			
15	136	137	1	13	8	1	7	6	2

TABLE VI (a).—Treatment of Ringworm.

Number of cases			Number of Consultations with Doctor	Number of Attendances made by Children at Clinic	Number of Bacteriological Examinations.	Number of cases cured.	Number of cases still under treatment		Number of cases for which no report is available.
Old	New	Total					Attending School	Not attending School	
58	143	201	1193	2367	442	130	68	2	1

(b) X-Ray Treatment of Ringworm.

Number of Cases.			Number of X-Ray Exposures	Number of Cases cured.	Number of Cases remaining under treatment.	Number of cases for whom no report is available.
Offered	Refused.	Accepted				
19	4	15	53	7	8	....

TABLE VII.—Electrical Treatment.

Number of Cases.					Number of Attendances for Treatment.	Disease or Defect.		
Boys		Girls		Total				
Old	New	Old	New			Infantile Paralysis	Naevus	Functional Paralysis.
7	2	10	4	23	375	13	9	1

TABLE VIII.—Summary of School Accidents which occurred during the Year 1925.

(Elementary School Children).

Number of Cases			Total Number of Attendances made by children at Clinic.	Number of cases where treatment was completed at Clinic.	Number of X-Ray Exposures.	Number of cases referred to Hospital or Private Practitioner for further treatment.	Number of cases resulting in permanent disability.
Serious	Minor.	Total.					
6	87	93	393	90	20	3	....

NOTE.—Cases of simple fracture not resulting in permanent disability and cuts requiring stitching, however extensive, so long as no permanent injury but a good scar resulted, are included as minor injuries.

TABLE IX.—SHOWING NUMBER OF CHILDREN DISCOVERED WITH ENLARGED THYROID AT ROUTINE MEDICAL INSPECTION.

ENTRANTS.

Number of Children medically inspected.										Number of Children found to have enlarged thyroid.							
Age 3		Age 4		Age 5		Age 6		Total		Age 3		Age 4		Age 5		Total	
Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
90	72	213	175	207	229	66	50	576	526	1	....	....	2	....	1	1	3

	Number of Children medically inspected.								Number of children found to have enlarged thyroid.					
	Age 7.		Age 8.		Other ages		Total		Age 7.		Age 8		Total.	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
INTERMEDIATES	53	88	462	386	....	....	515	474	4	5	8	12	12	17
	Age	12.	Age	13.	Age	14.			Age	12.	Age	13.		
LEAVERS	129	166	341	341	1	1	471	508	7	14	17	54	24	68

GRAND TOTAL.

Number of children medically examined (All ages).		Number of children found to have enlarged thyroid. (All ages).	
Boys	Girls	Boys	Girls
1562	1508	37	88

TABLE X.—BACTERIOLOGICAL AND OTHER EXAMINATIONS CARRIED OUT DURING THE YEAR 1925.

Number of Bacteriological examinations	....	488
Number of Blood examinations—Histological		142
Number of X-Ray examinations. (excluding treatment of ringworm).	....	69

HIGHER EDUCATION.

Statistical Tables.

Higher Education.

TABLE I.—Number of Children attending the Swindon Secondary Schools, Inspected 1st January, 1925 to 31st December, 1925.

A.—ROUTINE MEDICAL INSPECTIONS.

	AGE GROUPS.								TOTAL
	11	12	13	14	15	16	17	18	
Boys	....	....	....	23	43	53	8	2	129
Girls	11	33	44	69	60	43	27	6	293
TOTALS	11	33	44	92	103	96	35	8	422

B.—OTHER INSPECTIONS.

Number of Special Inspections	....	146
Number of Re-inspections	....	382
Total	....	528

TABLE II.—Return of Defects found in the Course of Medical Inspection in 1925.

Defect or Disease.	Routine Inspections. No. of Defects.		Special Inspections. No. of Defects.	
	Requiring Treatment.	Requiring to be kept under observation but not requiring treatment.	Requiring Treatment.	Requiring to be kept under observation but not requiring treatment.
(1)	(2)	(3)	(4)	(5)
Uncleanliness—Nits in Hair	7	....	....	....
Skin—				
Ringworm—Scalp	....	....	1	....
Non-tuberculous Diseases	4	....	8	....
Eye—				
Conjunctivitis	....	....	1	....
Pink Eye	....	....	1	....
Blepharitis	3	....	2	....
Defective Vision and Squint	73	2	3	1
Other Disease or Defect	4	1	10	....
Ear—				
Otorrhoea	....	....	3	....
Defective Hearing	4	4	4	....
Other Conditions	4	....	4	....
Nose and Throat—				
Enlarged Tonsils	5	9	3	2
Enlarged Tonsils and Adenoids....	....	....	2	1
Adenoids	1	....	....	....
Deflected Septum	1	2	1	....
Other Conditions	1	....	3	....
Glands—				
Enlarged Thyroid	51	....	1	....
Enlarged Glands	....	....	1	2
Heart—				
Defective	3	3	1	....
Anaemia	....	....	1	....
Dental Disease				
Decayed Teeth	138	....	....	....
Lungs—				
Defective	2	1	....	....
Pulmonary Suspected	....	....	1	....
Tuberculosis—				
Skin	1	....	....	....
Nervous System—				
Chorea	....	....	1	....
Asthma	2	....	....	....
Instability and Overstrain	24	1	1	....
Deformities—				
Spinal Curvature	19	1	3	3
Other Forms	4	1	1	....
Other Diseases or Defects	5	....	26	1

TABLE III. CONDITION OF TEETH OF SCHOLARS DENTALLY INSPECTED AT THE SECONDARY SCHOOLS DURING THE YEAR 1925.

VICTORIA ROAD BOYS.

Year of Birth	Number of Carious Teeth.										Number free from Caries.	Total number examined.
	1	2	3	4	5	6	7	8	9	10		
1907	....	....	....	2	....	....	....	....	....	....	1	3
1908	5	1	....	....	....	....	....	....	....	....	2	8
1909	8	9	3	3	1	2	....	....	....	....	9	35
1910	13	11	7	3	1	1	....	....	....	....	10	46
1911	11	5	9	9	4	2	1	....	....	....	8	49
1912	11	15	5	2	....	3	....	1	....	....	18	56
1913	14	13	7	5	....	1	1	....	1	....	16	58
1914	10	4	5	2	....	2	....	....	....	....	7	30
Totals	72	58	36	26	7	11	2	1	1	....	71	285

EUCLID STREET BOYS

Year of Birth	Number of Carious Teeth												No. free from Caries	Total No. examined.
	1	2	3	4	5	6	7	8	9	10	11	22		
1908	1	1	1	....	....	....	....	....	....	....	....	....	....	3
1909	3	5	4	4	2	2	1	....	1	1	....	1	1	25
1910	6	6	5	5	3	6	....	....	1	1	1	....	8	42
1911	3	3	3	3	1	....	....	....	....	....	....	....	1	14
1912	8	11	6	6	3	1	1	1	....	....	....	....	7	44
1913	5	6	4	1	2	1	....	....	....	....	....	....	6	25
1914	....	2	3	....	1	1	2	1	1	....	....	....	4	15
Totals	26	34	26	19	12	11	4	2	3	2	1	1	27	168

TABLE III. (Continued).

VICTORIA ROAD GIRLS.

Year of Birth	Number of Carious Teeth									Number free from Caries.	Total number examined.
	1	2	3	4	5	6	7	8	9		
1906	1	....	....	1	....	....	....	....	....	....	2
1907	....	2	....	....	....	....	....	....	....	....	2
1908	2	3	....	1	1	....	....	....	....	4	11
1909	5	4	6	1	2	....	....	....	1	3	22
1910	7	11	5	3	2	....	2	....	....	8	38
1911	8	11	2	4	5	1	....	....	....	9	40
1912	5	8	4	2	2	1	....	....	2	12	36
1913	5	5	4	3	1	....	1	....	....	7	26
1914	2	5	1	....	....	....	....	....	1	....	9
Totals	35	49	22	16	12	2	3	....	4	43	186

EUCLID STREET GIRLS.

Year of Birth	Number of Carious Teeth										Number free from Caries.	Total number examined
	1	2	3	4	5	6	7	8	9	26		
1907	....	....	....	....	....	1	1	....	....	....	....	2
1908	3	....	....	....	1	....	....	....	....	....	....	4
1909	5	1	....	2	....	1	....	1	1	....	2	13
1910	1	5	2	....	3	1	1	1	....	....	3	17
1911	3	5	6	2	1	4	....	....	....	1	2	24
1912	3	3	3	5	1	....	....	1	1	....	6	23
1913	2	5	4	2	....	1	....	....	....	....	6	20
1914	2	2	....	1	2	....	....	....	....	....	2	9
Totals	19	21	15	12	8	8	2	3	2	1	21	112

TABLE IV.

Defective Vision and Squint (excluding Minor Eye Defects treated as Minor Ailments).

Defect or Disease.	Number of Defects dealt with.					
	Under the Authority's Scheme			Submitted to refraction by private practitioner or at hospital apart from the Authority's Scheme.	Otherwise.	Total
	Old	New	Total			
(1)		(2)		(3)	(4)	(5)
Errors of Refraction (including Squint.)	33	23	56	....	11	67
Other Defects or Disease of the eyes (excluding those recorded in Group 1).	2	2	4	....	1	5
TOTAL	35	25	60	....	12	72

Total number of children for whom spectacles were prescribed :

(a) Under the Authority's Scheme 52
(b) Otherwise 12

Total number of children who obtained or received spectacles :

(a) Under the Authority's Scheme 50
(b) Otherwise 12

TABLE V.—Summary of Accidents which occurred to Secondary School Children during the year 1925.

Number of Cases.			Total Number of attendances made by children at Clinic.	Number of Cases where treatment was completed at Clinic.	Number of X-Ray Exposures.	Number of Cases referred to Hospital or Private Practitioner for further treatment.	Number of Cases resulting in permanent disability.
Serious	Minor	Total.					
3	32	35	116	34	13	1	....

NOTE.—Cases of simple fracture not resulting in permanent disability and cuts requiring stitching, however extensive, so long as no permanent injury but a good scar resulted, are included as minor injuries.

TABLE VI.—Treatment of Defects discovered in Secondary School Children.—Year 1925.

Disease or Defect.	NUMBER OF DEFECTS.					
	Referred for treatment.	Treated.			Not Treated.	For whom no Report was available.
		Under Local Education Authority's Scheme.	Otherwise	Total		
Uncleanliness—Nits in Hair	7	....	7	7	....	....
Skin	13	12	1	13	....	....
Vision and Squint	76	50	11	61	3	12
Eye Disease	21	20	1	21	....	....
Dental Disease	138	16	43	59	53	26
Ear Disease	11	7	3	10	....	1
Defective Hearing	8	7	1	8	....	....
Nose and Throat	17	11	4	15	2	....
Enlarged Thyroid	51	29	13	42	5	4
Enlarged Glands (Non-Tuberculous)	1	1	....	1	....	....
Heart and Circulation	5	4	1	5	....	....
Lungs Defective	2	....	1	1	....	1
Tuberculosis—Skin	1	....	1	1	....	....
,, Pulmonary suspected	1	1	....	1	....	....
Nervous System	28	19	7	26	....	2
Deformities	27	17	8	25	....	2
General	31	29	2	31	....	....

Number of X-Ray examinations	5
Number of Haematological examinations	7
Number of Bacteriological examinations	1

Borough of Swindon

Annual Report

OF THE

Medical Officer of Health

FOR THE YEAR 1925

BY

DUNSTAN BREWER, M.R.C.S., L.R.C.P., D.P.H.

Report of the Chief Sanitary Inspector

FOR THE YEAR 1925.

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Staff.

Medical Officer of Health, School Medical Officer, and Medical Superintendent of the Isolation Hospital.

DUNSTAN BREWER, M.R.C.S., L.R.C.P., D.P.H.

Assistant Medical Officer of Health.

MARION DRAPER, M.B., Ch. B., D.P.H. (Resigned Nov. 1925).
VIOLET KING, M.B., Ch. B. (Temporary).

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A. E. BOTTOMLEY
Certificate of the Royal Sanitary Institute.
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Assistant Sanitary Inspectors

F. H. BEAVIS
Certificate of the Royal Sanitary Institute.
Certificate of the Royal Sanitary Institute for Meat Inspection.
Certificate in Building Construction.

E. PARTRIDGE
Certificate of the Royal Sanitary Institute.
Certificate of the Royal Sanitary Institute for Meat Inspection.

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Miss M. JOHNS
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To the Chairman and Members of the Public Health Committee.

LADIES AND GENTLEMEN,

At the close of 1925, it became the duty of the medical officer of health to submit a detailed account of the sanitary conditions of the town and of the state of the public health service; to review the history of the past five years in so far as the development of public health work is concerned; to indicate the present needs of the town and to forecast the requirements of the immediate future.

Such work cannot be undertaken lightly. No service can be so complete that there is no part of it which might not be better, no history so favourable that it has not to record errors of judgment; prophecies which have been falsified and delays which the future reveal to have been injudicious. It is only by consideration of the failures of the past that we can guard ourselves from repeating them; it is only by admitting deficiencies that we can make progress.

The five years which are covered by this report coincide with the term of office of the present medical officer of health, so that there is continuity during the time under consideration and an abrupt break with the past at the beginning of the period. In comparing this quinquennium with the last, it is important to bear in mind that the period 1916—1920 was widely different from 1921-1925, and if we find, as we shall find that whereas the first period was one of organisation, the latter one of almost uninterrupted progress, we must, in the main, look for this difference in the annals of the general history of Europe.

The year 1925 was a very difficult year for the public health department. Sickness played havoc with the staff in many directions, whilst the continued indisposition of the assistant medical officer caused an almost insuperable barrier to progress. The year was naturally an unfavourable one, especially during the latter months when sickness of all kinds and especially infection, assumed serious proportions, causing long-continued periods of grave anxiety. But on the whole things turned out better than was expected, and as the body of this report will show, the state of Swindon in 1925, compares favourably with other towns somewhat similar to it and not unfavourably with itself in past years.

The meteorological conditions of 1925 were, with the exception of the Autumn which was unusually cold, quite ordinary, and cannot be credited with any direct influence over the health of the people. Only one year of the quinquennium, 1921, was in any way exceptional as regards meteorological conditions. This was the year of the great drought which caused considerable difficulty with the water supply of the town. The experience gained from the study of the drought upon the water supply of Swindon was, however, of immense and permanent value and more than compensated for the slight inconvenience that was caused by the shortage of water.

So much is made of the influence of the weather upon health and in the popular mind so much disease is attributed to changes of weather and exposure that it is well to start a review of the health conditions of the town by a consideration of this question. The advance in our knowledge of the science of medicine has pushed the belief in the influence of climatic conditions upon health into the background and it is questioned by many whether, with the exception of such direct influences as sunstroke and frostbite, the variation of climatic conditions that are met with upon the earth has any direct bearing upon the health of its inhabitants. The rapid advance in the study of tropical diseases has shown us clearly that the unhealthiness of various parts of the earth is not attributable to the unfavourable nature of the climate but to the local distribution of animals and plants which are parasitic upon man. That the body requires adaption to alterations in its physical environment is certain, but modern physiology has proved that the body itself has an almost unlimited capacity to adapt itself to all variations that it is likely to encounter. The only evil influence of the weather in this country upon health is dependent upon the attempts man himself makes to carry out adaptions which Nature, if left alone, will do perfectly without his aid. Injudicious clothing, and more especially artificial heating and the lack of ventilation which goes with it, produce a profoundly injurious effect, so that we find that those suffer most from changes of weather who take the greatest care to try to protect themselves from them.

The employment of the inhabitants of Swindon during the five years was steady, which, considering the general condition of the labour market, throughout the world, is somewhat extraordinary. The number of unemployed upon the register varied comparatively little and never reached the stage when it became a special problem.

The financial condition of the town was, mainly owing to the steadiness of employment, also much more even than would

have been expected. At the beginning of the period prices were, of course, very high, but wages were high also, and as both prices and wages declined the balance was maintained sufficiently level to be without influence upon the health of the population. The uncertainty of the financial outlook, however, was not without influence. The guardians of the town can be credited with having kept a fairly level outlook and did not indulge in those violent fluctuations of depression and elation which, in so many places, added to the difficulties which were unavoidable, and which are liable to have a more evil influence upon public health progress than in almost any other direction. This has enabled the public health department to progress steadily, producing five years of almost uninterrupted improvement in every part of sanitary administration.

The industries of the town are not such as cause any special influence upon the health conditions of the district. The engineering works of the Great Western Railway, which employ either directly or indirectly the great majority of the population, require labour which is not specifically dangerous. The liability to accident is not inordinately severe, and though there is amongst the carriage painters a possibility of lead poisoning, the methods taken for its prevention have in late years proved completely successful.

STAFF OF THE PUBLIC HEALTH DEPARTMENT.

The present staff of the public health department appears on page 2 of the Report. Little change has occurred in the staff during the five years. At the end of 1925 the position of assistant medical officer of health was vacant owing to the resignation of Dr. Draper, and the Council decided to appoint two assistant medical officers, one male and one female, in her place. When the two assistant medical officers are appointed the staff should be quite sufficient to do all work that is at present required or will be required in the immediate future, with the exception of the department of the sanitary inspector, which, owing to the enormous increase of work thrown on it by recent legislation, is inadequately staffed.

GENERAL FEATURES OF THE TOWN.

Swindon, the largest town in Wiltshire, and one of the largest centres of population in the South of England, is situated in the N.E. of the County of Wiltshire, 80 miles East of London, 40 miles West of Bristol and 70 miles North of Bournemouth. It is entirely modern. In the early part of the nineteenth century it consisted of a small village situated on the top of a hill and a few scattered homesteads on the North slope. The removal of the

works of the Great Western Railway from Wootton Bassett to Swindon in 1842 was the cause of the growth of the town, and indeed is still the main reason for its existence. Immediately after the advent of the railway works, building proceeded rapidly, so that in the course of a few years, what had been a small country village became a considerable industrial town. In 1864 the total area of the two urban districts of Old Swindon and New Swindon consisted of 2,200 acres, with a population of 7,200. The two urban districts were incorporated and the Borough of Swindon founded in 1900. The area of the new borough was 4,200 acres and its population 45,000. At the present time—1925—its area has increased to 4,265 acres and its population to 56,880. Since the war, and particularly during the last two years, the town has been growing rapidly and it has long since overflowed its Parliamentary boundaries. The original village of Swindon was situated upon a hill, in a commanding position amidst unusually attractive surroundings. The railway works were placed in the valley at the foot of this hill and, unfortunately, in accordance with the social ideas which ruled in the middle of the 19th century when it was considered essential that employees should live next door to their workshops, the newer buildings were congested in the valley. As time went on, the new Swindon which had sprung into existence around the works grew up to and became continuous with, the older village of Swindon, which had spread downwards to reach it; so that, at the time of incorporation, the division between old and new Swindon was an artificial one. The hill upon which the original village of Swindon was built is 480 feet high. It is formed by an outcrop of the Portland beds and consists mainly of Purbeck limestone. Half way up the hill there is a boggy stratum, consisting of clays about 20 feet thick and above that, forming the summit of the hill, is a deposit of loose green sand. Below the Portland beds, cropping out at the base of the hill and forming the whole valley on which the newer part of Swindon is built, is the deep, absolutely impervious, kimmeridge clay. Towards the North of the town, forming the upper part of Gorse Hill the clay is overlain by coral rag. On the South side of the hill, the town has spread down upon the slope, but the borough boundary ends before the clays on the South side reach the surface. The upper parts of the town though dry and free from fog, are exposed to cold winds from the North and to warm wet winds from the Channel.

The lower part of the town is colder and damper and liable to mists. The climate is generally bracing and dry and its rainfall low (28.05in.) though heavy falls of rain are not infrequent.

As might be expected from the date of its building, Swindon is severely handicapped by bad planning and the narrowness of

its chief thoroughfares : but fortunately the buildings are generally low, few being of more than two stories ; the houses, with very few exceptions, are supplied with back gardens, generally of moderate size and usually with small front gardens ; and not being particularly smoky, the town is more open and better ventilated than most industrial towns of the same size. The industries of the town do not produce much smoke, and coal being expensive, domestic smoke is not excessive. These factors, combined with the high amount of natural sunshine and the fact that the town is surrounded by many miles of country district without any large centres of population, render the town clean and bright. Though parts of the town are crowded and some blocks of property would be better for removal, Swindon has no slums, and of recent years the Town Council has very wisely reserved considerable areas as open spaces and playing grounds. Consequently the town suffers less from its bad original planning than most towns of similar date. The health statistics of the town bring out very forcibly the advantages which have been gained by keeping the town open and free from smoke. For instance, rickets, the great Nemesis of darkness, is almost non-existent.

SWINDON'S WATER SUPPLY.

The following critique of the water supply of Swindon was written in September, 1924, in the form of a report (which up to the present has not been presented), and will serve to show the position which was ruling at that date.

The water supply of a town to satisfy public health requirements must be abundant in quantity ; cheap in price ; constant in supply ; free from metallic contamination ; not overburdened with mineral matter ; quite free from animal pollution ; and the whole system so administered that any occasional or accidental source of pollution can be detected and remedied forthwith. Let us see how Swindon stands in relation to these requirements.

1. Quantity of Water.

It appears that prior to 1920 there was a shortage of water in Swindon and to remedy this the extension of the Ogbourne Works was undertaken. It was presumed that by driving adits at Ogbourne an abundant supply of water would become available. Experience has proved that this assumption was correct. It appears now that possibly up to 2,000,000 gallons per day could be obtained from Ogbourne, and that the amount that is derived actually from that source is limited, not by the under ground supply, but by the capacity of the pumps and mains to

deal with it. The quantity of water required may be estimated at 20 gallons per head, and as the population to be supplied is at present about 70,000, roughly about 1½ million gallons per day is the maximum quantity which is desirable at present. Ogbourne alone could satisfy this demand altogether apart from the second supply from Wroughton; so that as regards quantity of water Swindon is in a very favourable condition, and can not only supply its present needs, but has a margin for very considerable extension.

2. Price of the Water.

For domestic purposes, water is generally charged for at a flat rate of so much per house according to its rateable value. This is the best method and it obtains in Swindon. Even so, it is always advisable for a corporation to reduce its water charges to the minimum; if necessary, to a minimum which renders the undertaking unprofitable.

3. Constant Supply.

Swindon has a constant water supply. Amongst other advantages of the constant supply is that it does away with household tanks, always possible sources of local contamination.

4. Metallic Contamination.

The only metallic contaminations of water which are important are excessive iron and the presence of lead. As regards the first, this is generally derived from the strata. In Swindon there is no trouble in this direction. Nor have we any trouble in regard to lead; the water is not plumbo-solvent, and no trace of lead has ever been detected, either in the main supply or in the local house supply.

5. Mineral Matter.

Swindon water is somewhat heavily charged with mineral matter, producing a high degree of hardness and incrusting power. This hardness is perennially being accused of producing ill health, but it cannot be said that any interference with health is traceable to this source with one slight exception to be mentioned later. The mineral matters which occur in water are of two classes: (1) those which produce temporary hardness and are thrown down on boiling, and (2) those that produce permanent hardness; mineral matter which cannot be precipitated. From a public health point of view the former is of some importance; the latter is of great importance. Temporary hardness of water

does not assume public health importance until it reaches 25 degrees. The waters, both at Ogbourne and at Wroughton are constant in their temporary hardness between 19 and 20 degrees, the latter figure never being exceeded. Permanent hardness assumes public health importance when it is above 5 degrees. The waters at Ogbourne vary somewhat in their permanent hardness, generally being between 2 and 3 degrees, sometimes reaching 4 degrees; the highest reading obtained is 4.2, the lowest 2.5. Wroughton waters have a higher degree of permanent hardness, averaging about 4.5. The highest reading obtained was 5.2, on one occasion only; the lowest is 4 degrees; so that on the score of mineral content Swindon water will pass easily.

6. Freedom from Animal Pollution.

This is the most important of all matters in connection with the public water supply, and is one upon which it is always difficult to give a judgment unless continuous evidence over a long period is available. One cannot judge the purity or otherwise of any water (save such as is obviously foul) from a single chemical or bacteriological examination, and one cannot be contented of the purity or otherwise of a supply unless he has a long series of analyses extending over a considerable period of time which includes periods of drought and flood. As regards the chemical analyses, the point to look for is not the actual figures, but the extent to which they vary. Prior to 1920 I am not in possession of sufficient evidence to express an opinion; such evidence as I have being fragmentary and in some directions faulty; but since the beginning of 1921 I have before me complete evidence to enable me to express an opinion upon the organic purity of our water. This period includes the time of the great drought, so that its evidence is of the greatest value in that it tells us the state of purity of the water under ordinary and under most exceptional circumstances. So far as the water supply is concerned the drought may be said to have existed from April, 1921 to February, 1922.

The bacteriological analysis of water is of far greater importance than the chemical analysis. By it pollutions can be detected with great delicacy and rapidity. But in order to obtain a clear estimate of what meaning is to be attached to a bacteriological report, some knowledge of biology is necessary. Biological phenomena cannot be expressed in figures of mathematical accuracy as chemical percentages can be. The points which are of the greatest importance are: the number of micro-organisms which grow at blood heat, and the relation they bear to the total number of organisms which grow at room temperature. The organisms which are found in water are mainly surface growing

bacteria and moulds, which of themselves are of no public health importance. There are also present in all waters certain organisms which will grow at body heat and which are mainly derived from animal sources ; but they are not all so derived, a few of the surface organisms, generally less than 1 in 40, having the power to grow at blood heat also ; so that a water which contains less than 1 blood heat growing organism to 40 room temperature growing organisms may be considered free from animal contamination. All organisms that are derived from animal sources grow at blood heat, though some of them will grow at room temperature as well ; but one may generally roughly estimate the extent of animal pollution by the number of blood growing organisms above 1/40th of the number of room temperature growing organisms. The organisms derived from animal sources are not necessarily of themselves of importance, the vast majority being harmless, but they are an indication that they may be accompanied by disease producing germs. None of these organisms of animal origin are happy in water and all tend to die out quickly. Fortunately the disease germs are the most tender and die out before the harmless ones ; so that animal contamination of water can be detected after it has really ceased to be dangerous. Midway between the disease organisms and those that are harmless stand the organisms of the coli group, The bacillus coli is a normal inhabitant of the bowel of every warm blooded animal where it exists in the greatest profusion. In its normal position in the bowel it is harmless, if not useful, but it is a potent cause of disease should it penetrate the abdominal canal. Its presence in water is, of itself, perfectly harmless but it is an indication that faecal pollution has occurred comparatively recently so that if it is found in water in any quantity it is a danger sign. If found, as it generally is, in minute numbers and in a degenerate condition it is a sign that faecal contamination has occurred in that water but is probably no longer harmful. Animal contamination is, of course, a very bad point in any water, but from a public health point of view it is only contamination of human origin which is really dangerous. Unfortunately at the present time we cannot generally distinguish human from animal faecal contamination so we presume all contamination to be human and dangerous unless proved otherwise.

Take the Ogbourne waters first. From February 1922, up to the present (August 1924) the water has been of exceptional and persistent purity. Its chemical contents have been constant and its bacteriological condition has been in every way exceptionally favourable. Since the end of the drought in 1922 the maximum number of blood growing organisms present in the water has been 2 per c.c. ; twice out of three times it has been zero. On one occasion only has it been in a greater proportion than 1 in 40 of

room temperature-growing organisms. On that occasion the readings were 9 room-temperature-growing organisms to 1 blood-heat growing-organism—a water which is practically sterile. On no occasion has the bacillus coli been detected. Since February 1922, therefore, Ogbourne water has been perfectly free from any form or organic contamination. If we take the period of the drought—April, 1921 to February, 1922—we find that the number of surface organisms increased from very few in April, May and June to a maximum of 7,000 in November and very high figures from then until the end of February. One found that the number of blood-heat growing organisms increased also, but generally only in the right proportion to the room-temperature-growing organisms. Yet there were exceptions to this. In July the proportoin was 1 in 6 ; in January it was 1 in 5 ; on four occasions the bacillus coli was present, once in the proportion of 1 in 100 c.c., twice of 1 in 50 c.c., and once 1 in 10 c.c., all extremely minute quantities, and these were accounted for, as also was the increase of the blood-heat-growing organisms, by heavy rain following long periods of drought, washing contaminated matter into the well. There is reason therefore to believe that during the period of the drought the underground water supply of Swindon was not contaminated. The importance of this is most obvious, and in order to be sure of the facts the greatest attention was paid to the condition of the waters during the period. As the drought continued the underground reservoir was shrinking rapidly. Thus the waters would become concentrated. Moreover the shrinking of the underground stream would cause suction in the water-bearing strata, so drawing into itself any liquid that might filter into the rocks or penetrate directly from fissures, etc. In this way sources of contamination which, when the flow was abundant would be so diluted as to be quite undetectable, would become apparent. Thus suppose the effluent from a sewage works were finding its way into our underground supply, say twenty miles off, it would probably not be evident under normal circumstances, but under the special circumstances ruling at the end of the drought it would have produced marked evidence of its existence. The fact that Ogbourne waters came through so well from this strenuous and exacting test leaves me satisfied that the supply we have from this source is one of exceptional and trustworthy purity.

Turning now to the waters at Wroughton one finds that taking the period since the drought the water has varied considerably in its composition and bacterial content ; the room-temperature growing organisms have varied from 10 to 3,950 and the blood-heat-growing organisms from none to 40. Generally speaking the blood-heat-growing organisms are about twenty times as numerous as they are in the Ogbourne water and generally they

considerably exceed the allowable proportion of one blood-heat-growing organism to 40 room-temperature growing-organisms. The bacillus coli is generally present, occasionally in numbers which suggest danger. One must therefore presume that the water at Wroughton is subject to permanent, though slight, animal pollution. When one turns to the period of the drought we find that its influence upon the bacteriology of the waters of Wroughton was diametrically opposite to what it was on those at Ogbourne, the drought producing upon the Wroughton waters a sterilizing action. This apparent paradox is explainable by the fact that during the period of the drought no surface waters penetrated to Wroughton. At the end of the drought when the surface waters began to percolate the bacterial condition of the water became bad and from time to time it is found in Wroughton that when a dry period is followed by a wet period the quality of the water deteriorates considerably. In other words the waters at Wroughton behave like a surface water or shallow well, and it is perhaps best to consider Wroughton water as a shallow well water. It therefore appears that the Wroughton waters are much less pure than those of Ogbourne, and the question might be asked, whether it would not be advisable to abandon the former source of supply for domestic purposes seeing that we have an abundant supply at Ogbourne ; but when we come to consider the future of the water supply we see clearly that such a line of action would be dangerous and possibly disastrous. As regards the nature of the pollution at Wroughton we have no definite proof, but it appears probable that it is due to cattle farms upon the collecting ground. If we could definitely exclude human pollution we should be relieved of a certain amount of anxiety, but unfortunately this is not practicable at present. Chlorination renders the water at Wroughton quite safe for drinking purposes, but it is clear that under any circumstances some form of sterilization is necessary at Wroughton.

Chlorination produces a sterilizing effect upon water, but it must not be presumed that complete sterilisation can be effected by the addition of such quantities of the re-agent as it is safe to use. Its effects upon the Ogbourne water is practically nil, but upon the Wroughton water its effect is considerable ; so that its total effect upon the combined water supply of the town is to render it about equal to the raw Ogbourne waters. There are, however, some important considerations ; thus, when the water is exceptionally charged with organisms it is hardly possible to supply the town with water that is at the same time acceptable on its bacterial count and not overcharged with chlorine. This occurred on one important occasion towards the end of March, 1922. It has been mentioned that the termination of the drought rendered Wroughton waters comparatively foul and for a short period we could not obtain a satisfactory town supply, even with chlorination pushed to the limit of safety.

ADMINISTRATION.

It is a golden rule that when you have anything good it pays to look after it, and when you have anything indifferent it pays either to improve it or abandon it. Swindon, having an excellent water supply, should guard it with every possible care ; nor is this particularly difficult. However pure a water supply may be, it is always liable to accidental contamination, and it is therefore necessary to keep a strict watch upon the water in order to detect at the earliest possible moment any sources of contamination. It is particularly necessary to discriminate between contaminations in the supply itself and those which originate after it is taken from the earth. The former are very difficult to locate and are practically beyond our power to remedy. Where they occur they can only be dealt with by a process of mitigation. We have seen that at Ogbourne they do not occur. Most contaminations occur from fouling of the water in the immediate vicinity of the waterworks or in its transit from the waterworks to the mouth of the consumer. Practically all such sources of contamination can be traced by dead scientific reasoning (if the proper evidence is available) and can be suppressed immediately. It is important for all who are concerned with the water supply to recognise these three facts ; firstly, that contamination may occur at any time anywhere ; secondly, that contamination of the source is rare, and thirdly, that all other contaminations can be traced and remedied without fail.

The methods at present in vogue at Swindon for watching the water supply are good, but there are one or two matters which I think should be mentioned. First, it has already been mentioned that after the period of the great drought the first flood caused the waters at Wroughton to be unsatisfactory, and we were unable to render them satisfactory with the use of chlorine. Does not this suggest that if a similar state of affairs occurs again it would be advisable not to use the waters of Wroughton until they have returned to their average condition ? Another point of importance is this. The water at Ogbourne is obtained from the lower chalk, which is itself overlain by the middle and upper chalk, which in its turn is covered by very varying thicknesses of pervious and impervious strata. In the neighbourhood of the waterworks the upper chalk is practically bare, being covered only by surface soil. The special danger to water from the chalk is that this rock is particularly liable to fissure. It is true that as there are at least three strata of chalk, fissures are scarcely likely to occur right through all layers direct ; but this is not an impossibility ; and where the chalk comes to the surface as it does in the neighbourhood of Ogbourne Waterworks, it should be considered as a practical possibility especially so in the neighbourhood of the adits. For the adits themselves may cause settlements

or movements of the rock and so open up fissures direct from the surface into the adit. For these reasons it would be advisable for Swindon to consider seriously the purchase of as much land as possible surrounding their waterworks, more particularly of the land which lies immediately above the adits, so that we could control the surface ; for should cracks occur in the chalk in the neighbourhood of the adits it might be of vital consequence to keep the land above free from any possibility of animal pollution.

In the early part of August, 1924, a bacteriological examination of water from Hargreaves' Well showed a high degree of animal pollution, the blood-heat-growing organisms reaching 200 per c.c. a proportion of 1 in 2½ to the room temperature-growing organisms, and the bacillus coli was present in 5 c.cm. This is a foul water. At the same time an examination was made of the mixed Ogbourne waters taken from the tap in the engine house. This showed 15 per c.cm. blood-heat-growing organisms and the bacillus coli present in 20 c.cm., but the same proportion or practically the same proportion of blood-heat-growing organisms to room-temperature-growing organisms. This shows that the foul water from Hargreaves' Well had been diluted with a pure water. Unfortunately we had no analysis of the water from the main well, but the two analyses that we have show definitely that a serious pollution had occurred in Hargreaves' Well but not in the main supply. The cause of this was not difficult to trace. It was due to the faulty covering over Hargreaves' Well ; either bird droppings upon the well cover had been washed through the cracks into the well or else somebody with dirty boots had walked over the well cover, or something of a similar nature had occurred, so that though a condition which was very alarming had arisen the trouble could be quickly eliminated by a very few minutes' work. This, however, suggests that all the wells should be covered with permanent watertight lids.

Though the water supply of Swindon at present is good and abundant, we must face the possibility that in the future it may be less abundant. It is true that under the waterworks at Ogbourne is running a stream of almost unbounded capacity, but this stream is not the property of the Swindon Corporation, and it is not likely that Swindon will be the only waterworks to extend its tapping into the supply. One can clearly see that with the growth of population and the increasing need for a good and abundant water supply many local authorities will turn towards this water in the lower chalk to supply their needs, so that eventually we may find that the supply at Ogbourne will permanently shrink. The Wroughton supply is hardly likely to be drawn upon by any other body, so that Swindon is particularly fortunate in possessing this. But even so we must face the problem that confronts prac-

tically the whole of the country that as time goes on the demand for water will exceed the supply. At present nine tenths of the available water supply in this country runs to waste. Our rainfall is quite sufficient to supply water in almost any quantity to an almost unlimited population, but unfortunately very little use is made of the majority of the rain that falls. There is every reason why rain water should be conserved and used by the population at large. For most purposes it is in every way superior to any underground water. For drinking purposes it is in towns untrustworthy, though generally in Swindon, except after times of drought, it is fairly pure. From the public health point of view it is generally superior for personal washing. The only fault on public health grounds that I have been able to find with the Swindon water supply is its hardness for washing the skin.

This causes roughness of the skin, chiefly in babies, which sometimes goes on to the production of skin disease. I am not sure whether this roughness is produced actually by the lime in the water or by the precipitation of soap which occurs as a result of the lime. The latter I think more probable. At any rate the useof rain water for washing materially inhibits the production of this condition.

Swindon can do something to encourage its citizens to use rainwater, and as it may become essential for them to do so it is advisable to establish the habit before it becomes a necessity. Two means which can be adopted are to encourage the collection of rainwater and to educate the rising generation in the advantages of using it.

A SERIES OF ANALYSES OF SWINDON WATER.

These analyses are consecutive. Only analyses taken from special parts for special purposes are excluded.

Ogbourne Water. (Before Chlorination).			Wroughton Water (Before chlorination).			Water after Chlorination.		
Room Temp. organs. per c.c.	Blood heat organs. per c.c.	Bacilli coli per 100 c.c.	Room temp. organs. per c.c.	Blood heat organs. per c.c.	Bacilli coli per 100 c.c.	Room temp. organs. per c.c.	Blood heat organs. per c.c.	Bacilli coli per 100 c.c.
73	0	0	103	9	10	4	0	0
70	1	0	214	7	1	120	1	0
43	0	0	112	4	0	85	0	0
23	0	0	28	4	0	17	0	0
83	0	0	128	14	1	30	0	0
25	0	0	300	40	2	25	0	0
305	2	0	180	10	20	8	1	0
68	1	0	147	10	10	27	0	0
76	0	0	200	1	20	5	0	0
42	0	0	105	5	0	31	0	0
24	2	0	18	4	0	61	0	0
60	0	0	81	15	0	31	0	0
9	1	0	3950	8	10	7	0	0
12	0	0	610	36	100	10	0	0
10	0	0	32	1	20	4	0	0
			27	4	10	7	2	0
			30	0	0			
			24	2	1			
			132	20	1000			
			10	10	0			
			46	11	1			

MINERAL MATTER IN SWINDON WATER. A consecutive Table of Estimations of Temporary and Permanent Hardness.

OGBOURNE		WROUGHTON		TOWN WATER.	
Temp.	Perm't.	Temp.	Perm't	Temp.	Perm't.
19.5	4.2	19.9	5.2	18.6	4.9
19.5	2.8	19.8	4.9	19.6	4.4
19.6	3.8	19.8	4.6	18.6	4.1
19.6	2.5	19.3	4.5	18.5	4.4
18.4	2.5	19.3	4.6	19.1	4.6
19.9	2.8	19.6	4.8	18.8	5.2
19.6	3.6	19.8	4.6	18.2	5.0
19.9	3.4	19.9	4.2	19.1	3.8
19.8	2.8	19.8	4.2	16.5	4.8
20.2	4.0	19.6	4.0	17.7	4.8

The diminution in the temporary hardness which occurs between the source and the consumer is due to the escape of carbon dioxide precipitating a certain amount of calcium carbonate.

A SERIES OF CONSECUTIVE ANALYSES SHOWING THE NITROGEN CONTENT OF THE WATERS OF OGBOURNE AND WROUGHTON.

	OGBOURNE.			WROUGHTON.		
	Free Ammonia estimated as $N.O_3$.	Albuminoid Ammonia estimated as $N.O_3$.	Oxydized Nitrogen ($H.N.O_3$.) est'd as N.	Free Ammonia estimated as $N.O_3$.	Albuminoid Ammonia estimated as $N.O_3$.	Oxydized nitrogen ($H.N.O$.) estimated as N.
	0	.0007	.14	0	.0020	.14
Period of Drought.	.0022	.0007	.09	0	.0031	.14
	.0056	trace	.04	0	.0048	.12
	.0050	.0014	.02	0	.0008	.03
	.0046	trace	.07	0	.0029	.07
	.0007	.0017	.11	0	trace	.04
	trace	.0011	.07	0	trace	trace
	.0028	trace	.04	0	.0008	.07
	.0011	.0010	.11	trace	.0007	.05
	0	.0015	.12	0	.0011	.11
	0	.0017	trace	0	trace	.12
	0	.0017	.11	0	.0011	trace
	0	.0013	.12	0	.0003	.09
	0	0	.11	0	.0006	.12
	0	.0032	trace	0	.0010	.14
	.0010	.0006	trace	0	.0006	.14
	0	.0021	.05	0	.0038	trace
	0	.0010	0	0	.0022	.11
				0	.0024	.14

NOTE.—The great chemical purity of Wroughton Water during the drought

Wroughton water contains no Free Ammonia at all, all its free ammonia being oxydized to $H.N.O_3$.

Free ammonia varies in inverse ratio to $H.N.O_3$. The important point is the nitrogen content. To estimate this, 17 parts ammonia equals 14 parts $H.N.O_3$. (estimated as N.)

Nitrogen in water is not necessarily derived from organic matter. It is abundant in certain rocks.

Albuminoid Ammonia is generally of vegetable origin.

The chief practical use made of the chemical analyses is to enable local contaminations to be traced. If the water is not fouled between the source and the consumer the nitrogen content will be the same in the samples taken at the well and from the taps ; if it has been fouled the nitrogen content will be increased. As a matter of fact the fate of nitrogen in water is so complicated—being liable to oxidation, reduction, absorption from the air, discharge back again into the air, and entrance into complex compounds which do not give the reactions for ammonia, albuminoid ammonia, nitrites or nitrates, and so do not appear in the chemical analyses at all—that we scarcely worry about it, except, for the decision whether a water is fit for drinking purposes or not.

Month 1921.	Rainfall 4	Ogbourne Water (Raw) Organisms. Room 1	Blood 2	Coli 3	Wroughton Water (Raw) Organisms. Room 1	Blood 2	Coli 3	Town Water (Chlorinated) Organisms. Room 1	Blood 2	Coli 3
January	2.865	9	0	0	219	29	1000	27	0	0(a)
February	.315	812	95	2	24	11	2	0	0	0
March	1.660	5	0	10	63	10	10	0	0	0(b)
April	.600	15	1	0	9	2	0	5	0	0
May	2.125	0	0	0	9	1	0	13	2	0
June	.170	14	1	0	12	5	1	7	0	0
July	.400	375	63	1	9	2	0	84	0	0
August	1.375	358	61	0	25	3	0	1600	30	0
September	2.335	4250	20	0	5	1	0	500	12	0
October	1.175	2800	70	0	140	0	0	114	5	0
November	1.810	7000	100	2	11	0	10	1540	1	0(c)
December	1.715	4050	1	2	29	0	0	3040	4	0
January 1922	2.695	700	140	10(5)	14	0	0	1700	30	1(d)
February	3.145	3100	150	0	50	0	0	1090	3	0
March	2.405	10	0	0	1150	60	5(6)	1200	170	5(e)
April	2.745	10	0	0	innumerable.	68	2	800	1	0

NOTES. (a) There is no satisfactory explanation of the unusual count from Wroughton. It was this report which led me to prosecute a critical inquiry into Swindon Water.

(b) The reported presence of B. Coli in the Ogbourne water was possibly an error due to accidental contamination.

(c) The reported presence of B. Coli in the Wroughton water was possibly an error.

(d) B. Coli in this instance was derived from Ogbourne.

(e) In this instance chloros failed to produce a satisfactory water. (See Text).

1. No. of organisms growing on gelatine at room temperature per c.c.
2. No. of organisms growing on agar at blood heat per c.c.
3. No. of Coli organisms growing on agar at blood heat per 100 c.c.
4. Figures for Wroughton.
5. This count is caused by " Cover contamination." Similar counts occur from time to time at Ogbourne when heavy rain follows a long dry period. The explanation is washing of bird droppings, dirt, etc., through the interstices of the well cover.
6. A heavy rainfall clears Ogbourne water, which is a deep water liable to local limited surface pollution ; it fouls Wroughton water, which is of the nature of a surface water throughout.

Since the above was written, the Wells at Ogbourne have been supplied with impervious covers and no contaminations of the water have been registered. The waters of Ogbourne have retained consistently their excellent purity and those of Wroughton have maintained more or less continuously the same characters as are detailed in the critique.

The following report on the tainting of the water which occurred in July, 1924, is of interest, for tainting of a minor degree had caused much rumbling discontent in past years, which the measures taken after this somewhat severe dose, appear to have suppressed permanently.

A REPORT on the tainting of the Water Supply which occurred in Swindon on the 2nd, 3rd and 4th July, 1924.

Returning from a Conference in London on the evening of July 3rd, I found that the water supply of part of the Borough was seriously tainted. On arrival at my office on the morning of the 4th, I investigated the position and found that there had been numerous complaints from various citizens on the previous day ; that the first taint of the water was noticed on the evening of the 2nd ; that the trouble was limited to that part of the town supplied by the high main from Ogbourne ; that a new cover, recently creasoted, had been placed over Hargreaves' Well ; that the taint of the water had been presumed to be due to the creasote from this cover being washed into the waters, and that the cover had been removed.

The position left me far from satisfied. The taint of the water did not suggest to me contamination with creasote and as the removal of the suspected cover had produced no amelioration it was obvious that the condition required to be tackled in a scientific manner and remedied without delay. For this it was necessary to obtain an analysis of the water to decide definitely the nature of the offending ingredient. Mr. Bird, the analyst, was away and, as it was Trip Day, the usual channel for obtaining water analysis was not available. The matter being urgent, I asked Mr. Hartley of the Technical School if he could let me have an opinion upon the nature of the contamination sufficiently definite for me to act upon. Within ten minutes I obtained the required information. The water contained Hypochlorite of Soda in comparatively large quantities giving a marked reaction with the ordinary qualitative test. Since creasote does not contain this substance it was clear that the new cover was not the source of the trouble. As chloros which is added to the Swindon water consists of Hypochlorite of Soda it was extremely probable that that substance had been added in excess and spoiled the water.

During the morning of the 4th. complaints were numerous, both from private citizens and from manufacturers and tradesmen who were finding the undrinkable state of the water interfering seriously with their business. I was unable to go to the Waterworks myself but asked Dr. Draper and Mr. Cutting to investigate the matter and bring back with them the chloros bottle. They told me that they had detected no smell from the Hargreaves' Well nor from the main well, but that there was a very strong smell from the well which receives the waters after they have been mixed with chloros. The chloros apparatus being removed, the nuisance diminished rapidly and ceased entirely in ten hours. The proof that the trouble was caused by excess of chloros was therefore absolute so it remained to be determined how this excess had come about. This was not easy. At the time the chloros bottle was removed it should have been delivering five pints in the twenty four hours; actually it was proved by experiment that it was delivering nearly nine pints. This excessive quantity would not be sufficient to account for the very high charge in the town water of the 2nd and 3rd July. It was possible that the sample of chloros in use was more highly concentrated than usual, for this substance varies very greatly in its chlorine content, but it was found on analysis that the chloros then in use was slightly below and not above the standard. I therefore attempted to find out whether some human error had occurred, such as spilling of a carboy into the water supply or the refilling of the bottle to make up for too rapid dropping, etc. I was unable to find out anything definite.

Though the treatment of impure water supplies by the addition of chlorine is old, it was during the course of the War that it became prominent, and it was proved by conclusive evidence that chlorine could be added in small quantities to drinking water without rendering it unpalatable or in any way immediately deleterious; and that the addition of such small quantities of chlorine had a sterilising effect upon the water, enabling comparatively foul waters to be rendered fit for human consumption.

The application of this principle to water supplies which were doubtful as regards their purity was obvious, and it has become a wide-spread custom to treat public water supplies with chloros, using this method not only to improve water which, in a raw state, is either dangerous or doubtful, but also for waters which are essentially pure, as an added precaution against accidental contamination.

Of recent years, however, some doubt has been thrown upon the safety of the process. That it acts as an efficient steriliser to the water and is free from obvious or immediate dangers to health is not questioned; but it has been pointed out that the

proper treatment for contamination of the water supply is to discover its source and to suppress it, and that the injudicious or indescriminate use of chloros might be used as a cloak for inefficient administration. Moreover research into the effects of the addition to food stuffs of chemical preservatives has opened our eyes to the fact that the continued ingestion of chemical substances, even in quantities which are incapable of detection by chemical means, may in the course of time produce serious damage to health.

Since of all food-stuffs water is the most important ; is consumed in the largest quantity and is one for which nothing else can be substituted, it would follow that of all substances it is that with which it is most dangerous to tamper. It must be said that so far no deleterious effect has ever been brought home to chloros if properly used. It has been stated that the addition of chloros to water is the cause of the marked increase of goitre in so many parts of the world. At the present time we are unable to say whether this is true or not, but I can say that the investigations into the subject of goitre which are being prosecuted in Swindon lead me to exonerate the chloros treatment of the local water supply from any share in the production of this disease. Yet as future research may determine that the chloros treatment has an injurious action upon health in that or some other directions it is worth considering where we should stand should the chloros treatment have to be abandoned.

However the future may decide as regards the safety, or otherwise, of the chloros treatment it is obvious that where it is employed it must be safeguarded against excess. The reagent fortunately carries its own danger signal, its flavour being so powerful that very slight excess renders the water nauseous and so giving rise to immediate complaint. It does not appear that such slight excess of chloros as would render the water nasty in taste has any deleterious effect upon the public health, but if the excess is great, damage to those whose digestion is precarious, or who are sick becomes probable. Under any system, slight excesses may be expected from time to time though great excess should not occur and the machinery to prevent it must be absolute. During the time I have been Medical Officer of Health there have been two or three occasions when slight excess of chloros has appeared in the water, but on only one occasion, *i.e.*, the present, has the excess been of a serious nature.

The method in vogue at present for the chlorination of the Swindon waters is crude and experimental, depending to a great extent upon the human element of control ; yet if the human element is administered efficiently it is quite as reliable as any more

scientific or mechanical method. I believe that when the present system was introduced it was looked upon as a temporary expedient to be replaced by a more permanent system should it prove experimentally successful. One must refer to its working on the Wroughton water for evidence of the utility of the process, and here we find that not only has it achieved its purpose and so proved its value, but it has given so little trouble and been so reliable, that the question of replacing it by a more permanent plant has not so far called for urgent consideration. The Ogbourne waters, owing to their purity, have not offered a similar scope for research into the value of the treatment, but here also the apparatus in use has given very little trouble. Still it has given trouble and in July of the present year the trouble was serious. It would appear, however, that if the human control over this apparatus were made more definite and precise, trouble can be avoided. The fact that in the present circumstances grave excess of chloros found its way into the Ogbourne waters and that investigation failed to find accurate explanation as to how the excess got in is proof that the human control of the apparatus at Ogbourne is faulty. It appears to me, however, that with little trouble and little expense the human control at Ogbourne can be made practically perfect, as it is indeed at present at Wroughton.

If we stop to consider whether the time has arrived for the installation of a permanent chlorinating plant we must consider the matter in all its bearings. It is certainly apparent that a permanent plant is quite as liable to go wrong as our own experimental plant, and that it is necessary to instal apparatus both to chlorinate and to dechlorinate the water to insure automatic safety. The installation of such a plant would, of course, involve expense, but the question of expenditure by itself in such a direction should not weigh with us too seriously, if we are satisfied that the installation is advisable, likely to be satisfactory and not liable to be scrapped at a future date. There are two factors which might render the apparatus obsolete ; the first is the abandonment of chlorination upon health grounds ; the second is the decision to soften the water. All softening processes produce a sterilising effect upon water, so that if at a future date it were decided to soften the Swindon waters, the chlorinating plant would become unnecessary. What probability there may be of Swindon installing a water softening plant I cannot say ; and as it is not indicated on public health grounds, it is outside my province to express any opinion upon it.

Upon public health grounds, in the present state of our knowledge I am satisfied that the present method of chlorination can be safely continued if the human element at Ogbourne is furbished up into complete reliability. Had we to deal with

Ogbourne only, I should feel inclined to say that the process is totally unnecessary, but this does not apply to Wroughton, where some form of treatment of the water is desirable and possibly necessary to render it safe.

The date of issue of this report coincided with the appointment of Mr. Thompson, the present Borough Surveyor. Mr. Thompson considered this matter of chloros excess and introduced administrative measures which should render a recurrence of the trouble impossible. That these measures have proved efficient is evidenced by the fact that since they have been in operation, no complaint of taste in water has been received.

Towards the end of 1925, following a report of the Borough Surveyor and Waterworks Engineer, a scheme was inaugurated for repairing, renewing and augmenting the pumping apparatus at an estimated cost of £58,000. This will put all right for the immediate future. But the Waterworks Committee is alive to the possible requirements of the more remote future, and is on the look out for further extensions of its water undertakings.

The position is therefore an extremely satisfactory one, and redounds to the credit of all those who have been concerned in looking after the water supply of the town.

RIVERS AND STREAMS.

The only natural watercourse which touches Swindon is the River Ray, which in part forms the Western boundary of the Borough and in part flows through it. This is a small tributary of the Thames. It receives the effluent from both the sewage works of Swindon, and is a polluted stream which requires a certain amount of attention to keep it in order.

A special feature of sanitary importance is the old Wiltshire and Berkshire canal which runs through Swindon for a course of about a mile, cutting the town in twain. The Commission which considered the canal system in England decided that this canal was useless and it has been allowed to become derelict. That part of it which passes through Swindon was purchased by the Corporation and at the time of purchase, a suggestion was made that it should be filled up and converted into a public boulevard. But the question of its ultimate fate has proved a highly contentious matter and though a committee was appointed, and has been in existence for many years, to go into the question, no suggestion that has been put forward has met with the approval of the council and the ultimate fate of the canal is still in the balance. The canal has been the source of serious nuisances. It has been

used unofficially as a dumping ground for rubbish of all description, and at the beginning of the period which we are considering, it consisted of a series of stagnant pools of highly offensive water, the breeding ground of flies and mosquitoes, against which various palliatives were tried with little real effect. When the new storm water sewer was introduced it was decided to carry it through the bed of the canal and to fill up the remainder of the bed as the work proceeded. This work is now completed and has produced substantial benefit, as the majority of the canal is now dry ground. But it is still somewhat of an eyesore and is still unofficially used as a dumping ground ; and this is certain to continue until the council adopt and put into action some plan for its final settlement. Though in the days when the canal consisted of a series of ponds a presumptive danger to health existed, no definite damage to the health of the citizens could ever be traced to it. In the great drought, when the town water supply was short and there was some possibility of it failing, there is reason to believe that some of the inhabitants used the foul water for domestic purposes, but if this were so no deleterious effect could be traced to it. On one occasion owing to a curious combination of unusual circumstances some of this canal water got into part of the public water supply, but the trouble was quickly tracked down and speedily remedied ; it produced nothing more serious than a few complaints. A small outbreak of dysentery due to Morgan's bacillus occurred in 1921, and it was thought that this might have been caused by drinking the canal water, but bacteriological investigation proved that the canal was innocent.

COLLECTION AND DISPOSAL OF HOUSE REFUSE

In 1920 the methods of collection and disposal of house refuse were decidedly primitive and it was recognized that the system required reorganisation. There are no ash-pits in Swindon and by the Swindon Corporation Act of 1904, the owner or occupier of every house is required to furnish a sanitary dustbin of a pattern approved by the Council. This law had either never been put into force or else had lapsed completely, for in 1920 the number of such sanitary conveniences was infinitesimal. Curb collection ruled throughout the town, but the receptacles placed upon the curb were as unsatisfactory as possible. Old tins, baths and wooden boxes were generally employed, but even these were often lacking and the household rubbish was placed upon the curb wrapped up in old newspapers ; with the result that the rubbish was blown about by the wind and scattered by children, rag collectors and dogs. Repeated attempts were made to obtain enforcement of the 1904 Act but success was not achieved until 1924, when the council passed a resolution that sanitary dustbins shall be provided and instructed the Borough Surveyor to see that the order

was carried out. Improvement set in at once, but it will be some time before every house in the Borough is provided with a proper dustbin. Now that the preliminary difficulties have been overcome, there seems no reason why this reform should not proceed at an accelerated rate.

The collection and disposal of refuse has also undergone reorganisation during the quinquennium. After much discussion and various delays, the Ministry was asked to send down to Swindon one of their expert advisors to go into this question. Towards the end of 1924 a definite policy was adopted which in the course of a short time transformed that which was utterly inadequate, expensive and unhygienic into what meets the needs of the town from an esthetic and financial point of view and satisfies public health requirements. Formerly the rubbish was removed by cumbersome open carts, limited in their capacity, inconvenient for filling, drawn by heavy draught horses. Theoretically these carts were covered. These unsatisfactory vehicles are being replaced by motor tractors (S. & D. Freighters) with low and capacious bodies, and by lighter horse drawn vehicles in those districts where the horse is more efficient than the motor.

THE DISPOSAL OF REFUSE.

From the Incorporation of the Borough, the practice of disposing of refuse in dumps, which dates back to prehistoric times, continued in existence up to 1920. At that date there were two permanent dumps, one at Broome, inherited from the Old Swindon Urban District and one at Rodbourne, a legacy from New Swindon Urban District. There was also a more recent temporary dump in the centre of the town and in 1922 a second temporary dump was established. These two temporary dumps gave rise to serious troubles which will be discussed later. Some years before the War, the council had considered the question of establishing a destructor, but the War prevented any progress being made in this direction. In 1923 the question of the disposal of refuse came up for very serious consideration; all means which are utilized for the purpose were reviewed thoroughly, and in 1924 it was decided that the system of dump tipping should be abandoned and that in future the refuse shall be got rid of by trench tipping, the method which at present holds the field as being the most satisfactory. Difficulties arise owing to the scarcity of land available for the purpose; but these difficulties are not insuperable. Some time must elapse before dump tipping is finally abandoned for trench tipping. Much has been done recently to reduce as far as possible the unsightliness of the tips and nuisances which might arise from them. Fish offal and other offensive matter is excluded and dealt with elsewhere in a manner which produces no offence.

The methods of tipping have been improved and troubles due to tins and paper minimised.

Owing to the troubles that had occurred in connection with the dumps in the centre of the town, the council decided that in future no deposition of rubbish shall take place, save at the two permanent tips. In course of time when trench tipping has demonstrated its power of solving the problem of nuisances and unsightliness it is possible that the council may reconsider its decision and fill up certain holes in the town due to old quarrying.

The two temporary rubbish dumps which existed in Swindon during the past five years need special mention, for they gave rise to great nuisances of different kinds, and the experience gained from these two tips had much weight with the council in its consideration of the whole problem.

(1) The Tip known as Savernake Street Tip.

There existed in the town an old quarry about 2½ acres in extent which was dangerous and useless. It was decided to fill up this hole with town refuse and transform the pit into a playground. The late Medical Officer of Health, Dr. Whitley, in 1919, submitted that if this pit were filled up by a system of well organized trench tipping, no nuisance would arise. At first things went very well but before long everything went wrong; the trench tipping was not carried out in an efficient manner, too great depth being allowed. In consequence of this the dump fired, causing a great deal of trouble later. In 1923 the dump became infested with crickets which gave rise to a more severe nuisance and entailed great expense to remedy. After this trouble it was determined to abandon the pit altogether as a dumping ground, and to cover up with soil. The original object of transforming the pit into a recreation ground was achieved. The main cause of the trouble with the Savernake Street Tip was the scarcity of material for covering. Had sufficient sound earth been available for covering purposes there seems reason to think that no nuisance would have been engendered.

(2) The Tip known as Morris Street Tip.

In 1921 the council decided to fill up an old quarry which had become flooded. This pond was very deep and dangerous, and the decision to get rid of it was wise. When it was decided to fill this up with town refuse, if such could be done without offence, the Medical Officer of Health expressed the opinion that such could be done on condition that the pond was first drained and kept drained and that some means were provided for the incineration

of the more offensive part of the refuse. The pond was not drained and the rubbish was shot into the water, giving rise immediately to the most intollerable nuisance. Eventually the water was drained off and the pit kept dry, and the nuisance was abated, but the property passing out of the hands of the Corporation, the dump was abandoned before filling had been completed. It has not given rise to any trouble since. The action of the Corporation in 1924 in reorganizing the house scavenging department will in course of time produce great benefit to the town and save the ratepayers much annoyance and expense, but the full effect of the resolution will not be evident for at least another twelve months.

SEWAGE WORKS.

On the Incorporation of the Borough it inherited two sewage farms, one from Old Swindon and one from New Swindon. Both plants are still in existence and owing to the configuration of the town are likely to remain ; for the town being built on both sides of a hill it is necessary to have a sewage works on either slope or else an extensive pumping station. Recently the present Borough Surveyor has thought out a plan by which all the sewage of Swindon might be treated at one farm, the necessity for a pumping station being avoided by taking the sewage round the hill by a conduit ; the flow being produced mainly by gravity, though some pumping will be necessary. The southern sewage farm situated at Broome served Old Swindon in the past and now serves about one fifth of the property in the Borough. There has been a considerable amount of building on the Southern slope of the hill, and as time goes on this is likely to increase to a large degree, but up to the present the old sewage works have proved sufficient to cope with the sewage of that part of the town. Broome sewage farm has a considerable area but the works are of an obsolete pattern. The method employed is the admixture of lime, treatment in precipitation tanks, treble contact beds, and finally land filtration. The works are old but they have been added to from time to time, and recently the contact beds have been relaid. The land is suitable for surface irrigation and the resulting effluent, though not everything that could be desired, is generally satisfactory, and not objected to by the Thames Conservators. Up to the present time there has been no real necessity to consider the re-organisation of these works. Should the town continue to extend on the South, the question of re-organising them and probably replacing them by a more up to date plant will have to be considered seriously.

The sewage works for the lower part of the town are much more extensive and important as they deal with about four fifths of the town's sewage. The original plant, inherited from the

former New Swindon District was obsolete and unsatisfactory. It was somewhat similar in type to the works at Broome and relied to a great extent upon broad irrigation. But the land at Rodbourne is utterly unsuitable for the purpose, being heavy, waterlogged and sour; so that the effluent was never satisfactory and was the cause of great objection on the part of the Thames Conservators. Before the war, the question of the re-construction of these works came up in a somewhat acute form, but the outbreak of hostilities forced matters to remain in abeyance until the advent of peace. In 1920 it was eventually determined to reorganise the sewage works at Rodbourne and the work was entrusted to Mr. Midgeley Taylor, who submitted a scheme, which was approved and carried out. The work was completed in 1924. Some delays and difficulties occurred, and part of the plant installed not proving completely satisfactory had to be replaced. The chief difficulty experienced was with the pumps. On the score of economy 4 inch pumps were substituted for 6 inch pumps as originally suggested. These proved in practice to be incapable of coping with the work and so had to be replaced with 6inch pumps. When the sewage works were completed, the storm water sewer was not finished and difficulties arose when this was in working order, which required further works to be carried out. At the present time difficulties still arise in connection with the humus tanks, which are neither large enough, nor sufficiently numerous, causing the effluent to be unsatisfactory from excess of suspended matter. This is now receiving attention and there is every reason to believe that when things are settled down and such extra tanks as are required are supplied the works will prove completely satisfactory.

Sewerage and Drainage.

As always occurs everywhere, the sewering of the town is a constant trouble and anxiety. Built mainly in the middle of the nineteenth century without any idea of proper town planning and with little foresight, the main sewerage system of the town and also the peripheral drainage is constantly causing difficulties. The original sewering was unsatisfactory. The sewers generally are too shallow and too small and in many particulars of very questionable workmanship. The somewhat rapid growth of the town augments the difficulties arising from a bad start but improvements are being made constantly and the total result of the last five years work is certainly satisfactory. Great difficulties have arisen in the low-lying parts of the town owing to flooding. Swindon is liable to heavy rainfalls, and the township of New Swindon, which is built almost entirely upon the kimmeridge clay, was run up apparently without any regard to the difficulties that must arise in wet seasons. Consequently the lower parts of the town were liable to frequent and severe floodings. To

remedy this a large storm water system was installed and was completed in 1925. This remedied matters very considerably, and complaints of flooding are now infrequent. There were none during 1924, but after some heavy rains in 1925 some flooding of low lying property was reported; and perhaps some further provision for storm waters will have to be supplied. The kimmeridge clay is absolutely impervious to moisture and in a great part of the town it is directly on the surface, so that there is no natural means of getting rid of storm waters.

PUBLIC CONVENIENCES AND URINALS.

The number of public conveniences in Swindon is unusually great, namely, 15, and without exception they are bad and insanitary. During the past 5 years this matter has been discussed repeatedly and fortunately in 1924, a definite policy was adopted by the Council, which, when it materialises, will be a great benefit to the town. By this policy the town is to be supplied with 5 public conveniences for both sexes with an attendant for each division, and most of the existing conveniences are to be removed Obviously this reform will take some time, but a considerable section of the council is most emphatic upon the subject, so that it is likely that the matter will not be inordinately delayed. Contracts for four of the new conveniences will be placed early in 1926. There is a difficulty with the fifth which is needed to replace the lavatory under the Town Hall, which was closed on public health grounds in 1925. A temporary building was erected to replace this, but this cannot remain permanently.

HOUSING.

At the Census, June 1921, there were in Swindon Borough 54,920 inhabitants, 12,395 dwellings and 63,734 rooms, giving an average of 4.4 persons per house and an average of 1.15 rooms per person. The 12,395 dwellings were inhabited by 13,275 separate families.

The estimated population for each of the five years 1921—1925, was 55,500, 55,680, 55,980, 56,570 and 56,880. The numbers of inhabited houses were 12,470, 12,650, 12,750, 13,100 and 13,539. To accommodate an additional 1,380 inhabitants 1,069 new houses have been erected so that the building has not only kept pace with the increase of population but has gone some way to relieve the overcrowding which, at the end of the war, was very serious. The number of new houses ready for occupation for each of the five years was: 4, 24, 103, 299, 414, a very satisfactory progression. Of the 414 new houses erected in 1925, only two, a pair of experimental steel houses, were erected by the Corporation, the remainder

having been built by private enterprise. Another 450 houses will be erected in 1926.

From these figures it appears that some improvement in the housing conditions of the town has occurred during the quinquennium. But the improvement is much greater than these figures for the Borough indicate; for the Corporation has built, as part of a housing scheme, what is practically a new township just outside the Borough boundary. This estate comprises 320 houses built and occupied during the past five years, and 120 in course of erection. Moreover much private building has taken place on the outer side of the Borough boundary. All these houses are inhabited by natives of Swindon, so though the Borough has only grown slightly the town has increased very considerably. Roughly there are about 1,400 more houses available for Swindonians in 1925 than was the case five years ago. It must, however, be remembered that the figures of population which are given are those for the Borough itself only. The population in that part of the town which now lies outside the Borough boundary has increased at a much greater rate, so that though the house accommodation for the whole town is, having regard to the increase of population, unquestionably better than it was in 1920, it is nothing like so much better as it appears to be on a cursory review of the figures. The population of Swindon is in general a fairly stationary one; but recently there has been a considerable migration from the town into the suburbs without the Borough, particularly into the Hurst Park district, whither have gone something like 2,000 Swindonians, who have left the Borough but not the town. A similar migration, on a smaller scale, has taken place into the new houses built by private enterprise in the environs of the town. Against this there has been an immigration into the town to occupy the new houses built by private enterprise within the Borough itself. Practically all these migrants, in and out, are Swindonians, working in the Swindon industries, the immigrants being workers within the town who had been forced to live outside owing to lack of housing accommodation. The immigration into the town which had been produced by the somewhat favourable position of Swindon attracting people out of work from other districts, has but slight bearing upon the question of house accommodation, and what influence it does have is more or less temporary, as, failing to find work in the town, this floating population promptly leaves it again.

The position as regards overcrowding does not improve to any considerable extent. But there has been a little improvement, particularly during the latter part of 1925. The end of 1923 was the worst period. It must be remembered that with the exception of the 320 houses built by the Corporation, none of

the new property is built for letting. Moreover, the older property, of which the great majority was let to tenants, gradually becomes converted from property which is let to property which is sold, as, owing to the state of the market, every owner of property seizes the first available opportunity to sell. There is no reason to suppose that house-letting will again become a financial proposition for many years, and the population is being gradually compelled to purchase its own houses. This has much to say in its favour and it must be admitted that it is rendered as easy as possible, both by the building societies and by the Corporation scheme which enables tenants to purchase their houses with a very small deposit. But there is another side to the story. The larger families are seldom in a position to buy houses under any circumstances. The deposit of 10 per cent, small as it is, is quite beyond the power of the man with a small wage and a large family. In fact, it may be said nowadays that it is impossible for the average working man to rear a family and at the same time possess a habitation in which to rear it. This is a most serious proposition and unless some means can be devised to remedy it, our civilisation must collapse. The cause of overcrowding is the existence of large families which are poor combined with the absence of anything but small unsatisfactory property to let; producing a condition in which the number of inhabitants in a house is in inverse proportion to its size.

Unsatisfactory as is the property that can be obtained by renting, its price is very high, so that the large families have to be content with a portion only of a house, the whole of which would be quite insufficient for their needs. Until property of a fairly satisfactory character can be rented at a low figure the problem of overcrowding will remain pratically as it is. It would appear to be out of the question to expect a solution of this problem without a call, and probably a heavy call, upon the nation's purse.

The housing scheme of the Swindon Corporation is, as has been stated, without the Borough boundary. It is therefore no concern of the Borough Medical Officer of Health. But the existence of this estate has such a profound bearing upon the whole medical work and aspects of the town that it would be impossible to give a review of the health of Swindon without saying something about it. The whole scheme has, of course, been criticised on various grounds. It must be admitted candidly that a great deal of this criticism is unfair. The problem which is before the Housing Committee is about as difficult and complicated as anything can be, and though doubtless it has made mistakes, it is but fair to say that it has done as well, if not better, than was expected by those who are qualified to judge. It is unfortunate that the

estate is not within the Borough boundary, and it also must be admitted that the number of houses erected might have been doubled or even quadrupled with advantage, but for the latter the Corporation is certainly not to blame. The houses have been let, as they should be, to the Swindonians who, other things being equal, possess the largest families. The type of tenant which the Housing Committee has sought is precisely that type which a municipal housing scheme should seek to relieve ; not by any means a desirable class of tenant from a landlord's point of view, but desirable from the municipal point of view, in that it does what it can to relieve those that are most distressed and to mitigate overcrowding. It has been said that the estate is becoming a warren and is in danger of becoming a slum. The first, if put rather less offensively, is precisely what it ought to be ; the latter can be prevented ; but it certainly requires continued supervision to do so. The proportion of children in the housing estate is very much greater than it is in any part of the Borough. It is, therefore, the most inflammable part of the town in regard to infectious disease. The high incidence of infection in Hurst Park is not due to any defect either of the houses or of the site, but entirely to the high proportion of young children.

It is impossible to give any definite figures as regards the amount of overcrowding which exists in the town, for the position is one which varies greatly from day to day. Most of the cases are known to the Medical Officer's Department and a considerable number of them are severe and distressing. No prosecutions have been taken during the last five years in regard to overcrowding for the simple reason that the only available remedy would merely increase the severity of the disease.

The influence of overcrowding upon the prevalence of infection is a point which has received a good deal of attention, of which statistical evidence is available.

It will be seen from the Census Return that the number of rooms per person in Swindon is 1.15. It has probably not varied much from this figure during the past four years, such variation as has occurred being in the direction of rather more room space. The accommodation of the houses in Swindon is as follows :—

1—3 rooms	2%
4—5 ,,	61%
6—8 ,,	35%
Over 8 rooms	2%

In cases where notifiable disease occurs in the household, an investigation is made into the room space and the number of persons in the household. In a certain number of cases the infor-

mation obtained is either faulty or unreliable. In the following tables only cases are considered upon which full reliance can be placed.

A.

	Pneumonia	Scarlet Fever	Diphtheria	Tuberculosis
No. of Cases	170	154	58	72
No. of Rooms	899	728	284	407
No. of Persons	1026	906	385	403
Rooms per Person	0.87	0.80	0.74	1.00

B.

(More than one case in each household).

No. of Households	10	16	7	....
No. of Cases	21	45	15	....
No. of Rooms	56	73	36	....
No. of Persons	82	99	50	....
Rooms per Person	0.68	0.73	0.72	....

C.

Size of houses in which infectious disease occurred. Figures are percentages cast to nearest unit.

No. of Rooms.	Standard	Pneumonia	Scarlet Fever	Diphtheria	Tuberculosis
1—3	2	1	1	5	4
4—5	61	59	74	57	52
Over 6	37	40	25	38	44

These tables reveal points which are striking and it is therefore advisable to criticise the evidence before any deduction is made from it. The number of cases is small; so the unavoidable error is great. As regards scarlet fever, the main brunt of this disease in Swindon in 1925 fell upon one district of the town where the houses are small. This is evidenced by Table C. It may be stated however, that this district was not the poorest part and was not the most overcrowded part of the town. The cases of pneumonia and of tuberculosis, and to a less extent of diphtheria, occurred scattered throughout the town and as will be seen from Table C, occurred in houses rather better than the average.

Referring to Table A, it will be seen that the average room space per person in houses where infectious disease occurs is markedly lower than in the average house. This is least marked in tuberculosis, most marked in diphtheria. Considering the houses in which more than one case of infectious disease occurs at the same time, one finds that there is a still greater diminution of room space per inhabitant, most marked in pneumonia. It is admitted that the number of such cases is exceedingly small, but it is worth noting that though pneumonia occurred generally in houses above the average capacity it occurred mainly in such houses as were overcrowded, and spread chiefly in those houses where overcrowding was dangerous. And much the same is true of the other notifiable diseases. There is a general impression that infectious disease is more common amongst the poorer classes than it is among the well-to-do. This is absolutely untrue, the reverse being the case ; so that the increased prevalence in overcrowded dwellings is not due to the fact that the inhabitants are poor but to the fact that they are overcrowded.

SURVEY OF THE FITNESS OF THE HOUSES.

Swindon is a working class town and the majority of the houses are of the general working-man and artisan type. It is only necessary to say that most of the town was built between 1860 and 1900 to give a good general idea of the class of property that makes up the bulk of the town. The houses are, with few exceptions, built of red brick made locally and generally of indifferent quality. Most of the property is of two stories without basements or attics, and arranged in terraces. Ashpits are unknown. Every house now has a watercloset, but only about fifty per cent of the water closets are supplied with flushing apparatus. The town's water is laid on to all houses in the Borough except four which are at present supplied from private wells. These will probably be closed shortly. There are about six instances of blocks of three or four houses supplied by a standpipe ; otherwise there is a separate water supply to every house. In the older part of the town there are one or two cesspools connected with the bigger houses, but these are gradually being abolished. In some of the new houses which are being built on the Western side of the town cesspools are being installed, as at present there is no public sewer available. The number of such cases is small. A large number of houses lack accommodation for the storage of food and in a fair number of them there is no sink. The houses being low and, with the exception of part of the old town, having gardens at the rear and often small gardens in front, the ventilation and lighting of the houses are on the whole good. There are no slums in Swindon and no unhealthy areas, but there are several small districts and streets which are undesirable and which might

be removed with great advantage to the town when the economic condition allows of it. About 30 per cent of the property is owned by the occupiers. During the war much of the property fell out of repair and for the years succeeding the Armistice great difficulty was encountered in obtaining renovations. This difficulty is much less than it was; but, as will be seen from the schedule, the work of looking after the property and getting repairs done is a formidable task for the Sanitary Department. On the whole the property is moderately well looked after and the tenants are generally clean. The late Mr. Benjamin Broadbent of Huddersfield, who visited Swindon in 1924 to study the conditions, in a letter written to the Medical Officer of Health, makes the following remark, "The housewives have the good repute of being house-"proud and they keep their homes in good condition."

The new property which has been erected in Swindon recently and that which is in the course of erection or contemplation is on the whole satisfactory. Most of it is being erected in new streets, forming new suburbs of the town. The street planning here is good; the roads are wide and the property attractive. Though doubtless the construction of the new houses and the materials of which they are built are open tc criticism, the general result should satisfy all reasonable persons. But there is reason to regret that in some of the streets, terrace houses have been built where the semi-detached type could have been used without much increase of expense.

TENTS, SHEDS AND VANS.

In January, 1926, there were 23 living vans situated in different parts of the Borough. These vans were occupied by 39 males and 41 females.

The number of these vans varies considerably from time to time. There is a schedule of by-laws in existence dealing with tents and vans, and in general the van dwellers adhere to these by-laws or are made to do so, but it must be admitted that the existence of these dwellings in a compact town like Swindon is, under any circumstances, undesirable. There is need for the revision of the existing by-laws, but still more for a revision of the laws under which these by-laws are made. The van dwellers give rise to a considerable number of complaints during the course of the year, but it is generally found that the troubles that are complained of are such as cannot be remedied in the existing state of the law.

PREMISES WHICH CAN BE CONTROLLED BY BY-LAWS AND REGULATIONS.

There is one common-lodging house in Swindon. This is situated in the old part of the town and its accommodation is as follows :—

Common Lodging-House situated at 16, 18, 20 & 22, Albert Street.

	Description or Number of Room.	Dimensions or Cubical Contents of Room.	Maximum Number of Lodgers.
Ground Storey	No. 2	608 cub. ft.	2
	4	729 ,, ,,	2
	5	1080 ,, ,,	3
	10	608 ,, ,,	2
	11	870 ,, ,,	3
First Storey	No. 1	9100 cub. ft.	30
	3	910 ,, ,,	3
	6	1536 ,, ,,	5
	7	1152 ,, ,,	4
	8	1008 ,, ,,	3
	9	1395 ,, ,,	4

Common Lodging-House situated at 24 & 26 Albert Street.

	Description or Number of Room.	Dimensions or Cubical Contents of Room.	Maximum Number of Lodgers.
Ground Storey	No. 1	3580 cub. ft.	11 & 1 child
	2	3036 ,, ,,	10
	3	1296 ,, ,,	4
	4	913 ,, ,,	3
First Storey	5	734 cub. ft.	2 & 1 child
	6	1375 ,, ,,	4 & 1 ,,
	7	770 ,, ,,	2 & 1 ,,
	8	1125 ,, ,,	3 & 1 ,,
Second storey	9	1024 cub. ft.	3 & 1 child
	10	828 ,, ,,	2 & 1 ,,
	11	828 ,, ,,	2 & 1 ,,
	12	1337 ,, ,,	4 & 1 ,,
	13	872 ,, ,,	3
	14	795 ,, ,,	2 & 1 ,,

It is practically always full. The Sanitary Department keeps this lodging house under rigid supervision. No cause for complaint of any importance has occurred in connection with it during the past five years.

Besides the ordinary type of occupant, the lodging house accommodates a number of persons and families who are permanent residents in Swindon and who are compelled to live in the lodging house owing to inability to find private dwellings.

There are no underground sleeping rooms in Swindon.

The only scheduled offensive trade in Swindon is one—that of a hide and bone dealer—established on premises which are eminently suited for the purpose and which never gives rise to complaint.

There are, however, several rag and bone dealers who have been long established. In most of these cases the premises used are not satisfactory and have to be kept under constant supervision to mitigate nuisance as far as possible.

SLAUGHTERHOUSES.

There are 9 registered and 10 licensed slaughterhouses in the Borough and all are used extensively. It is seldom that any complaint arises in connection with them which requires action, but many of them are old and none of them is up-to-date. The question of the provision of a public abattoir for Swindon has been brought up for discussion by the Health Committee on many occasions, but the suggestion has so far not been received favourably. The expense of the measure and the existence of so many registered slaughterhouses are considered reasons which render the project impracticable. But with the growth of the town and the increased amount of supervision that has to be exercised over the slaughtering of animals for food, it may be that the suggestion of a public abattoir should be considered afresh. It is possible that the saving of time of the Corporation's officials might help to reduce the net expense to the Corporation, and the greater possibilities of the utilisation of offals which are offered by one central slaughtering house against numerous small ones, might make the provision of a public abattoir a financial success.

INSPECTION AND SUPERVISION OF FOOD.

Milk Supply.

Swindon being the centre of a milk producing area the adequacy and wholesomeness of the supply are generally satisfactory.

There are in the town :—

48 Milkshops.
16 Roundsmen without shops.
15 Cowsheds.
84 Individuals registered with the local authority as cowkeepers and purveyors of milk.

No licence was refused during the period and none was revoked. Only one license was granted for the sale of milk under special designations.

The condition of the various dairies in the town is satisfactory and the methods of distribution are fair. There is a consideable increase in the amount of milk delivered in sealed bottles, but the bulk is still retailed from open vessels.

The Tuberculosis Orders of 1925 were put into force when they became operative. 17 post mortems were attended by the Medical Officer of Health with a view to judging whether any parts of the carcases were fit for human consumption. Since cattle from the neighbouring districts are brought into Swindon either for slaughter or for post mortem examination, the Medical Officer of the Borough has to deal with a large number of carcases which are not those of Swindon animals.

No occasion arose on which it was necessary to put in force the Public Health (Prevention of Tuberculosis) Regulations of 1925, as so far as can be discovered no person with open tuberculosis is at present engaged in the milk trade. The Sections of the Milk and Dairies Act of 1915 bearing upon the prevention of tuberculosis from the consumption of infected milk have not so far been utilised, but when the improvements in the pathological department are carried out we hope to be in a position to proceed.

MEAT.

The inspection of meat slaughtered locally has always been carried out systematically, and when the Meat Regulations of 1924 came into force those sections dealing with the slaughtering of animals were immediately enforced in their entirety. The marking of meat which is passed for human consumption has been accepted locally with the sanction of the Ministry, and though owing to changes in the staff it has not yet been put into operation, it is hoped that this deficiency will be remedied before this report is printed. The work thrown upon the sanitary department by the Meat Regulations of 1924 is exceedingly heavy as is shown by the figures in the Appendix.

Beyond the great amount of work involved, no serious difficulty was encountered in carrying out the law. The butchers of the town render every facility, but it is unavoidable that slaughtering must on occasions take place at awkward hours. Meat inspection alone is more than sufficient work for one Sanitary Inspector, and the hours which have had to be worked by the inspector who does the bulk of this work were both unduly long and irregular.

There is, however, one grave difficulty in the administration of this Act. Complaint is made, and it must be admitted on just grounds, that the butchers in the districts where the Meat Regulations are carried out rigidly suffer from unfair competition with those who slaughter in districts where the law is evaded, and it is common, when a beast is condemned, to hear a remark that had that beast not been slaughtered in Swindon, but in some other district, it would never have been inspected and would have found its way to the table. In order to minimise this, so far as can possibly be done locally, the Public Health Committee is determined to deal drastically with any case that comes to its notice of the importation into the town of meat of diseased animals. But the difficulty with parts of carcases is great, as individual joints may show no sign of disease, and yet have come from animals suffering from conditions which rendered all parts of the carcase unfit for human consumption.

That part of the Regulations of 1924 which deals with butchers' shops and the control of the sale of meat is so obscure and so difficult of interpretation that it is not possible to do very much with it. Something has been done and improvements in the conditions of retailing of meat have been achieved, but until some definite plan of action is available the object of these Regulations will not be achieved.

Other Foods.

Control over foods, so far as it is in the hands of the local authority, is carried out in a fairly satisfactory manner. The amount of food seized and condemned under the Public Health Acts is given in the table in the appendix. The Food and Drugs Acts are carried out by the County Council.

Unless the three cases of paratyphoid fever, elsewhere mentioned, be so considered, no case of genuine food poisoning occurred during 1925, or indeed in any year since 1920; but there were one or two scares during May, 1925, which were investigated. In one case, material was transmitted to London for analysis, but it proved innocuous and the illness of the family who had

consumed part of the suspected food was probably not connected with it.

HOSPITALS FOR GENERAL DISEASES.

The accommodation which exists in Swindon for general medical and surgical cases consists of the Great Western Railway Medical Fund Accident Hospital, with 12 beds available only for members of the G.W.R. Medical Fund Society, and the Victoria Hospital, open to all, with permanent accommodation for 36 patients and temporary extension huts which house about 12 others. This has to serve a population of between 80,000 and 90,000 !

For twenty years the hospital accommodation at Swindon has been inadequate, a deficiency which the increasing population and rapidly growing powers of medical science have rendered more obvious with each succeeding year. A condition of complete deadlock has existed for these five years past, and though much talk has been expended no solution or attempted solution of the problem has yet been achieved. Towards the end of 1925 a special meeting of the Town Council was called to consider the situation afresh and a committee was appointed to explore the situation, and to report further. The G.W.R. Medical Fund Society has made an attempt to move so far as their own members are concerned, and have a suggested scheme for building a private hospital, but the obvious objections to this and the difficulties surrounding it are not lightly to be dismissed, so it is still in abeyance. The problem of hospital accommodation in Swindon is replete with difficulties, but these are not insurmountable, and a scheme suitable and acceptable to deal with it could be come by, if all concerned will sink their differences in consideration of the public weal. The lack of beds, disastrous as it is for the lives of the citizens of the district, is less serious than the lack of equipment. Some two years ago the Victoria Hospital installed an X'Ray apparatus, suitable for diagnostic work ; but beyond this, there is nothing whereby the inhabitants of Swindon can obtain locally the benefits of modern methods of treatment. The lack of a pathological laboratory is the most serious defect. Except for such work as can be done by the Public Health Department there is no facility for any kind of pathological investigation. Some of the doctors of the town do send material to London or Bristol, but the delay involved renders this of little value in the treatment of disease, though it may be of interest in explaining deaths which might have been prevented.

Since everything in the modern treatment of acute disease depends upon rapidity and accuracy of diagnosis, and this is seldom if ever possible without pathological investigation, it follows

that, with the exception of one or two specified conditions for which facilities have been made available, the citizens of Swindon today are no better off than were their fathers. The existing hospitals are utilised to their utmost (and much beyond the limit of safety), and the work done is excellent so far as the limitations allow. But it is easier to run a factory without machinery than to run a hospital without a laboratory.

Consideration of the deaths which occur in the town bears testimony to the debt which Swindon pays annually from postponing what is one of the primary duties of a civilised community.

Our views on the building, equipment and management of a hospital have undergone great changes during the twentieth century and requires expert knowledge of modern medical methods to direct them. This consideration is commended to those in Swindon who are really concerned over the local hospital question. There are many men and women in Swindon who possess the energy and determination to put an end to the present state of affairs, but confliction and lack of definite plan have so far prevented them from presenting a solution.

Maternity and Child Welfare.

MATERNITY AND CHILD WELFARE.

Maternity and child welfare is one of the chief elements in modern public health administration. But it is more—it represents the endeavour to carry out the first duty of mankind and the first objective of all government—"Save the women and children." Yet it is often considered as a subsidiary function; a luxury of the public health department, which though highly commendable, must, in times of difficulty, give place to more important matters. Fortunately, in Swindon, its cause has always been championed by men and women determined to see it progress and to uphold the high traditions of the borough in connection with child care. The difficulties which beset the public health department in 1925 were not allowed to curtail the work of child welfare, and except for some difficulties with the ante-natal clinics, the standard which had obtained during the past years was maintained. In certain directions improvements were introduced, chiefly in the control of puerperal sepsis and the furtherance of extended help from bacteriology and pathology for the elucidation and treatment of the complaints of childhood. The services of the orthopaedic clinic are now utilised for infants and ophthalmic treatment, ionization and X'rays are available whenever required. Dental treatment for mothers and children is not yet available, but the means of supplying it are at hand and a scheme for this most important addition to our service is being prepared. Shortage of hospital accommodation is the most serious obstruction to progress.

Lack of facilities deprives the inhabitants of Swindon of the benefits to be derived from light treatment. Swindon being a light and open town, the need for such treatment in the child welfare department is not so insistent as it is in smoky towns, so the provision of a heliotherapeutical department as an adjunct to the municipal clinics would be a luxury. But there are many children who need this treatment and ought to be able to obtain it.

During 1925 the pressure on the department was too great to admit of the introduction of Schick and Dick testing and immunization against scarlet fever and diphtheria. This was unfortunate as during the latter half of the year Swindon suffered somewhat severely from both diseases.

So far as infants and toddlers are concerned, the borough scheme has been fairly complete for some years. At the beginning of the quinquennium it was developed rapidly and as early as 1922 it reached the position that was originally aimed at. Since then its development has been in the direction of adding to it such embellishments as the march of medical science rendered desirable and feasible.

BOROUGH OF SWINDON.

ANNUAL STATISTICS RELATING TO THE MATERNITY HOSPITAL—1925.

	Borough	County.	Total.
(1) Total number of cases admitted	174	42	216
No. of patients in hospital 1/1/25	11	1	12
No. of patients in hospital 1/1/26	8	1	9
No. delivered	165	35	200
(2) Average duration of stay	15 days.	17 days	—
(3) No. of cases delivered by :—			
(a) Midwives	133	24	157
(b) Doctors	32	11	43
No. of cases in which no delivery took place	9	7	16
(4) No. of cases in which medical assistance was sought by the midwife with reasons for requiring assistance—			
(a) Ante-natal	—	5	5
(b) during labour	17	9	26
(c) after labour	17	4	21
(d) for infant	7	—	7

(5) No. of cases notified as puerperal sepsis with result of treatment in each case.	2 Removed to Fever Hospital. Complete recovery.
(6) No. of cases in which temperature rose above 100.4 for 24 hours with rise of pulse rate.	31
(7) No. of cases notified as Ophthalmia Neonatorum with result of treatment in each case.	3 1 Complete recovery. 2 Removed to V.D. Hospital; complete recovery.
(8) No. of cases notified as "Inflammation of the eyes," however slight.	1
(9) No. of infants not entirely breast fed while in the institution, with reasons why they were not breast fed.	4 Entirely artificially fed. 2 On account of deaths of the mothers. 2 On account of severe disease of mothers. In addition 25 babies received supplementary feeds temporarily.
(10) No. of maternal deaths with causes.	4 deaths occurred. 1 Delivered before admission. Admitted in a moribund condition, and died after 6 hours. Eclampsia. 2 Placenta praevia, with ante-and post-partum haemorrhage. 3 Placenta praevia. Caesarian section. 4 Severe obstruction. Instrumental delivery. In addition 2 women were removed from the hospital and died within a few days. 1 Influenzal pneumonia, present before delivery. Removed to fever hospital. 2 Acute appendicitis. Removed to Victoria Hospital.

Annual Statistics relating to Maternity Hospital—*Continued.*

(11) No. of foetal deaths (Still-born or within 10 days of birth) and their causes—and the results of the post-mortem examination if obtainable.	10 Stillbirths :— 1 Presumed intercranial haemorrhage. Transverse position. Mother severe post-partum haemorrhage. 1 Premature. Transverse presentation. 1 Obstructed labour. Stillbirth not satisfactorily explained. 1 Breech presentation with extended legs. 1 No obvious cause. 1 Transverse presentation. Adherent placenta. 1 Breech with extended legs. Contracted pelvis. 1 Obstructed labour. 1 Transverse presentation. 1 Birth occurred in a Taxi just outside the hospital. Baby born in a caul. *Deaths under* 10 *days.* 1 Lived one day. Premature 28 weeks. Weighed 1lb. 14oz. 1 Lived 4 hours. Premature 38 weeks. Weighed 3lbs. 6oz. 1 Lived 2 days. Post mature. No obvious cause of death. 1 Lived 5 hours ; twin ; premature 28 weeks. Weighed 3lb. 12oz. Presumed congenital heart. 1 Lived 3 days. Post mature ; no obvious cause of death. 1 Lived 6 days. Infection of the navel and erysipelas. 1 Lived 10 hours. Premature 26 weeks. Weighed 2½lbs. 1 Lived 16 hours. Congenital influenza. The mother died of influenza on the next day. 1 Lived 1 day. Premature 7 months. Haemorrhage from the rectum. Cause doubtful. *Deaths of Infants over* 10 *days of age.* 1 Lived 12 days. Premature 26 weeks. Weighed 3lbs. 2oz. Died in convulsions. 1 Lived 14 days. Uncontrollable haemorrhage from the navel. Congenital syphilis. The blood of this child had retained its embryonic character.

THE MATERNITY HOSPITAL.

The Swindon Maternity Hospital was opened in July, 1922. Before that date the Corporation provided two beds for maternity cases in the Milton Road Nursing Home. The present hospital was made by converting part of the G.W.R. Medical Fund Society's Baths. It is therefore a makeshift, but in its way not a bad one, and though, as we shall see, it has now outgrown its capacity, it served the chief purpose for which it was established by demonstrating the need of such an establishment and enabling a just view to be obtained as to what will be required permanently to satisfy the needs of the town.

It was prophesied when the hospital was opened that it would take two years to reach its full working capacity and that it would then tend rapidly to go beyond it. In 1924 the hospital reached its full working capacity. In that year it was capable of carrying out efficiently everything that was required of it. In 1925 it got beyond this point and its administration presented problems of great difficulty. The work done by the hospital during 1925 was far greater than it had done in any previous year; the number of admissions being 216 against 155, 105 and 38 in the three preceding years. The number of actual deliveries that occurred during the year was 200, which represents rather more than one fifth of the total deliveries which were registered in the borough. But it is important to remember that the deliveries in the hospital now include practically all the abnormal cases in the borough, and a large proportion of those in the neighbouring county area. The main object of the hospital is to offer facility for difficult and complicated cases. During the year 18 borough and 11 county cases, or 29 in all, were admitted as emergencies. This number, at all events as regards the borough, represents, with but few exceptions, all deliveries in which grave difficulties arose during the course of labour. But even the 171 booked cases are not unselected, for the majority of these were booked owing to the fact that difficulty in delivery was expected. If these facts are grasped, it will be readily understood why the majority of maternal deaths in childhood take place in the hospital, that the number of stillbirths and of infants who die during the first few days of life will be excessively high and that the number of puerperal infections which have to be dealt with will be serious.

When reviewing the subject of maternity in Swindon it must therefore be borne in mind that the maternity hospital is the centre where all dangers and difficulties are congregated. This is of material advantage in that it renders it possible to give the

best service with the minimum expense and waste of time to those that require it, but on the other hand, it makes Swindon Maternity Hospital a very different kind of institution from a lying-in home.

The Borough Council is contemplating building a new maternity hospital to satisfy its needs, and has got so far as to sanction the principle, but the details have yet to be worked out, and however energetically this project is pushed forward, it means that for at least two years the present hospital must serve and the difficulties of its administration faced.

The official accommodation of the hospital is 11 beds and 2 isolation beds. Early in the year a room that had formerly been used for ante-natal consultations was converted into a second labour ward, which in emergency can accommodate 2 patients. But 11 beds still remains the official accommodation and the hospital may be considered full when these 11 beds are occupied. There are therefore 4015 bed days available. During 1925, 3797 of these were utilised, viz., 94 per cent of the maximum working capacity. Unfortunately the call for accommodation varies considerably so that frequently the hospital has become full or over-full. In fact, on many occasions lack of accommodation gave rise to great anxiety. Theoretically difficulties of accommodation can be overcome by selection of booking, but owing to the fact that women are frequently out in their calculations and to the considerable proportion of emergency cases, difficulties in practice cannot be avoided.

During the year we did not have to refuse a single case, but we got to the limit on several occasions and had to cast about for some means of accommodating another case if it came along. An explanation is required why the number of cases of pyrexia in the hospital, (31, or roughtly 15 per cent of the patients) appears so high. Pyrexia in the puerperium is an extremely common phenomenon and is very frequently both temporary and of no particular consequence. But if the serious cases are to be controlled, it is absolutely essential to consider any case, however slight, as a potentially dangerous one. The tendency, therefore, at Swindon, would appear to be to exaggerate the amount of pyrexia that follows delivery, but when the cases are worked out, it will be seen that the results locally are very favourable.

Amongst the more serious cases dealt with in the hospital during the year were 7 cases of obstructed labour requiring Caesarian section, 7 cases of placenta praevia, 4 of severe haemorrhage, 3 of eclampsia, 1 of severe heart disease and 1 of pneumonia, delivered during the height of the disease.

PUERPERAL PYREXIA.

The success obtained by the local method of dealing with ophthalmia neonatorum suggested that by a somewhat similar process puerperal fever or sepsis or pyrexia might be brought under control. The details for such a measure have not yet been fully thought out, for the subject is difficult and complicated, and it is necessary to proceed with caution and experimentation to devise a scheme which would fulfil its object.

Since Swindon contains a maternity hospital which admits complicated cases from the surrounding county and an infectious diseases hospital which accepts cases of puerperal sepsis from the whole of the Northern part of Wiltshire and since the town of Swindon is now partly within and partly without the borough boundary and since, moreover, the Borough is not an authority for carrying out the Midwives' Act it is obvious that no scheme could be worked which did not have the sanction, the help and the hearty co-operation of the County Council. With this in view, the Borough Medical Officer is at present in conversation with Dr. Tangye, the County Medical Officer.

Bearing in mind what has been said above, it is obvious that material for the study of puerperal sepsis will be abundant in Swindon. It must also be understood that since puerperal sepsis from a wide area is gathered together in Swindon, the Borough Medical Officer will deal with many cases which are not of borough origin, else what is given might be taken as indicating that pyrexia after confinement was alarmingly prevalent in Swindon. This is certainly not the case. From the fact that during the quinquennium with its 5,000 confinements not a single death from puerperal sepsis has been registered, it can be gathered that the disease cannot be inordinately prevalent and that the means taken to combat it have met with complete success.

Notification of "Puerperal Fever," which is compulsory, is, owing to circumstances which need not be detailed here, carried out in a manner which renders it useless or worse than useless, so it is necessary to obtain information regarding the occurrence of puerperal pyrexia by means other than the official notification.

The infectious diseases hospital has for some years afforded accommodation for cases of puerperal fever, but until the beginning of 1925 only cases notified as puerperal fever could be accepted. This meant that the cases were either kept from treatment until they were too late for treatment or else that the notification had to be stretched. The latter has always been advocated by the local medical officer of health. In the beginning of 1925 the

occurrence of several cases of puerperal pyrexia in the maternity hospital induced the medical officer of health to bring matters to a head by notifying them as puerperal fever and removing them to the isolation hospital. As a result the County Council approached the Hospital Board to sanction the admission to the hospital of cases of puerperal pyrexia without official notification, and the Board agreed to accept cases of puerperal pyrexia from the district served by the Hospital Board whether or not such cases had been officially notified. It was found at once that practitioners and midwives who had been reluctant to label cases as "Puerperal Fever" were quite ready to give information of "Puerperal Pyrexia" and the first difficulty of getting cases early, when they are curable, and not late, when they are nearly hopeless, was got out of the way.

Another formidable difficulty presented itself for solution. Pyrexia in the puerperium is very common. Much of it is trivial—much of it has nothing to do with the puerperal process. Obviously to admit all cases of pyrexia to hospital would be neither requisite nor feasible. It therefore becomes necessary to discriminate. This means an accurate diagnosis which requires a long and complicated pathological inquiry. The only way out of this difficulty is to carry out the process in all cases of puerperal pyrexia which are not obviously of no consequence. This is laborious, taking two hours at least for each case; for besides an exhaustive clinical examination it requires a bacteriological examination of the whole of the genital tract and an examination of the blood. But if women are to be saved from the perils of childbirth it is essential to go through it—it was found that it could be done and it was done; and it is mainly due to the fact that it is done that the women of Swindon do not die from the infections of childbirth.

We have not yet worked out a scheme by which the necessary bacteriological and blood examinations can be carried out at the patients' homes. It is doubtful if it is possible to ensure the refinement which is requisite to obtain accurate results under the conditions which rule generally in the patients' homes. Fortunately this is not often called for. It will be seen that about 20 per cent of deliveries take place in the Maternity Hospital, and practically all the difficult, dangerous and complicated cases go into that institution. The pyrexias which develop after simple deliveries are generally either trivial or very severe; the former can be ignored; the latter are admitted at once to the fever hospital, where the necessary investigation can be carried out in comfort; so that in practice this second difficulty was surmounted. But the time involved is a very serious consideration. The only place in Swindon which possesses full equipment for dealing

with these cases is the isolation hospital. The maternity hospital has not got it, so that when required the machinery has to be taken there. This involves trouble and time.

One other difficulty presents itself. Puerperal infection is occasionally apyrexial. But these cases are so desperately ill that the course of action is obvious. One such case occurred in 1925.

It is unnecessary to go into the question of treatment. We have at the fever hospital a complete scheme for dealing with anything that may happen. In early cases—and the whole scheme is devised to get cases early—the treatment depends entirely upon the bacteriology and is conducted on the same principles as those which rule in other infections. In cases which are not seen until late, surgical treatment might be required. It is provided for, but so far has not been utilized.

It is obvious that no scheme of this kind would be workable unless it obtained the help and goodwill of the local medical practitioners. There is no difficulty in its doing so, if a reasonable amount of intelligence is exercised and certain outstanding grievances and misunderstandings are removed. The practitioner attending the case is the best judge as to whether a pathological examination is necessary and the scheme offers to the practitioner the opportunity of having this done if he asks for it, and the case either removed for treatment or left under his care at his discretion.

So far as we have gone we have not met with any difficulty. During 1925 nineteen cases have been fully investigated, of which eleven were removed to the fever hospital. These will be dealt with in the report of the hospital. The remaining eight cases were treated throughout at the maternity hospital. They were mainly pneumococcal infections or slight local infection of tears. There were a number of cases of puerperal pyrexia dealt with earlier in the year, before a definite plan of action had been worked out, but the reports of these cases are imperfect.

MATERNAL MORBIDITY.

Death from childbearing being one of the most distressing of human calamities, calls for the utmost endeavour for its suppression. Unfortunately our knowledge of maternal mortality is far less good than it should be, for the evidence upon which we have to work is fragmentary and faulty. The registrar general gives each year a table of maternal deaths ; but as, in this country, the fact of pregnancy or delivery is not generally stated upon death certificates unless in the opinion of the certifier, death was

directly connected with the generative process, the Registrar's figures lose much of their value. Death may occur during childbearing from causes in no way connected with reproduction, but on the other hand death is not infrequently due directly to reproduction though it may be delayed until months or years after delivery.

During 1925 the following deaths occurred which appear to be due, in whole or in part, to childbearing.

1 Obstructed delivery. Pulmonary embolism.
2 Placenta Praevia.
3 Caesarian Section. Nephritis.
*4 Nephritis of Pregnancy.
*5 Septicaemia, following injury to varicose veins, died during puerperium (Inquest).
6 Placenta Praevia (not a Swindon Borough case).
*7 Appendicitis following parturition (not a Swindon Borough case).
8 Eclampsia.
*9 Phlegmasia Dolens. Tuberculosis.

Those cases with an asterisk do not appear on the Registrar General's returns of deaths due to accidents and diseases of pregnancy and parturition.

ANTE-NATAL SUPERVISION.

From the consideration of the mortality of childbirth—practically all of which can be prevented; from the consideration of the vast amount of chronic illhealth and disability caused by childbearing—practically all of which also can be prevented; and from the large number of deaths of infants before, during and immediately after birth, of which some at least can be prevented, it follows that ante-natal supervision—the scientific consideration of every expectant mother—is one of the most obvious requirements of preventive medicine.

An ante-natal clinic has existed in Swindon since 1921, but it has undergone many vicissitudes and interruptions. In June, 1925, it was re-organised and now promises to work well. From the figures of attendances it is obvious that once put on a satisfactory basis it will forge ahead. If we can get this clinic stabilized and develop it as development is called for, it is certain that the women of Swindon will utilise it to the full, as they do the provisions for preventive treatment which are made for them in other directions. Then we shall see a great reduction in the deaths and diseases of the reproductive woman and no small improvement in family life, for there is no more fruitful cause of domestic

unhappiness than the troubles caused to women by the damage done by childbearing. Women have for many generations looked upon these troubles as in the nature of things which must be endured. One object of the ante-natal clinics is to teach them otherwise. Childbearing is a normal physiological process. The diseases and disabilities which surround it are preventable.

Post-natal care is also required. Women need attention after the birth of the child as well as before. A properly organised clinic must make provision for caring for our mothers throughout the productive process. This can be done and it will be done.

The subjoined table shows the work done at the Ante-natal Clinic during 1925.

No. of cases on Books—	
Old	20
New	195
Total	215
No. of Attendances	605
No. of Consultations	387
No. of Bacteriological Examinations	4
No. of Urine Examinations	487
No. of Ante-Natal cases admitted to hospital	148
No. of Ante-natal cases confined at home	7
Conditions found at Clinic—	
Cystocele	2
Enlarged Thyroid	8
Pyorrhoea	8
Varicose Veins	26
Albuminuria	20
Fibroid	1
Defective Heart	1
Mastitis	1
Gonorrhoea	1
Confinement Results—	
1. Normal Deliveries	134
These include :—	
Twins	1
Congenital Heart Disease	1
Premature Births	6
2. Abnormal Deliveries :—	
Caesarian Section	3
Forcep Deliveries	8
Still-Births	4

CHILD WELFARE CLINICS.

A Child Welfare Clinic is held three times a week at Eastcott Hill, and once a week at Gorse Hill and Rodbourne respectively. Up to the present it has not been possible to supply a medical officer for Gorse Hill and Rodbourne, these clinics being taken by the health visitors who refer to Eastcott Hill all cases requiring medical advice. In addition to the recognised clinics, the premises at Eastcott Hill are open at all times and on every day for attention to cases which are in any way urgent or requiring to be seen more often than the regular clinics will allow of. The child welfare clinics are open without distinction to infants and toddlers. The great success of the scheme in Swindon owes much to these two provisions :—a clinic which for practical purposes is open at all times and the acceptance of all children below school age, so that there shall be no break in the attention which may be given to the growing child.

It is unnecessary to say much about this department this year as the matter has been so fully dealt with in the annual reports of the last two or three years, but one or two matters of medical interest are worth recording.

There is a disease of infancy which of late has been met with not uncommonly. In this disease the blood retains after birth its embryonic characteristics. The children suffering from this condition are of a peculiar lemon colour. They appear to be comparatively healthy and to develop normally up to a point, but generally die early, death usually being certified as being due to bronchitis or to some similar condition. But it is found that if the condition is recognised cure can generally be obtained The following case will give some idea of the disease in a severe form :—A boy born in October, 1923 had attended the clinic for some time, but was not considered to need medical attention until April, 1924. He was then lemon-coloured and the liver and spleen were large. The blood examination was as follows :—

Red Corpuscles	192,000
White Corpuscles	19,400

Differential Count of the white cells :—

Leucocytes	11
Small lymphocytes	71
Large lymphocytes	6
Eosinophiles	3
Myelocytes	3
Leucoblasts	6

Nearly all the white cells were of immature character. There was not a single red cell which was normal ; most of them were

small irregular fragments; about 10 per cent were nucleated; there were many megaloblasts. The child improved slightly for a time but died four weeks later from a spreading cerebral thrombosis. The blood condition here was extraordinary and will appear scarcely compatible with existence. Yet the child was not obviously ill and the mother was not greatly concerned about the child's condition. We have not met with another case in which the blood condition was so abnormal as this, but during 1925, 6 cases of the disease in a less severe form were under observation. Of these 2 died, death being certified as being due to bronchitis. The other four are doing well. In two of these the blood has become reasonably like that of a normal child of the same age, but in the other two it has not done so. Both of these children are now two years old.

Another condition to which attention is worth calling is infantile scurvy, for this appears to be increasing. Vitamin deficiency is, of course, one of the commonest conditions of infancy, but cases in which a definite diagnosis of scurvy can be given are not common. We have seen it relatively more frequently in Swindon than elsewhere. In 1925, 5 cases were seen and treated, against 2, 1, 1 and 3 in the four preceding years. The disease presents no difficulty in diagnosis except that it has been occasionally mistaken for infantile paralysis. The results of treatment of this disease are amongst the most brilliant triumphs of medicine.

Another condition is the development of abscesses of the glands of the neck due to no tangible cause, occurring during the first few weeks of life. During 1925 these were not uncommon and they were coincident with an extensive epidemic of scarlet fever and measles in the Borough. Bacteriologically these cases are due either to staphylococci or to streptococci, the former make good recoveries; the latter generally die, either from spreading cellulitis or septic pneumonia.

Another matter for comment is the question of the treatment of phimosis. In former years an enormous proportion of male infants were circumcised, but while admitting that this operation may occasionally be necessary it seems ridiculous to think that anything between 60 and 90 per cent of the male infants born should be so mis-formed as to require surgical treatment. The results that have been obtained by circumcision are also by no means perfect and the occurrence of troubles following the operation and of one or two deaths attributable to it rendered it advisable to explore the position and see if better results could not be obtained by a different practice. During the last five years this subject has received unremitting attention, and it will be seen from the reports that a considerable number of cases

have been dealt with, the figures for the past five years being 69, 71, 115, 93 and 74. Four conditions require consideration. The prepuce may be unusually long, its aperture may be unusually tight, it may be adherent to the glans, and it may be damming back a large amount of secretion behind the glans. Since circumcision cannot be performed properly unless the prepuce is stripped from the glans and the accumulated secretion removed, it was feasible to consider whether, if this preliminary procedure were adopted alone the circumcision itself might not be unnecessary. As a result of this inquiry the number of children who have been circumcised has steadily diminished, and for the last two years it has not been found necessary in any case. The conclusion arrived at was this, that the freeing and cleansing of the prepuce should be part of the preliminary cleansing of the infant as soon after birth as possible. In the majority of cases it is quite easy and results in permanent cure. But some of the cases are difficult, and it is certainly not denied that some few infants do require circumcision. A somewhat similar state of affairs exists in connection with the eyes. A large number of cases of ophthalmia in children not gonorrheal in origin are due to obstruction of the canaliculus. If the nasal duct be pressed upon a small quantity of secretion is shot out of the punctum and the ophthalmia automatically resolves. It would appear that the treatment that the newborn infant requires is cleansing and attention to those parts where the skin and mucous membrane meet, and calls for more attention being given to the natural apertures of the body to see that they are free. In other words the infant at birth requires to be looked over more thoroughly to see that it is working properly and a little less polishing up to try to make it appear respectable. The work of Dr. McIlroy upon this point is highly instructive and should be widely known.

It will be noted that the number of infants who attend the Swindon clinics, the number of their attendances, the number of cases which receive medical advice and treatment, and the number of consultations involved has been for some years practically constant. Infant Welfare work has long since reached its full capacity and the numbers dealt with now vary only in accordance with the varying Birth Rate.

TABLE SHOWING THE NUMBER OF VISITS PAID BY THE HEALTH VISITORS TO MOTHERS AND CHILDREN AND TO CASES OF TUBERCULOSIS.

	1925	1924	1923	1922	1921
No. of first visits paid to mothers and children	922	923	1010	1142	1178
No. of revisits	3568	3189	3047	3913	3915
No. of visits paid to expectant mothers	229	262	214	345	191
No. of visits paid to cases of Deaths and Still-births	67	78	78	93	116
No. of visits to cases of Tuberculosis....	366	123	123	109	88
No. of visits paid to children aged 1—5 years	3060	3033	2610	2139	—
	8212	7608	7082	7741	5488

RECORD OF WORK DONE AT THE INFANT WELFARE CENTRES DURING THE YEARS 1918-1925 INCLUSIVE.

	1918	1919	1920	1921	1922	1923	1924	1925
No. of Infants on the books of the Centre at :—								
Eastcott Hill	1046	1189	1517	1037	1050	1125	1127	1115
Gorse Hill	—	—	—	250	305	272	310	259
Rodbourne	—	—	—	202	206	208	209	236
TOTAL	1046	1189	1517	1489	1561	1605	1646	1610
Number of Attendances—								
Eastcott Hill	2297	2798	4444	4971	5073	5698	5521	5742
Gorse Hill	—	—	—	1216	1520	1319	1474	1399
Rodbourne	—	—	—	951	1461	1306	1211	1577
TOTAL	2297	2798	4444	7138	8054	8323	8206	8718
Number of cases which received medical advice and treatment	184	341	656	761	600	580	625	654
Total Consultations	—	—	—	—	1526	1461	1672	1631

SUMMARY OF CONDITIONS SEEN AND TREATED AT THE INFANT WELFARE CLINICS DURING THE YEAR 1925.

	Infants.	Toddlers.	Total.
Disease and Defects due to Ante-Natal Causes—			
Phimosis	73	1	74
Congenital defects of nervous system	11	18	29
Congenital diseases of the blood	5	0	5
Other congenital deformities & defects	32	10	42
	121	29	150
Specific Infections—			
Congenital syphilis	7	1	8
Gonorrhoea other than O.N.	1	1	2
Ophthalmia neonatorum	21	0	21
Tuberculosis	7	2	9
Diphtheria, scarlet fever, measles, whooping cough	17	8	25
Pneumonia	23	5	28
Poliomyelitis and polio-encephalitis	5	0	5
Various infections	55	7	62
	136	24	160
Deficiency States—			
Ill-feeding	115	5	120
Scurvy	4	1	5
Rickets	8	2	10
Anaphylaxis	7	2	9
Various	6	9	15
	140	19	159
Injuries	6	5	11
Miscellaneous	121	53	274
	524	130	654
In Bacteriological examinations	43	3	46
In Haematological examinations	16	13	29
In X'Rays examinations	4	1	5
No. of Mental Defectives	4	9	13
No. of Physical Defectives.	5	7	12
No. of Blind Children	1	1	2
No. of Deaf Children	0	1	1

OPHTHALMIA NEONATORUM.

The number of cases of this disease notified in the Borough during 1925 was 9, against 15, 34 and 21 in the three preceding years. In addition to the notified cases 11 cases which were not notified also came under observation. Every case both notified and non-notified, except one, was treated throughout by the public health department.

Treatment at the Child Welfare Clinic.

10 notified cases and 11 non-notified cases were treated at the Child Welfare Centre.

Bacteriologically the notified cases revealed :—	
Gonococcus	4
Diphtheroid	1
Staphylococcus	1
Bacilli of ? nature	2
Sterile	1
Not examined	1
The non-notified cases :—	
Diphtheroid	1
Bacillus of doubtful nature	1
Kock's-Weiks bacillus	1
Cocco-bacillus ? Pfeiffer	1
Sterile	7

One case was transferred to Gorse Hill Hospital ; 1 case left Swindon before treatment was completed, but the eye was not in danger. The others were cured without injury to the eye.

Treatment at the Maternity Hospital.

4 cases of ophthalmia occurred amongst children who were born in the Maternity Hospital. Of these 3 were notified and 1 was not notified. Of the notified cases 2 were caused by the gonococcus and removed to Gorse Hill Hospital ; 1 was sterile and was treated in the Maternity Hospital. The non-notified case was also sterile. All recovered without injury to the sight.

Treatment at the Gorse Hill V.D. Hospital.

2 new notified cases from Swindon Borough, 2 new notified cases from districts outside Swindon and 1 old case from without the Borough—or 5 cases altogether, all notified—were treated as in-patients at the V.D. Centre during the year. All were caused

by the gonococcus. All recovered completely without injury to the vision.

This is the fourth year in which the special administrative machinery for dealing with ophthalmia neonatorum has been in full working order and the fourth year in succession in which no Swindon-born child has been blinded by this disease. Formerly so far as can be ascertained from children who survive an average of two children suffered total loss of sight from ophthalmia neonatorum each year in the Borough. The administrative machinery has, therefore, proved completely successful and it has been carried out without the slightest hitch or friction with anybody concerned. This procedure was introduced in order to prevent blindness from ophthalmia neonatorum. It was not devised to prevent the occurrence of the disease, so that the very welcome drop in the notifications during the past two years cannot be credited to this action. Indirectly, however, the campaign against ophthalmia neonatorum has educated the midwives of the town to be much more careful in dealing with the eyes of infants and it is possible that this has had some say in the decline of the notified cases. Another cause for the diminution of the disease is the advance of ante-natal treatment in which women suffering from gonorrhoeal infections have been brought under treatment before delivery, so minimising the risk to the child's eyes. We are beginning to think that ophthalmia neonatorum should be considered in the same way as congenital syphilis, *i.e.*, as a congenital systemic disease, of which ophthalmia is only one, (though the most prominent) manifestation ; for it is found that children with gonorrhoeal ophthalmia frequently suffer also from gonorrhoeal infection of other mucous membranes. Thus, in the last case treated at Gorse Hill, though the infant was admitted with gonorrhoeal ophthalmia, it had also gonorrhoeal infection of both ears and of the vulva. Taking this view, the rule should apply before discharging the patient as cured, of proving failure to react to a prevocative vaccine.

Table showing the number of cases of Ophthalmia Neonatorum notified, the number treated, the results of treatment, and the number of deaths occurring.

No. of Cases notified 9.	No. of Cases	Vision Unimpaired	Vision impaired	Total blindness	Deaths
Treated at Clinic	5	5	....	....	....
Treated at Gorse Hill Clinic	3	3	....	....	....
Treated at Maternity Hospital	....	....	....	....	....
Treated privately	1	1	....	....	....
TOTALS	9	9	....	....	....

OPHTHALMIA NEONATORUM.

Year	No. Notified.	Cases of infantile Ophthalmia due to gonococcus	Where treated.				Result.				Not notified as O. N.
			Home	Gorse Hill	Clinic	Maternity Hospital	Cured	Blind	Injured	Died.	
*1921	7	?	3	....	4	....	7	....	....	....	19
1922	21	?	2	....	19	....	20	....	1	....	16
1923	34	23	5	4	25	....	30	....	2	2	11
1924	15	13	....	3	10	2	15	....	....	....	12
1925	9	4	1	2	5	1	9	....	....	....	11

All treated at clinic and all cured.

* These figures are incomplete.

THE MILK (MOTHERS' AND CHILDREN'S) ORDER.

This order has been in force throughout the quinquennium. It has undergone considerable alterations, and modifications since its inception, but has finally settled down to take its place in the general scheme of maternity and child welfare. The statistics for the past five years are :—

	1921	1922	1923	1924	1925
No. of applications granted	60	88	54	61	52
Total Quantity of Milk issued (Galls.)	1800	900	750	900	900
TOTAL COST	£250	£100	£75	£90	£90

Properly guarded against abuse (and locally this presents little difficulty) the cost is therefore very slight and it is of great practical value, especially in cases of temporary distress.

Various brands of dried milk and a few proprietary articles are sold by retail at the clinics. This provision is steadily declining and is not encouraged, for it is open to certain abuses, and is offensive to modern physiological views of diet. But it has a very distinct, if limited, value quite sufficient to retain it in the general scheme.

INFANTILE MORTALITY.

Few fields in preventive medicine yield more valuable produce than the accurate and detailed study of those lives which fail early. The whole history can be condensed into small bulk and carried within the purview of the recent memory of a single explorer, so that after all is over it is possible to cast the mind back to points of obscurity and interest which can often explain the cause of failure. For as there are many very alarming things which happen in infancy and apparently pass without leaving permanent damage behind them, so are there others which at the time apparently trivial, are the first step or indication of an approaching catastrophe.

Accurate information of the precise cause of death—but seldom to be obtained from the death certificate—is important, but far more important is a reliable history which tells us not so much why the child died as why he did not live. No history is reliable which is not recorded whilst in the making ; a history obtained by cross examination after the event must, so long as the human mind remains as it is, be either in part or in entirety (generally the latter) fictitious.

The numbers who die in childhood being fortunately few, the evidence obtainable in a small town like Swindon accumulates slowly.

The deaths investigated are only such as occur within the borough itself, so that the figures do not necessarily correspond with those of the Registrar, for the latter take cognisance of the deaths of Swindonians who die outside the borough.

STILLBIRTHS.

Still births and miscarriages after the seventh month are notifiable. In 1925 30 cases were notified, 10 of which occurred in the Maternity Hospital, and 1 in the Victoria Hospital. Of those born in the hospital 4 were not borough cases. In 7 cases delivery was premature and in 23 it was full time. 17 were first pregnancies and 13 were subsequent pregnancies. The large number of first pregnancies ending in stillbirth is to be noted. The same obtains in deaths occurring immediately after delivery and up to the end of the first week. After that the infantile mortality is higher in later than in first children. The excessive mortality in first pregnancies is a matter for grave consideration. Locally it is increasing, and it appears to be generally increasing throughout the country. Many causes for this can be surmised, but at present lack proof. Advance in the age of marriage and of first pregnancies probably has some say in the matter ; whether the use of contraceptives is in any way responsible is not known. Ante-natal supervision should reduce materially the mortality of first births, as these are mainly due to discrepancy between the size of the child and the size of the maternal passages. Ante-natally these discrepancies can be detected and treated appropriately. They cannot be treated properly when the first indication of their existence is a deadlock occurring in the course of delivery.

The stillbirths were all legitimate except one. 13 of them were definitely due to obstructed labour. The cause of death in the remaining 17 is unknown.

Deaths Before the End of the First Day.

11 infants died before they were 24 hours old (7 males and 4 females). 9 were first pregnancies and 2 subsequent pregnancies. In 3 cases death was due to error of development. 2 died from inattention at birth. Inquests were held upon these two cases. In one the skull was fractured. In the other the child was apparently asphyxiated.; 4 were reported as being premature, and in 2 no obvious cause of death is known or was discovered. All the cases but one were legitimate.

DEATHS BETWEEN THE END OF THE FIRST DAY AND THE END OF THE FIRST WEEK.

8 infants (5 males and 3 females) died between the end of the first day and the end of the first week of life. 5 were first pregnancies and 3 were subsequent pregnancies. 1 died from infection of the navel; 2 died from haemorrhage (on one of which there was an inquest, but this threw no light on the cause of death), the other was a case of congenital syphilis. 2 were premature, 2 post-mature and in one there was no obvious cause. The actual reason for death in the last five cases is obscure. All were legitimate. 2 of them had been breast-fed; the other six had not been breast-fed.

DEATHS BETWEEN THE END OF THE FIRST WEEK AND THE END OF THE FIRST MONTH.

10 deaths occurred during this period (6 males and 4 females). All were legitimate. 9 were breast-fed and 1 was artificially fed. 1 was a first pregnancy, the other 9 subsequent pregnancies. 1 died from erysipelas, probably from a mosquito bite; 2 died from congenital heart disease; 1 died from haemophilia; 1 from bronchitis, probably early measles; 1 was suffocated in bed, and in 4 no cause of death was given except prematurity.

DEATHS BETWEEN THE END OF THE FIRST MONTH AND THE END OF THE FIRST YEAR.

24 deaths (12 males and 12 females) occurred between the end of the first month and the end of the first year of life. Of these 12 had attended the clinics and their life histories were fully known. Of these 5 had been breast fed. Their deaths were caused as follows:—

Streptococcal septicaemia	1
Pneumonia, of which 1 for certain and the other in all probability was due to measles	2
Intussusception	1
Abnormal blood condition	1

7 had been artificially fed. 2 died of tuberculosis; 3 died from illfeeding; 1 died from measles and pnuemonia and 1 from whooping cough and pneumonia.

Of the 12 infants who had not attended the clinic and whose history is imperfectly known, 6 were breast fed who died from the following conditions:—

Pneumonia, following whooping cough	2
Pneumonia, following measles	1
Erysipelas	1
Bronchitis	1
Gastritis	1

The 6 infants who were artificially fed died from the following conditions :—

Spina bifida	1
Whooping cough	1
Pneumonia following measles	1
Illfeeding	3

Deaths in Children between 1 and 2 Years of Age.

9 such deaths were registered. Of these 5 were clinic cases whose life history was known and 4 were not. Of the 5 clinic cases 2 had been breast fed. One of these died from tuberculous meningitis and one from epidemic diarrhoea. Of the 3 that had been artificially fed 1 died from accident and the other 2 from whooping cough. Of the four children who had not attended the clinic and whose histories were not known, 1 died from convulsions, 1 from infantile diarrhoea, 1 from cerebro-spinal meningitis, and 1 from broncho-pneumonia.

Deaths between the Second and Fifth Year.

23 such deaths were registered. 11 of these had attended the clinics and their life history was known, and 12 had not attended the clinic. Of those who had attended the clinic 9 were breast fed These children died from the following conditions :—

Whooping cough	2
Pneumonia	1
Laryngeal diphtheria	1
Acute anaemia	1
Measles and pneumonia	4

The 2 artificially-fed children died from the following :—

Scarlet fever	1
Tuberculous meningitis	1

Of the children who had not attended the clinic and whose history was imperfectly known, 1 died from whooping cough ; 2 from measles ; 1 from broncho-pneumonia ; 1 from influenza ; 1 from scarlet fever ; 2 from diphtheria ; 1 from volvulus ; 2 from burns and 1 from chronic constipation.

Deaths of Children aged 5-10 Years.

9 cases occurred, of which 3 attended the clinics and their life histories were known. Of these 1 was breast-fed, who died from meningitis resulting from chronic ear disease. 2 were artificially fed. 1 died from rheumatic fever and 1 from pneumonia following measles. Of the children whose history is imperfectly known 1 died from tuberculous meningitis ; 1 from cerebro-spinal

meningitis ; 1 from measles and pneumonia ; 1 from ulcerative endocarditis ; 1 from diphtheria and 1 from influenzal pneumonia.

DEATHS OF CHILDREN AGED 10-17 YEARS.

9 such children died. 6 girls and 3 boys. The causes of death in the girls were :—1 pulmonary tuberculosis ; 1 nephritis ; 1 purpura ; 1 perforated gastric ulcer ; 1 rheumatic fever ; 1 pernicious anaemia. The causes of death in the boys were :— 1 cerebral abscess ; 1 lobar pneumonia ; 1 diphtheria.

The child mortality for 1925 was, therefore, 103—the same as last year in numbers, but slightly less in rate owing to the increase of population. The stillbirths were about the same as last year, as were also the deaths during the first month of life. The deaths between the end of the first month and the end of the first year were 5 less than in 1924, and those between the ages of 1 and 2 were also 5 less ; but between the second and fifth year, *i.e.*, the late toddler age, the deaths were 9 more ; and between the ages of 5 and 10 years, 4 more than in the last year. The deaths between 10-17 were 3 less than in 1924.

Several features in these mortalities are worth attention. The artificial feeding of infants is far less common than it used to be and where it is adopted it is far better controlled. This causes a great drop in the deaths due to illfeeding, which are now comparatively rare compared with what they used to be. It also causes a reduction in the deaths from infantile tuberculosis which is most frequently of the bovine type and derived from tuberculous milk. In 1925 whooping cough was very severe in the early months of the year and measles was very severe in the later months. The former caused altogether 9 deaths and the latter 13 deaths. Noteworthy also are the three deaths due to rheumatic fever, a disease which for some years has not been very prevalent in Swindon ; and also 4 deaths due to abnormal state of the blood, which raises a most important point in connection with preventive medicine.

Reviewing the infantile mortality during the quinquennium and comparing it with that which preceded it, we find that the average mortality from 1916 to 1920 was about 80, and from 1921-1925 about 60—a drop which is very material. The greatest drop in infantile mortality actually occurred in 1920, when it dropped fourteen points. The five rates during the quinquennium just completed were 67, 60, 53, 63 and 60. The rate now shows a tendency to become stationary, such variations as occur from year to year depending upon the prevalence or otherwise of whooping cough and measles. The average rate ruling at present is not much more than half what it was at the beginning of the century

and the main element which has caused this tremendous drop is the elimination of infantile diarrhoea, which for all practical purposes has ceased to exist. The great drop which occurred in Swindon in 1920 was coincident with the development of child welfare and undoubtedly the favourable rates which have ruled since owe much to the care that is now given to the infant ; but one must not credit any specific action with being either the sole or the chief agent in the reduction of infant mortality, for there are many causes which are all operating together to favour the infants and it is from the combination of these causes that improvement ensues. Neither in the past five years nor in the five years that preceded them, have the social factors in Swindon varied to an extent which might be expected to influence the infantile mortality. Thus employment has been good throughout the period—compared with the rest of the country exceptionally good and exceptionally steady. The previous five years had been years of high prices and high wages ; the last five years of lower prices and lower wages and these about balance. There has been no scarcity of any consequence during the past ten years.

It is not infrequently stated that the fall in infantile mortality is attributable to the fall in the birth rate and that the smaller the family the better the chances of survival. This has been shown to be completely erroneous and that there is no direct connection between the two factors. Actually, in Swindon, though the average birth rate for the last two quinquennia has been identical the infantile mortality has fallen 25 per cent. Judging from the extraordinarily high mortality in the early weeks of life amongst first children it would appear that lowering of the birth rate favoured a high infantile mortality—a proposition which in all probability is correct. Though the infantile mortality as a whole has fallen very considerably there is no such marked improvement in the deaths during the first month of life, though the figures for the past five years, *i.e.*, 36, 35, 32, 31 and 30 compared with an average of 40 for the previous five years, show some slight and progressive reduction. Possibly when the ante-natal clinic has developed a more marked reduction will be obtainable.

TABLE SHOWING THE CAUSES OF DEATHS OF CHILDREN UNDER 17 YEARS OF AGE IN THE BOROUGH OF SWINDON DURING THE YEAR 1925.

Cause.	0-1	1-2	2-5	5-10	10-17	Total
Errors of development	7	....	....	....	....	7
Congenital syphilis	1	....	....	....	....	1
Abnormal blood	1	....	1	....	2	4
Scarlet fever	....	....	2	....	....	2
Diphtheria	....	....	3	1	1	5
Pneumonia	....	1	2	....	1	4
Cerebro-spinal meningitis	....	1	....	1	....	2
Tuberculosis	2	1	1	1	1	6
Infection of navel	1	....	....	....	....	1
Erysipelas	2	....	....	....	....	2
Septicaemia	1	....	....	....	....	1
Measles	5	....	6	2	....	13
Whooping cough	4	2	3	....	....	9
Influenza	....	....	1	1	....	2
Meningitis and abscess	....	....	....	1	1	2
Intussusception	1	....	....	....	....	1
Volvulus	....	....	1	....	....	1
Rheumatism	....	....	....	2	1	3
Gastric ulcer	....	....	....	....	1	1
Suffocation	1	....	....	....	....	1
Accident	....	1	....	....	....	1
Burns	....	....	2	....	....	2
Nephritis	....	....	....	....	1	1
Gastritis and diarrhoea	1	2	....	....	....	3
Bronchitis	2	....	....	....	....	2
Prematurity	10	....	....	....	....	10
Haemorrhage	1	....	....	....	....	1
Post maturity	2	....	....	....	....	2
Illfeeding	6	....	....	....	....	6
Inattention at birth	2	....	....	....	....	2
No obvious cause	3	....	1	....	....	4
Convulsions	....	1	....	....	....	1
Totals	53	9	23	9	9	103

Note.—The death of every child under the age of 17 years is made the subject of enquiry, in which all matters connected with the medical history of the child are considered, and from the available evidence the conclusion is drawn as to what was the main factor which destroyed life. In the above table the deaths are given in accordance with these findings, so that they do not necessarily correspond with the official records

INFECTION.

INFECTION.

Infection, which covers considerably more than half of human disease, belongs to that department of biology which deals with the interaction of organisms living in intimate connection with each other. Organisms which live upon others are roughly divisible into three classes; those which are parasitic and which live upon the host to his detriment; those which are semi-parasitic and which live upon the host without detriment to him; and those which are saprophytic, which live upon waste products and take nothing from the host except heat. In studying the phenomena of human parasitology it becomes clear that the same organism may act in any one of these capacities according to circumstances. What we call infectious disease (which includes all human diseases characterised by certain reactions of which increase of body temperature is the most obvious) is really part of the natural history of symbiosis and is, in its essence, a process by which organisms, originally parasitic, are rendered incapable of further damaging the host, so that in future they live upon him as saprophytes or semi-parasites, innocuous so long as the condition of the body of the host produced by the reaction continues. Since we are very much concerned with our own health and destiny and have no personal interest in the parasites which tend to destroy us, it is only natural that until quite recently infective disease has been looked upon as a perquisite of man, and not in its true light as a struggle for survival between organisms, on both of which nature looks with an indifferent eye. It is impossible to understand the nature of infection unless it is considered in this light as a biological phenomenon in which man, the host, plays one part only; and until the nature of infection is understood, no means either for its treatment, where necessary, or for its suppression, where advisable, can be satisfactory. The vast increase in knowledge of the phenomena of infection which has been accumulating slowly, since the days of Pasteur, and with accelerating rapidity during the last decade, has added tremendously to our power of protecting man from becoming infected with parasites with which he need not necessarily live in communion, and enabling him to withstand or react to those parasites which, being co-extensive with mankind, he cannot escape.

The host—man—is a highly specialized organism which is undergoing evolution at a comparatively slow rate; so slow that the ten thousand years of the historic era have produced little material difference. The parasites which affect mankind, are in a different state, being capable of evolutionary changes within short periods. Since most of them are capable of undergoing many hundreds of generations in the course of a day, it is possible for them to become profoundly altered within a comparatively short period.

Since the majority of the human parasites are ubiquitous wherever man congregates, it follows that it is impossible for man to escape infection and the only chance of human survival depends upon the ability of the human body to render itself immune to the deleterious effects produced by such parasites. There are however, others which are comparatively rare, at all events locally, such as the germs of plague and cholera from which it is possible for man to escape contact. The disease-producing organisms of mankind are all, or nearly all, strictly parasitic, they live upon the host and cannot live apart from him. It is true that it is often possible to grow them apart from their host for short periods under very special conditions; but in general it may be said that the parasites of mankind which produce disease die speedily unless they can find another host.

Some parasites are harmless when alone, but become virulent when growing in common with others; others again are inhibited or destroyed by contamination. Many parasites spread direct from human host to human host; others require an intermediary host and undergo alternate generations or periods of rest.

There are some organisms which produce poisons which are highly deleterious to mankind, though the organisms themselves are not parasitic, such as the bacillus tetanus and the bacillus botulinus. The former, which produces lockjaw, can indeed grow in dead material which is still inside a body, such as the contents of a wound, but it is incapable of invading the living body, though the poison it produces can be readily absorbed. Human parasites belong to various different orders of the animal and vegetable kingdom. The most important, (or at all events those which are best known), belong to the schizomycetes or fission fungi; but there are a great number of animal parasites and a number of organisms which being ultra-microscopic, cannot be seen directly and whose nature is at present doubtful, which are equally important with the better known microbes.

The infections of mankind have from time immemorial been separated and classified. Until recently such classification was based upon anatomical and clinical phenomena; but this classification gives us nothing but names, and usually misleading ones. Another classification, more scientific and more productive of practical result is the division of the infections according to the nature of the infecting parasite. The objections to this classification are, however, twofold. In the first place it is only in a small number of infections that we are certain of the nature of the parasite, and in the second place it is by no means certain that these parasites are not capable of assuming different forms and producing different clinical reactions.

The increase in our knowledge of infection has completely revolutionised our ideas of acute disease and it should have revolutionised our methods of prevention and treatment. To some extent it has done so, but nothing like to the extent which it might have done. Yet there can be no question that the older attempts at suppression and treatment of acute disease are rapidly becoming obsolete and methods based upon strict science are taking their place. In the prevention of infectious disease we are still bound down by traditions which are not only obsolete but which have become ridiculous. The parent of all our administrative machinery is the Public Health Act of 1875, which was introduced before any part of our knowledge of infection had come into existence, and though the provisions of the 1875 Act have been much modified, augmented and in many ways altered we are still, to such extent as we will submit to it, confined by laws which are scarcely more modern than the laws against witchcraft. Fortunately, however, the Ministry of Health, which controls the prevention of disease in this country, is far more enlightened than the laws which it administers and demonstrates a progressive spirit which enables the control of infection in this country to be carried out in a rational spirit.

Some of the infectious diseases are notifiable, *i.e.*, the local Medical Officer of Health must be informed of their occurrence. Others are not so notifiable. The Medical Officer of Health is empowered to put into action certain laws and regulations in connection with some infections, but not with others. He has powers over certain infections which he does not want and never utilises, and not over others where they are essential. Thus, he may cause to be shut up a common lodging house on the occurrence of a case of erysipelas—which he would never do if he were in his senses ; but he may not shut up the same common lodging house for an outbreak of plague—which he certainly would do whether or not he had the legal power to do so.

NOTIFIABLE DISEASES.

The diseases notifiable in England are smallpox, scarlet fever, diphtheria, erysipelas, typhus, typhoid and para-typhoid fevers, ophthalmia neonatorum, tuberculosis, polio-myelitis, polio- encephalitis, encephalitis lethargica, cerebro spinal fever, dysentery, cholera, plague, malaria, pneumonia, intermittent, trench and puerperal fevers, and one or two other diseases which do not exist. These diseases are notifiable under different Acts and Orders and the machinery for dealing with them varies considerably.

Scarlet Fever.

In 1925, 173 cases of scarlet fever were notified in the borough, excluding those cases that were withdrawn. Two deaths were

attributable to this disease. The number of cases of scarlet fever notified in Swindon during each of the past five years was 158, 257, 173, 20 and 173. The deaths from the disease were respectively 2, 2, 0, 1 and 2. A special method of controlling the disease was in operation from February, 1924 to February, 1925. During that period 11 cases only were notified.

At the end of May, 1925 an epidemic of scarlet fever swept over part of Swindon and the neighbouring district. No value would accrue from a description of this epidemic unless it were considered as a whole. It has therefore been considered more convenient to discuss this epidemic in the Annual Report of the Isolation Hospital. An extract from this report is given in the appendix.

ERYSIPELAS.

24 cases of erysipelas were notified. 11 were removed to hospital and 4 died.

Erysipelas is not a contagious disease in civil practice, though occasionally it will spread in an overcrowded hospital. It is, however, a suitable disease for treatment in an infectious hospital as it is inclined to interfere with midwifery and surgical practice.

PUERPERAL FEVER.

7 cases of puerperal fever were notified, but the notification of this disease is so faulty that this figure carries no meaning whatever.

THE PNEUMONIAS.

The statistics for pneumonia for the past five years are as follows :—

Year.	Total No. of cases notified.	Total No. of deaths.	Cases removed to Hospital.			Cases treated at Home.		
			No.	Deaths	Death Rate	No.	Deaths	Death Rate
1921	36	19	....	....	....	36	19	52
1922	156	43	1	0	0	155	43	27
1923	68	28	12	0	0	56	28	50
1924	175	62	31	5	16	144	57	46
1925	204	61	50	10	20	154	51	33
5 Years.	639	213	94	15	16	545	198	36

This table requires explanation because it does not agree with the official figures. The deaths attributable to pneumonia by the registrar general are 19, 44, 28, 47, 37. In the above table deaths are accredited to pneumonia where the pneumonia infection is believed to have caused the fatal issue ; but in the registrar's tables, pneumonia is only considered as the cause of death when it is the primary disease. In years of epidemic whooping cough and measles (1924, 1925) the discrepancy between the two sets of figures is considerable.

Prior to 1922 notification of pneumonia was most imperfect, and no investigation was made either into the cases or into the deaths. Since that date the figures are reliable. Cases of pneumonia were not admitted into the fever hospital until the end of 1922.

The 61 deaths from pneumonia which occurred in 1925 may be classified as follows :—

Primary pneumonia	22
Pneumonia secondary to whooping cough	9
Pneumonia secondary to measles	12
Pneumonia secondary to influenza	9
Terminal pneumonia	9

During the last two months of the year accommodation at the fever hospital for cases of pneumonia was strictly limited, so that we could not admit all cases that sought admission.

Pneumonia stands first of all human infections. In temperate climates it causes more death and more disease than all other infections put together ; yet it is that which is in general least controlled and that in which modern methods of treatment and suppression are least utilized. Pneumonias of all forms are caused by a parasite, the pneumococcus ; or rather by a group of parasites known under that name. There are at least four (and in all probability more) distinct varieties of the pneumococcus which produce distinct forms of disease and for which a distinct form of immunity is requisite for resistence. All forms are common and all varieties of the parasite may be found upon the bodies,(chiefly in the mouth), of persons living in communities. It would appear that everybody in a civilised country must somehow obtain immunity to all varieties of the pneumococcus. He may do so, according to circumstances, by undergoing a most trivial illness—many varieties of cold in the head are pneumococcal reactions—or he may have to undergo a most severe and dangerous disease in which the chance of his failing to establish immunity is great. The immunity established towards the various varieties of the pneumococcus lasts for a more or less indefinite period and probably requires renewal from time to time. It is probable that periodical colds are the normal method by which the body maintains its resistence to the pneumococcus, and that it is infection with a strain of pneumococcus which is foreign to the host which causes the severe forms of the disease. The immunity to the pneumococcus is probably never complete, so that failure of health will render the body susceptible to reaction to pneumococci which live upon the mucous membranes and normally do no harm. Invasion of the body by the pneumococcus in this way is the ultimate cause of death in most chronic diseases and probably is the final act in

old age. The pneumococcus is, therefore, the most persistent and the most virulent of the enemies of mankind, and as has been said, there is reason to believe that it always wins in the end. Human life is in this respect a long drawn out losing battle against the pneumococcus ; all that we can do, or hope to do, is to prevent these organisms from destroying us until our bodies are worn out or useless. The pneumococcus is strictly parasitic and cannot live apart from its living host. Exposure to air and to sunlight are fatal to it, but where it has the opportunity of spreading from one host to another as it does in conditions of overcrowding and lack of ventilation and sunlight it is, unfortunately, the most actively infecting of all known parasites. Thus one will see pneumococcal infection spread in an overcrowded hospital ward or in an overcrowded building in a way that is not seen with any other infection. It has been said that a cold in the head is very often a pneumococcal reaction. It is by no means always so, for colds may be reactions against infections of many kinds which can be differentiated only by bacteriological methods. The disease which for countless generations has been known as pneumonia is one form of severe reaction to the pneumococcus in which the stress of the infection falls upon the lung. It is this form only which is notifiable and it is to this form that the term pneumonia is often confined. It might be supposed that since the pneumococcus is one of the commonest causes of cold in the head the disease known clinically as pneumonia should often start from a cold in the head. This is a popular superstition. But one person with a cold in the head due to the pneumococcus may, and extremely frequently does, give rise to clinical pneumonia or to certain forms of puerperal pyrexia or other form of grave disease in others who come in contact with him.

The treatment of pneumonia, until recently, has been entirely a question of nursing, and in the main it is so still, though research into respiratory functions has very materially modified our ideas as to how it should be nursed. It is a self-limited disease which in the majority of cases will terminate in recovery without intervention. Those cases which are not favourable can frequently be made favourable by serological treatment. We are only at the beginning of the serological treatment of pneumonia, but already a considerable difference in the mortality from this disease has been achieved. One can notice from the table the considerable reduction of the death rate of the cases treated in hospital compared with those treated at home. Not all of this reduction, by any means, is due to serological treatment but part of it is. By pathological investigation it is possible to find out within about twelve hours whether pneumonia will naturally end in recovery or in death. Serological treatment is only indicated in those cases which without it will prove fatal. The prevention of pneumonic

infection and its limitation to the milder and harmless reactions is a matter of great public health importance—perhaps the most important of all things in public health. To keep the body from infection with the pneumococcus is an impossibility, but it can be kept from massive doses and highly virulent organisms. If we all lived in the open air, pneumonia would become a much less fatal disease and it appears that the greater the exposure and worse the weather conditions under which one is living the less liable is the body to be seriously affected with the pneumococcus. It is by proper ventilation, decent housing conditions and an open-air life that the prevention of pneumonia will chiefly be achieved. But something can also be done in another direction. Pneumonia being a biological struggle in which both a host and a parasite are concerned, attention to the host may increase his resistence and so enable him to defy the parasite. We have not at present any way of producing artificial immunity to the strains of the pneumococcus, though it is by no means impossible that before this is printed such may be in existence. But since the fight between the host and parasite is mainly fought in the blood and blood-producing apparatus, a considerable amount can be done during periods of apparent health to relieve this system from conditions which are injuring it.

Meningococcal Infection.

The meningococcus is a somewhat highly specialised organism which derives its name from its power of causing meningitis. Cerebro-spinal meningitis, or spotted fever, is the most formidable form of meningococcal disease, but the organism produces reactions of a far less serious character. In times of prevalence of cerebro-spinal fever it is not uncommon to find the meningococcus causing 'cold in the head' in those who have been in contact with the disease. It would appear that this is the usual reaction to infection with this organism.

An outbreak of cerebro-spinal fever occurred in Swindon in the early part of 1925. One case, typically severe, ended fatally. Three other cases in the same house developed the disease in a mild form without the nervous system being involved; they recovered. Earlier in the year a case of cerebro-spinal fever was notified, which recovered. There was no pathological examination in this case so that there is some uncertainty as to the correct diagnosis. Another case of meningitis occurred during this period which was severe but recovered with slight permanent damage to the nervous system. Here also no pathological examination was made so the diagnosis is doubtful. Another case occurred in a woman who became insane and died in Devizes Asylum. A post-mortem examination was made but no bacteriological

examination. Here again the diagnosis is doubtful. Two other suspected cases in adults, diagnosed as encephalitis lethargica, were admitted to hospital. Neither of these was a case of acute infection of the nervous system. At the same time a child was admitted to hospital supposed to be suffering from cerebro-spinal meningitis. This case ended fatally and a death certificate was given under that diagnosis, but the bacteriological examination made it certain that it was a case of tuberculous meningitis. All these cases occurred in the same district of the town. At the same time there was a mild outbreak of herpes zoster in the same district.

Somewhat complete notes were taken of these cases which afforded some fragmentary evidence which is of value only as indicating the necessity for research.

Encephalitis lethargica, of which no true case occurred in Swindon during 1925; polio-encephalitis, of which 1 case was notified, and poliomyelitis, of which 1 case was notified, during 1925, are obscure infections more common than is generally supposed. Most of the cases that occur fail to be notified during the acute stage and their true nature is only recognised by their after-effects.

GONORRHOEA.

The control of gonorrhoea falls under the County Council except as regards ophthalmia neonatorum, which is discussed elsewhere in the report. This disease is of very great importance in preventive medicine and causes one of the big problems in ante-natal work. It is liable to become exceedingly chronic, if not incurable, and to produce remotely a large number of dangerous diseases, particularly in women. It is the cause of one of the diseases included under the term "Puerperal Fever."

In Swindon gonorrhoea is met with mainly amongst respectable married women and the method by which they become infected is open to much doubt. The disease is by no means uncommon in young girls, where unless it is recognised and treated specifically, it remains throughout life. There is strong reason for believing that the great majority of these cases are not of sexual origin. Overcrowding and dirt, and particularly many persons sleeping in one bed, tend to the dissemination of this disease. This remark is commended to those who are considering the problems of housing.

SMALLPOX.

There was no smallpox in Swindon during 1925.

In 1923, 3 cases of mild smallpox occurred which were traceable to the epidemic at Gloucester. Otherwise the borough has been free during the past five years. Chicken pox was less obvious in 1925 than it was in 1924 and 1923, but perhaps this is only due to the fact that less attention was given to it.

THE TYPHOIDS.

No case of true typhoid fever occurred in the borough in 1925. During the last five years there has been only one case of borough origin.

There were, however, 3 cases of para-typhoid B, one of which ended fatally. The fatal case was infected away from Swindon whilst on holiday in Devonshire. The other two cases proved untraceable, but it is curious that all three occurred within a stone's throw of each other, though at different times of the year.

DIPHTHERIA.

During 1925, 75 cases of diphtheria were notified. 19 of these cases proved not to be diphtheria, so that the true number was 56, and of these 3, though bacteriologically positive, were not suffering from the disease, so that the actual number of true cases was 53. Every case was removed to hospital.

The numbers of true cases during the last five years in Swindon were 39, 22, 18, 60 and 53 ; and the deaths were 6, 2, 1, 0 and 6.

At the beginning of 1921 Swindon was just recovering from an epidemic of diphtheria of a very virulent type. In March, 1921, it was found that one citizen of the borough had been chiefly instrumental in the spread of this infection. On removal of this citizen the epidemic collapsed and an attempt was made to free the borough as far as possible from spreaders of the diphtheria bacillus. This work was long and laborious, but profitable. For the remainder of 1921 and throughout 1922 and 1923 very little diphtheria occurred in the borough, and what little did occur was in all cases traceable to outside infection. Towards the end of 1924, however, an epidemic wave of diphtheria swept over Wiltshire from West to East and infected the rural districts lying around Swindon. This epidemic was introduced into the borough through the unusual medium of men working in the Great Western Railway factory, and the characteristics of diphtheria in 1924 were that the majority of the patients were adults, the majority of the positive contacts were adults and the disease itself was in an unusual form and without fatality. In 1925 however, the disease became much more serious. An outbreak of diphtheria,

(of what extent is unknown) whose virulence was exceedingly high, started in Hurst Park, outside the borough, during the epidemic of scarlet fever. From this source several cases in the borough can be traced. In November an outbreak of diphtheria of extremely severe form occurred in connection with a school. Three cases only occurred, but they were so formidable in type that active methods of tracing the source of infection and suppressing it were prosecuted immediately and vigorously. The source here was a person, who living outside the borough, worked within, who had recently had an attack of sore throat. Twelve positive contacts were found in connection with these cases apart from the members of the same families, which furnished six other positive contacts. These were quickly freed and the epidemic collapsed.

Diphtheria is better known to us than any other human disease and theoretically should be capable of complete control. The disease is caused by a highly specialised branching fungus. This organism is a strict human parasite growing only on human mucous membrane and rapidly dying when it becomes separated from its host. It is not a normal symbiotic with man, and generally when it finds a lodging is not very happy and speedily perishes. But in some throats it will thrive for indefinite periods. Should it alight upon a new host it may or may not set up the disease known as diphtheria. Whether it does so or not depends upon the state of immunity of the host. Immunity to diphtheria can be demonstrated and measured, and when it is absent or feeble can be strengthened to complete resistence. There are, therefore, for the suppression of diphtheria two methods available, both of which have their value and their limitations. Since the organism of diphtheria is not an ordinary inhabitant of the mouth it is possible to keep it away from a stationary isolated population, or if it gets in accidentally, to suppress it. This method is applicable in limited communities, but is comparatively useless in large centres of population where a proportion of the citizens will always be found to be harbouring the organism, and acting as centres from which new epidemics start. Swindon is a town in which much may be done to keep the inhabitants free from the organism of diphtheria. Much has been done in this direction, and it may be said as a result of experience that the diphtheria organism is not found in the throats of healthy children who have not been in immediate contact with the disease. As a slight proof of this it may be mentioned that every case of scarlet fever admitted to the fever hospital is examined for the presence or absence of diphtheroid organisms, and if such are found they are tested for virulence to see if they are the true parasite. In a series of some 250 consecutive cases not a single virulent diphtheroid was found. Nor have we in Swindon found virulent diphtheroids in throats which have been swabbed for any purpose except that they are

suspected of having diphtheria or of having been in contact with it. But it must be admitted that this method of controlling diphtheria, even under the most favourable circumstances, is very uncertain. A method of preventing the disease dependent upon the fact that the organism is harmless to those who are immune to it is now available. As has been stated, the state of immunity of any person to diphtheria can be estimated, and if it is low it can be raised. This method, which is extensively used in America, where formerly diphtheria was highly prevalent, is now used in many countries of Europe, including our own, and doubtless before long will become the standard method of stemming the ravages of what has been throughout human history one of the most persistent plagues of mankind. Except occasionally, and for special reasons, this method has not been used in Swindon up to the present owing to the pressure of work upon the medical staff of the Corporation. Beyond the two methods above described for suppressing diphtheria all other proceedures (which are still used extensively), are a mere waste of time and money.

The Swindon Corporation Act allows the borough to pay the wages of persons who, being contacts, but not actual sufferers from the infection, are kept in quarantine by the medical officer. This provision is exceedingly valuable. The expense involved is not great, for quarantine is now used but seldom, and only for special purposes. It is in connection with diphtheria and one or two rare infections that quarantine for limited periods is useful, allowing infected units to be found and rendered infection-free before being discharged back into the population.

TUBERCULOSIS.

The treatment of tuberculosis is in the hands of the Wilts County Council, but the control of the disease is one of the duties of the borough medical officer. It will be seen from the tables that tuberculosis was less prevalent in 1925 than it had been previously and that for the last twelve years there has been a considerable, though somewhat irregular, improvement in the position of the borough in regard to tuberculosis. A register of cases of tuberculosis of all forms has now to be kept, and kept up to date. It is only recently that this register has been in a trustworthy condition but it will be possible in future to keep it in such a state that it will give a true index of the state of the town in regard to this disease.

The problem of the control of tuberculosis is one of the most serious matters in preventive medicine. The difficulties to be overcome are formidable and somewhat exceptional. Briefly stated, every human being in a civilised community becomes infected and repeatedly infected, with the organism of tuberculosis.

It is not possible to prevent this infection so that the problem really is not to prevent the tubercle bacillus from infecting the body, but trying to arrange that it should be incapable of pursuing its normal course of destroying its host. On the side of infection several matters are of importance ; thus the danger resulting from infection depends, first, upon the age at which the body becomes infected. Here the later the initial infection, the greater is the chance of resistence. There is a growing feeling that in all cases where tuberculosis pursues a fatal course at any age, the infection dates from the earliest days of life. Thus, a tuberculous mother is very liable to infect her infant with tuberculosis, which may be fatal, either immediately or many, many years afterwards. The dose of infection seems to be important ; minute doses are probably resisted by everyone, whereas massive doses may set up a fatal disease. Thirdly, the type of the tubercle bacillus is important. There are two types which infect man—the human and the bovine. The human is in general the more virulent, but the bovine is very virulent in the first year of life. Lastly, the channel of infection is important, infections through the respiratory tract being generally more serious than that through the alimentary tract.

The preventive medicine of tuberculous infection is founded upon these four points. The condition of the host is, however, of at least equal importance for conditions of overcrowding, ill-feeding, alcoholism and so on, deprive the host of his normal powers of resistence.

The fight against tuberculosis is long and difficult. The success met with so far has been moderate. It has been interfered with greatly by sensationalism and lack of scientific precision in estimating the factors which bear upon the subject. The greatest enemy in our war against tuberculosis is the belief (not limited to those who are ignorant) that a cure for the disease may be discovered. Many methods for the treatment of tuberculosis have been introduced, all of which have some limited value, but all become discredited because too much being expected of them, they fail to realise expectations. In fact, about half a dozen times a year some ' Cure ' for tuberculosis is boomed in the newspapers. If the public can once get it driven into its head that a cure for disease which has produced anatomical change is a pathological chimera, we shall get along much better in our fight against disease. There is a normal craving of the human mind after elixers, which is so deeply rooted that even prolonged scientific training cannot eradicate it entirely, even in minds of superior calibre.

The treatment of tuberculosis is within the province of the County Council and not of the borough, but there is one means of mitigating the disease which can be utilised by the borough

without interfering with any other authority or assuming powers that the borough has not got already. This is the housing of cases of tuberculosis which have been temporarily arrested. A certain proportion of cases of early tuberculosis are capable of arrest by sanatorium treatment, etc. Residence in a sanatorium or similar institution is only economically sound for a short period. Many such patients are returned with the disease arrested and a possibility of the arrest being permanent if circumstances are favourable. In general such patients are returned to their own homes and their former condition of life, the benefit which has accrued from treatment is promptly lost and the disease becomes fatal. It would be possible, as part of a housing scheme, to build a small number of houses of such a type and in such a situation that they would be favourable domiciles for cases of arrested tuberculosis. Such could be built and let only to families containing some member who has tuberculosis recently arrested. The expense of such a measure would be practically nothing and the benefit to the community might be very considerable, for unfortunately most of such patients are young adult males with families dependent upon them and the saving of such lives is, of course, of paramount importance.

Measles.

Measles was exceptionally prevalent and virulent during 1925, this disease influencing the public health of the town more than any other. Measles, not being a notifiable disease, it is always very difficult to get down to any facts bearing upon its epidemic prevalence and type. A considerable number of measles cases were treated in the isolation hospital owing to their developing such complications as pneumonia or croup, and evidence of considerable scientific accuracy was available from the hospital practice which could not be gathered in the course of the health administration of the borough. Altogether measles caused 13 deaths, and a very large number of grave complications.

Whooping Cough.

Whooping cough was prevalent in the first two months of the year, but not again until November. In the last two months of the year there were a few cases only. Nine deaths from whooping cough occurred, mainly during January and February.

Chicken pox, German measles and mumps were not markedly prevalent during 1925.

Cancer.

The medical officer's department possesses no information regarding cancer except the death returns. The number of deaths

from cancer which occurred in 1925 was 89. For the five years the death figures have been 56, 57, 68, 79 and 89. The prevalence of cancer cannot be gauged accurately from the death returns for the improvement of surgery results in an increasing number of cures. Locally in Swindon the lack of hospital accommodation has a material bearing upon the fatality of cancer. Where cancer occurs in a position where it can be recognised early and got at, the mortality will depend upon the time when the patient first presents himself for treatment and the time which elapses between presentation and the actual operation. The first factor is, of course, dependent upon the patient himself. Education of the people to seek treatment for cancer on the first suspicion of the disease is essential. The rise of ante-natal and maternity clinics will exercise a most important influence in getting some forms of cancer under treatment early. The delay which occurs between the patient first seeking advice and obtaining operation is dependent upon the available accommodation and one has to regret that in many cases in Swindon delays occur which convert favourable into unfavourable cases. Going very carefully into the subject, the medical officer of health came to the conclusion that if all cases of cancer could be operated upon immediately they presented themselves, the local mortality rate from this disease in Swindon might possibly be reduced 17 per cent. (1924).

Acute Abdominal Diseases.

Acute abdominal diseases, particularly appendicitis and peptic ulcer, have for the past generation been increasing rapidly and are now a most serious problem in medicine. Like so many points in which accurate information is essential, the evidence we possess upon the subject of acute abdominal disease is fragmentary and unreliable. At the Victoria Hospital alone 111 cases of appendicitis were operated upon amongst the inhabitants of the borough. This probably represents about 70 per cent of the total number of cases and gives some indication of the formidable problem presented. The great success of the curative treatment of appendicitis has influenced unfavourably the study of the disease from its preventive aspect, yet there is reason to believe that the disease is in the main preventable and that the liability to it can be estimated and probably suppressed. Very probably the same is true of the peptic ulcers, which are almost equally frequent disasters. Doubtless, in course of time we shall collect scientific evidence concerning these diseases upon which rational methods of prevention can be based. At present we have to be content with pompous platitudes and vague generalisations, upon which science is powerless to proceed.

PATHOLOGICAL DEPARTMENT.

A pathological laboratory is an essential, perhaps the first essential, of a modern public health department. In Swindon it is more than usually important for no other means for pathological work are available in the town. In 1920 there was no laboratory work done at all, but early in the period we are considering, an endeavour to remedy this was put on foot. Previously such little work as was done for the public health department (and a part from the examination of swabs for diphtheria there was very little indeed) was sent to London or to Bristol, a method which was expensive, and owing to postal delays, not much better than useless.

From the table it will be seen that the work now undertaken is considerable and covers a wide field. This table does not take cognisance of the work done at the fever hospital, which appears in a separate report. With the exception of the preparation of bacteriological material, inquiries involving biological tests and the analyses of water and sewage, the investigations are carried out at the public health department or at the fever hospital. The apparatus we possess is good but scanty; the room space bad and scanty. The latter is about to be improved, and within a few months we hope to have the equipment and accommodation suitable for modern clinical pathology.

VITAL STATISTICS.

942 births occurred in Swindon during 1925, giving a birth rate of 16.56. The birth rates for the past five years have been 20.27, 18.98, 17.77, 17.11 and 16.56, averaging 18.13 for the quinquennium, against 18.01 for the previous five year period and 22.41 for the five years before that. Except for the abnormal fluctuation which occurred during and immediately after the war, the birth rate has steadily declined throughout the whole of the present century ; locally from 30.6 in 1901 to 16.56 in 1925. For many years the birth rate of Swindon has been considerably below that of England and Wales. There is in Swindon a factor which is disturbing the birth rate—the drafting of many of the most fertile citizens into Hurst Park Estate which is without the borough boundary. On the whole there is reason to believe that the fertility of Swindonians is at least stationary, if it is not increasing slightly.

Of the births 459 were males and 483 were females, giving an average of 93 males to 100 females, against the normal constant of 104 males to 100 females. This is very curious as even when dealing with small numbers it is very rare to find the female births

in excess of the male. During the last five years the proportion of male to female births has been 100, 108, 111, 105 and 93, or an average of 103 males to 100 females. Infantile mortality during the same period, though it has been generally very low for both sexes, has been considerably higher for males than for females, particularly during the first month of life. In 1925 there were 18 male and 11 female deaths before the end of the first month so that the 1925 addition to the population is markedly female.

ILLEGITIMACY.

The number of illegitimate births was 38,—20 males and 18 females, or 4 per cent of the total. This is about our average figure for Swindon. It is low, but Swindon is a town in which the illegitimate birth rate would be expected to be low.

631 deaths occurred in Swindon during 1925, giving a death rate of 11.09. The death rates during the last five years have been 9.58, 12.17, 9.27, 10.78, 11.09—an average of 10.57.

The death rate for England and Wales has fallen since the beginning of the century, but the fall has been less steep and much less steady than the corresponding fall in the birth rate. There is now a tendency for the rate to increase. Locally the death rate varies considerably from year to year, but very little from hemi-decade to hemi-decade. Except over long periods, dealing with great numbers, the death rate is not a figure worth much argument. It is influenced by so many varying factors that in small communities the unavoidable error in casting the rate is so great, as to render the result of little value.

Of the 631 deaths, 331 were males and 300 were females, or about 110 males to 100 females. The death rate among males is generally higher than that among females as the male is the more vulnerable sex and his life is shorter. The influence upon the coming population of the ebb and flow during 1925 is therefore a net increase of 311, of which 128 are males and 183 are females. Should this discrepancy between the sexes continue the town would quickly become predominently female.

During the five years 2,519 males were born and 2,426 females and 1,506 males and 1,464 females died, leaving a net increase of 1,013 males and 963 females. There is therefore at present no opening for the discussion of means for accommodating the excess of women over men.

The figure for Swindon for correcting the crude into the standard death rate is .958. This means that the population of

Swindon can be expected to die less rapidly than that of England and Wales as a whole in the proportion of 958 to 1000. The cause of this is that, being an industrial town, it attracts young adults at the ages when death is uncommon. It offers no amenities which attract chronic invalids and there is a normal tendency for Swindonians who retire to leave the borough and die elsewhere. In calculating the deaths of a population, deaths of citizens which occur elsewhere than in the town of which they are citizens are credited to their normal residence, but if they have left the town to reside in another part of the world, their deaths would be credited to the place in which they died. It is necessary to bear these details in mind when contrasting the death rates of various districts. They disturb the death rate so much, that dealing with a population of 50,000 the annual figures tell us very little and the collection of death rates for periods of less than a year are a sheer waste of time.

The infant mortality rate is the most delicate rate for calculating the health of a community as the data from which it is cast are practically constant and independent of the age or sex distribution of the inhabitants. The only error to which it is liable is that, being obtained by dividing the number of births in one year by the number of infant deaths in the same year, it will only be absolutely true if the birth rate is constant. With a falling birth rate, the infantile mortality rate rules too high. The illegitimate death rate is generally at least double that of the legitimate rate—a cynical smirch on our boasted civilisation, for the inference is obvious.

In 1925 the illegitimate death rate in Swindon was 52.63 or less than the legitimate rate. For the last five years the average rate has been 110.55, as compared with 59.35, so that it is not quite double. The reasons for the increased death rate among illegitimate children are three-fold. Firstly, they are rarely breast-fed, secondly, attempts are more frequently made to get rid of them before birth, and thirdly, more determined and often successful attempts are made to get rid of them after birth. Against these adverse factors must be placed a very powerful reason why they should survive, *i.e.*, that their parents are generally young and vigorous. In some parts of the world the illegitimate death rate is terriffic. In one very progressive city within the Empire it is 78 per cent. In England there has been a decided and welcome fall in the illegitimate death rate, as owing to improvements in our legislation and communal morality, the incentive to murder them is becoming less. The infantile death rate for 1925 was 60.50, the average for the past five years is in round numbers about 60, against 80 for the five years that preceded it. It shows a tendency to become stationary, the only variations recently being accounted for by the prevalence or otherwise of measles and whooping cough.

The abolition of infantile diarrhoea reduced the infantile death rate about 30 per cent, and the general care and consideration given to the infant reduced it another 30 per cent. So far as these two factors are concerned we are now down on base rock and the further reduction of infantile mortality will only come about by the suppression of those causes which inhibit the inherent vitality of the infant and operate mainly, if not entirely, before its birth. It is, therefore, by ante-natal research only that any further significant reduction of infant mortality can come about. What can be accomplished in this way we do not at present know.

RATES PER 1,000 OF POPULATION.

Scarlet fever attack rate	3.0
Scarlet fever death rate	.03
Diphtheria attack rate	.98
Diphtheria death rate	.10
Pneumonia attack rate	3.5
Pneumonia death rate	.65
Tuberculosis attack rate	1.6
Tuberculosis death rate	0.89
Cancer death rate	1.5

Nothing much will be gained by discussing the zymotic death rates for such a small population as Swindon, but the death rates for tuberculosis and cancer are important. The death rate for tuberculosis for 1925 was 0.89 per 1,000 inhabitants. This is the lowest recorded since 1914. Up to 1923 the tuberculosis death rate averaged 1.3. In 1924 it dropped to 0.93 and this year to 0.89.

The cancer death rates during the five years have been in round numbers 1, 1, 1.2, 1.4 and 1.5, an increase which is significant and more than can be accounted for by the increase in the average age of the population.

The year 1925 is notable for the work that was done in connection with cancer research. There is now a tendency to study this subject more seriously, to talk less and to work more. The problem is not one which can be settled in a hurry, for the main causes of cancer are probably exceedingly remote and may be found to operate from the beginning of life. There has been a far greater improvement in our knowledge of cancer during the past few years than the public is aware of, but the practical position is not altered. Cancer is a disease which offers considerable possibility of reduction by surgery if it is attacked as early as possible. There is no treatment apart from excision which offers the least chance for cure, and there is no chance of cure even by this method unless it is used early.

CONCLUSION.

One must be satisfied with the progress which Swindon has made during the past five years. When we trace the steady improvement in every direction of public health activities which have been recorded, it would be ungracious indeed, not to acknowledge that the Guardians of the town have done their work well and exhibited an enlightened and progressive policy. Much may still be open to criticism, much room remains for further progress, much which might have been done remains undone; but considering the great difficulties and uncertainties of the times, the limited assets of the town, the little help which is available from outside sources, nothing but political bias could deny that Swindon Borough Council has demonstrated its capacity to govern the town to its advantage, at all events so far as the health of its citizens is concerned. But satisfaction with the past must not blind us to the present and future needs for further progress. Many changes in public health administration may be expected in the immediate future—changes which demand much level-headed thinking to turn into real advantages and a firm grip and rigid determination to ensure that they may make for progress and not for reaction. In the more strictly medical part of public health the ceaseless advance of theoretical knowledge necessitates ceaseless action to keep up with it. The application of truth is often as difficult as its discovery and is hampered far more than is pure research, by fixed ideas, obsolete practices and vested interests. Even the Ministry of Health, enlightened and progressive as it is now, allows the continuation of methods which its own scientific publications prove to be obsolete. Legislation must always halt behind progress, but in no direction has it fallen so far in the rear as in connection with preventive medicine. Practices have become fixed and any attempt to alter or suppress them is met with hostile obstruction. Proof that a measure has been tried for a thousand years and completely failed at all times is not considered a reason for abandoning it, for the influence of superstition upon the human mind in its present state of evolution is far greater than the influence of science. Yet there are signs of improvement. It is still true that of the population that is past middle age not one in ten has a correct knowledge of scientific argument or more than the most rudimentary idea of logical deduction. But the increase of education is producing a race which understands the meaning of proof, and which in time will prefer truth to prejudice. Vested interests assail us on all sides. There is a vast section of the community that feeds upon disease and which is not by any means wholehearted in its desire for its suppression. The manufacture of dummy teats, for instance, is still a thriving industry though the proof that the products of its activity produce

serious calamities, is absolute *. None of the truths revealed by physiology and pathology can be applied without encountering a vast flood of opposition from those whose interests are assailed. Yet with it all we do make progress. Much of the superstition of the past generation has disappeared and people are beginning to find that life and health are more valuable possessions than prejudices.

Knowing the enormous advance that has been made for the well-being of mankind by the products of scientific thought, the more intelligent section of the community is wondering why so little benefit has been derived from biological sciences. The reason is not that the science of biology has been any slower in its progress than electricity or engineering, but that, whereas the application of the two latter does not touch man directly, the application of biological science immediately reacts upon his individuality. Any man can discuss dispassionately such questions as the age of the moon or the value of the addition of nickel or tungsten to steel, but cannot keep his temper when discussing the problem as to whether the food value of a turnip is increased or diminished by cooking; for in the latter case his feelings, tastes and prejudices are involved, and these he finds difficult to submit to the scientific argument.

The future of preventive medicine lies entirely in the application of pure science. It is, of course, admitted that the treatment of disease is as much a social as a scientific problem, but the suppression of disease is purely scientific. This is becoming more generally appreciated. Science, which is logical deduction from tangible evidence is dependent for its progress upon evidence, and of late years there has been an endeavour to find out what real evidence we have bearing upon disease and to augment and purify this evidence so that we can use it for deduction. So much of our practice has resulted from expressions of opinion, which are scientifically worthless and from traditions, which if they ever contained any truth, have long since lost it, that almost every problem before us has to be re-considered afresh, and it is seldom found that the truth lies where we expected it. The causes of disease are not what we thought they were. They are not what they are generally supposed to be. Disease itself is not an entity but an event. Its prevention depends upon unravelling its history and disentangling from the complex phenomenon which we call life those adverse threads which become interwoven with it and lead to its extinction.

*Since this report was written the manufacture and sale of dummy teats have been prohibited in France.

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BOROUGH OF SWINDON.

GENERAL STATISTICS.

Area (Acres)	4265	
Population (1925)	56880	
Number of inhabited houses (1925)	13539	
Number of families or separate occupiers (1925)		(Figure not available).
Rateable Value	£276,886	
Sum represented by a penny rate	£1,100 (approx.)	

EXTRACTS FROM VITAL STATISTICS OF THE YEAR.

		Total	M.	F.	
Births	Legitimate	904	439	465	
	Illegitimate	38	20	18	Birth Rate 16.56
Deaths	....	631	331	300	Death Rate 11.09

Number of women dying in, or in consequence of childbirth — From sepsis —; From other causes 4

Deaths of Infants under one year of age per 1,000 births :—
Legitimate 60.84 Illegitimate 52.63 Total 60.50

Number of deaths from Measles (all ages)	12
,, ,, ,, Whooping Cough (all ages)	8
,, ,, ,, Diarrhoea (under 2 years of age)	3

INFECTIOUS DISEASE.

TABLE showing the numbers of Infectious Diseases notified in the Borough during the year 1925.

Disease.	Cases notified at various ages. (Years).												Total cases notified	No. of cases admitted to Hospital	Total Deaths
	Under 1	1-2	2-3	3-4	4-5	5-10	10-15	15-20	20-35	35-45	45-65	65 & upwards			
Diphtheria	1	1	6	4	7	22	10	7	13	2	2	—	75	74	6
Erysipelas	6	—	—	—	—	1	1	—	4	7	5	1	25	11	4
Scarlet Fever	2	—	7	17	22	84	20	9	11	4	—	—	176	149	2
Ophthalmia Neonatorum	9	—	—	—	—	—	—	—	—	—	—	—	9	2	—
Dysentery	—	—	—	—	—	—	—	—	—	—	1	—	1	1	—
Pneumonia	25	17	17	13	12	17	9	12	18	16	34	14	204	49	37
Enteric Fever	—	—	—	—	—	2	—	—	1	—	—	—	3	2	1
Encephalitis Lethargica	—	—	—	—	—	—	—	—	—	—	3	—	3	3	—
Puerperal Fever	—	—	—	—	—	—	—	—	6	1	—	—	7	5	—
Poliomyelitis	1	—	—	—	—	—	—	—	—	—	—	—	1	—	—
Cerebro-spinal Meningitis	—	—	—	—	1	2	—	—	—	—	1	—	4	3	2
Polio-encephalitis	1	—	—	—	—	—	—	—	—	—	—	—	1	1	
Tuberculosis—															
(a) Pulmonary M.	—	—	—	—	1	2	2	4	19	7	8	—	43	—	
F.	1	—	—	—	—	—	1	3	10	4	4	—	23	—	
TOTAL													66	—	42
(b) Non-Pulmonary M	1	1	—	1	1	5	1	2	2	1	—	1	16	—	
F	—	1	1	—	—	2	1	—	3	—	1	—	9	—	
TOTAL													25	—	9
TOTALS	47	20	31	35	44	137	45	37	87	42	59	16	600	300	103

TABLE SHOWING MONTHLY INCIDENCE OF INFECTIOUS DISEASES (Corrected for errors of diagnosis) AND THE NUMBER OF DEATHS DURING 1925.

Disease.	No. of Cases.												Total	No. of deaths.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
Diphtheria	—	3	3	2	1	3	3	2	4	13	16	6	56	6
Erysipelas	1	—	2	2	1	1	4	2	3	2	4	3	25	4
Scarlet Fever	1	—	1	—	1	23	19	21	26	33	24	22	171	2
Ophthalmia Neonatorum	—	—	—	—	1	2	1	2	1	2	—	—	9	—
Dysentery	—	—	—	—	—	—	—	—	—	1	—	—	1	—
Pneumonia	16	9	29	17	12	10	7	5	14	22	33	29	203	61
Enteric Fever	—	—	—	—	—	—	—	1	1	—	1	—	3	1
Encephalitis Lethargica	—	—	1	—	—	—	—	—	—	—	—	—	1	—
Puerperal Fever	—	—	—	1	2	—	—	—	1	—	1	1	6	—
Poliomyelitis	—	—	—	—	1	—	—	—	—	—	—	—	1	—
Polio-encephalitis	—	1	—	—	—	—	—	—	—	—	—	—	1	—
Cerebro-spinal Meningitis	1	—	—	—	1	2	—	—	—	—	—	—	4	2
TOTALS	19	13	36	22	20	41	34	33	50	73	79	61	481	76

Comparative statement showing the number of notifications received of the various forms of Tuberculosis and the Death Rates resulting from each form of the disease for the years 1914-1925.

	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914
No. of cases notified (all forms)	91	111	117	103	98	97	73	116	129	132	140	160
Respiratory Tuberculosis	66	75	75	68	63	72	51	86	102	95	86	101
Deaths from Respiratory Tuberculosis	42	42	48	59	42	55	44	66	60	48	51	53
Deaths from Tuber. Meningitis	5	4	12	6	11	8	8	11	8	10	10	3
Deaths from other forms of the disease	4	7	7	6	12	6	8	11	10	10	8	1
Total deaths from Tuberculosis	51	53	67	71	65	69	60	88	78	68	69	57
General Death Rate for all forms of Tuberculosis	0.89	0.93	1.19	1.27	1.17	1.28	1.16	1.74	1.5	1.3	1.32	1.07
Death Rate for Respiratory Tuberculosis	0.73	0.74	0.85	1.05	0.75	1.02	0.85	1.30	1.15	0.95	0.98	1.0

BACTERIOLOGICAL INVESTIGATIONS.

	Public Health Dept.					School Medical Dept.				
	1921	1922	1923	1924	1925	1921	1922	1923	1924	1925
Examinations carried out by Bristol University		7	3	....	5		....	....	2	1
Examinations carried out at Gorse Hill Hospital :—										
Throat swabs examined		178	161	613	780		4	1	....	....
Urine : Examination for Tubercle bacilli		....	....	....	....		1	....	....	....
Examinations carried out at 61 Eastcott Hill :										
Throat ; swabs examined direct		7	....	....	5		3	1	2	6
Eyes ; swabs examined direct		62	71	48	33		17	9	11	1
Pus and discharges :—										
For Tubercle bacilli		3	8	3	20		13	9	5	8
For other organisms (cultures)		48	43	25	47		20	18	18	11
Hair. Examinations for Ringworm fungus		11	13	18	12		637	430	507	439
Other conditions		....	....	1	3		6	....	5	4
Blood, Histological examinations		2	9	50	48		5	36	66	149
Blood for Wasserman Reaction		....	....	....	2		....	....	....	....
Cerebro-spinal fluid		....	....	1	....		....	....	....	....
Sputum. For Tubercle bacilli		3	1	1	....		7	....	2	....
For other organisms		3	1	1	....		2	....	2	....
Urine-Chemical examinations		78	27	19	15		13	8	23	16
,, Microscopical examinations		....	....	....	9		....	....	....	2
,, Bacteriological examinations		....	3	5	....		....	....	3	....
For diseased meat		....	13	10	16		....	....	....	....
Miscellaneous		6	13	....	....		13	2	2	....
Totals		408	366	795	995		741	514	648	637

No. of samples of water submitted for chemical and bacteriological analysis	....	....	....	20
No. of samples of sewage effluent submitted for chemical examination	....	....	....	11

REVIEW OF THE COMPARATIVE VITAL AND MORTALITY STATISTICS FOR THE BOROUGH OF SWINDON, TOGETHER WITH THOSE FOR ENGLAND AND WALES FOR THE YEARS 1901 TO 1925 INCLUSIVE.

	Birth Rate		Death Rate		Infant Mortality Rate.		Illegitimate Death Rate.
Year	Swindon	England and Wales	Swindon	England and Wales	Swindon	England and Wales	
1901	30·6	28·5	11·8	16·9	102·9	151	—
1902	28·3	28·5	12·7	16·3	104·7	133	—
1903	29·5	28·5	11·27	15·5	106·9	132	—
1904	30·0	28·0	12·49	16·3	111·2	145	—
1905	28·4	27·3	11·2	15·3	95·4	128	—
1906	29·4	27·2	9·9	15·5	86·2	132	—
1907	28·8	26·5	12·3	15·1	91·8	118	—
1908	28·9	26·7	11·8	14·8	101·5	120	—
1909	26·5	25·8	10·8	14·6	78·2	109	—
1910	23·4	25·1	9·7	13·5	86·8	105	—
1911	21·6	24·3	10·9	14·6	103·1	130	—
1912	23·4	23·9	10·3	13·3	76·3	95	—
1913	23·39	24·1	12·08	13·8	86·4	108	—
1914	22·5	23·8	11·5	14·0	73·7	105	—
1915	21·16	21·9	12·83	15·7	67·7	110	—
1916	18·9	20·9	11·3	14·4	72·4	91	—
1917	15·5	17·8	12·25	14·4	88·6	96	—
1918	16·53	17·7	15·13	17·6	81·3	97	129·63
1919	16·86	18·5	11·97	13·8	83·9	89	79·52
1920	23·25	25·4	11·64	12·4	69·0	80	122·44
1921	20·27	22·4	9·58	12·1	67·5	83	102·56
1922	18·98	20·6	12·17	12·9	60·5	77	121·95
1923	17·77	19·7	9·27	11·6	53·2	69	83·33
1924	17·11	18·8	10·78	12·2	63·01	75	192·30
925	16·56	18·3	11·09	12·2	60·5	75	52·63

BOROUGH OF SWINDON.

CAUSES OF DEATH, 1925.

(Registrar General's Official Returns).

CAUSES.	MALES	FEMALES	TOTAL
Enteric Fever	—	1	1
Measles	7	5	12
Scarlet Fever	2	—	2
Whooping Cough	2	6	8
Diphtheria	4	2	6
Influenza	7	9	16
Meningococcal Meningitis	2	—	2
Tuberculosis of Respiratory System	28	14	42
Other Tuberculous Diseases	5	4	9
Cancer, malignant disease	47	42	89
Rheumatic Fever	2	4	6
Diabetes	1	2	3
Cerebral Haemorrhage &c.	18	21	39
Heart Disease	56	47	103
Arterio-sclerosis	7	8	15
Bronchitis	15	25	40
Pneumonia (all forms)	21	16	37
Other respiratory diseases	4	3	7
Ulcer of Stomach or duodenum	4	2	6
Diarrhoea &c. (under 2 years)	3	—	3
Appendicitis and typhlitis	5	1	6
Cirrhosis of Liver	2	—	2
Acute and Chronic nephritis	15	7	22
Puerperal Sepsis	—	—	—
Other accidents and diseases of .... pregnancy and parturition	—	4	4
Congenital Debility and Malformation, premature birth	15	9	24
Suicide	5	2	7
Other Deaths from Violence	7	4	11
Other defined diseases	45	61	106
Causes ill-defined or unknown	2	1	3
	331	300	631

BOROUGH OF SWINDON.

INFANT MORTALITY.

1925. *Nett Deaths from stated causes at various ages under One Year of Age.*

Compiled from the Official Registrations.

CAUSES OF DEATH.	Under 1 week	1–2 weeks	2–3 weeks	3–4 weeks	Total under 4 weeks	4 weeks and under 3 months	3 months and under 6 months	6 months and under 9 months	9 months and under 12 m'ths	Total deaths under 1 year,
All Causes :—										
Certified	....	....	....	....	....	....	....	....	....	....
Uncertified	....	....	....	....	....	....	....	....	....	....
Small-pox	....	....	....	....	....	....	....	....	....	....
Chicken-pox	....	....	....	....	....	....	....	....	....	....
Measles	....	....	....	....	....	....	....	....	2	2
Scarlet Fever	....	....	....	....	....	....	....	....	....	....
Whooping-Cough	....	....	....	....	....	....	....	1	1	2
Diphtheria and Croup	....	....	....	....	....	....	...	....	....	....
Erysipelas	....	1	....	1	2	1	1	....	....	4
Tuberculosis Meningitis	....	....	....	....	....	....	....	....	....	....
Abdominal Tuberculosis	....	....	....	....	....	....	1	....	....	1
Other Tuberculous Diseases	....	....	....	....	....	....	....	1	....	1
Meningitis (not Tuberculous)	....	....	....	....	....	....	....	....	....	....
Convulsions	....	....	....	....	....	1	-	....	....	2
Laryngitis	....	....	....	....	....	....	....	....	....	....
Bronchitis	....	....	....	....	....	2	1	1	....	4
Pneumonia (all forms)	....	....	....	....	....	2	2	....	2	6
Diarrhoea	....	....	....	....	....	....	....	....	....	....
Enteritis	....	....	....	....	....	....	....	....	1	1
Gastritis	....	....	....	....	....	1	....	....	....	1
Syphilis	....	....	....	....	....	....	....	....	....	....
Rickets	....	....	....	....	....	....	....	....	1	1
Suffocation, overlying	2	1	....	....	3	....	....	....	....	3
Injury at Birth	1	....	....	....	1	....	....	....	....	1
Atelectasis	....	....	....	....	....	....	....	....	....	....
Congenital Malformations	4	2	....	1	7	1	....	....	....	8
Premature Birth	7	....	2	2	11	....	....	....	....	11
Atrophy, Debility & Marasmus	4	....	....	1	5	1	1	....	....	7
Want of Attention at Birth	1	....	....	....	1	....	....	....	....	1
Intussusception	....	....	....	....	....	....	1	....	....	1
TOTALS	19	4	2	5	30	9	8	3	7	57

LIST OF HOSPITALS PROVIDED OR SUBSIDISED BY THE LOCAL AUTHORITY OR BY THE COUNTY COUNCIL.

TUBERCULOSIS.	Two beds at Winsley Sanatorium, near Bath, provided by the local authority.
MATERNITY.	A Maternity Hospital of 13 beds provided by the local authority.
CHILDREN.	Nil.
FEVER.	A fever hospital provided by the Swindon and District Hospital Board. (About 90 beds.)
SMALL POX.	A Smallpox Hospital provided by the Swindon and District Hospital Board. (Permanent brick building with 12 beds).
VENEREAL DISEASES.	A hospital with 6 beds provided by the Wilts County Council.

LIST OF CLINICAL TREATMENT CENTRES IN THE BOROUGH OF SWINDON.

Name of Clinic.	Where held	Days and hours of attendance	By Whom Provided.
Maternity and Child Welfare	61, Eastcott Hill	Mondays, Wednesdays & Fridays, 2.30 p.m. to 4.30 p.m.	Swindon Corporation
Maternity and Child Welfare	Girls' Club, St. Paul's Street	Tuesdays, 2.30 p.m.—4 p.m.	,, ,,
Maternity and Child Welfare	Primitive Methodist School, Romsey St.	Thursdays, 2.30 p.m.—4 p.m.	,, ,,
Ante-Natal Clinic	Maternity Home, Milton Road	Tuesdays and Fridays, 2 p.m.	,, ,,
Minor Ailments	61, Eastcott Hill	Every morning 9 a.m.—11 a.m.	,, ,,
Dental Clinic	Faringdon Street	Daily 9.30—12.30 a.m. & 2—5 p.m. (Saturdays 10—12.30 p.m.)	,, ,,
Eye Clinic	Faringdon Street	Tuesdays 2—4 p.m. and Alternate Tuesdays, 9—11 a m.	,, ,,
Ringworm Clinic	61, Eastcott Hill	Tuesdays, 2—5 p.m.	,, ,,
Throat, Nose & Ear Clinic	,, ,, ...	Mondays, 2—5 p.m.	,, ,,
Enlarged Thyroid Glands	,, ,, ...	Thursdays, 2—5 p.m.	,, ,,
X'Ray Clinic	,, ,, ...	Thursdays, 2—5 p.m.	,, ,,
Electrical Treatment (General)	,, ,, ...	Mondays, 2—4 p.m.	,, ,,
Electrical Ionization Clinic	,, ,, ...	Fridays, 2—4.30 p.m.	,, ,,
Observation Clinic	,, ,, ...	Saturdays, 9.30 a.m.—12 noon	,, ,,
Tuberculosis Clinic	Tuberculosis Dispensary, Milton Road	Thursdays, 11 a.m.—1 p.m.	Wilts County Council.
Venereal Diseases Clinic	Isolation Hospital, Gorse Hill	Men. Wednesdays, 7—8.30 p.m. Saturdays, 1.30—3 p.m. .... Women and Children— Tuesdays, 5—6.30 p.m. .... Fridays, 2—3.30 p.m.	Wilts County Council
Orthopaedic Clinic	Isolation Hospital Grounds, Gorse Hill	Tuesdays, 11 a.m.—5 p.m.	Voluntary Association

AMBULANCE FACILITIES.

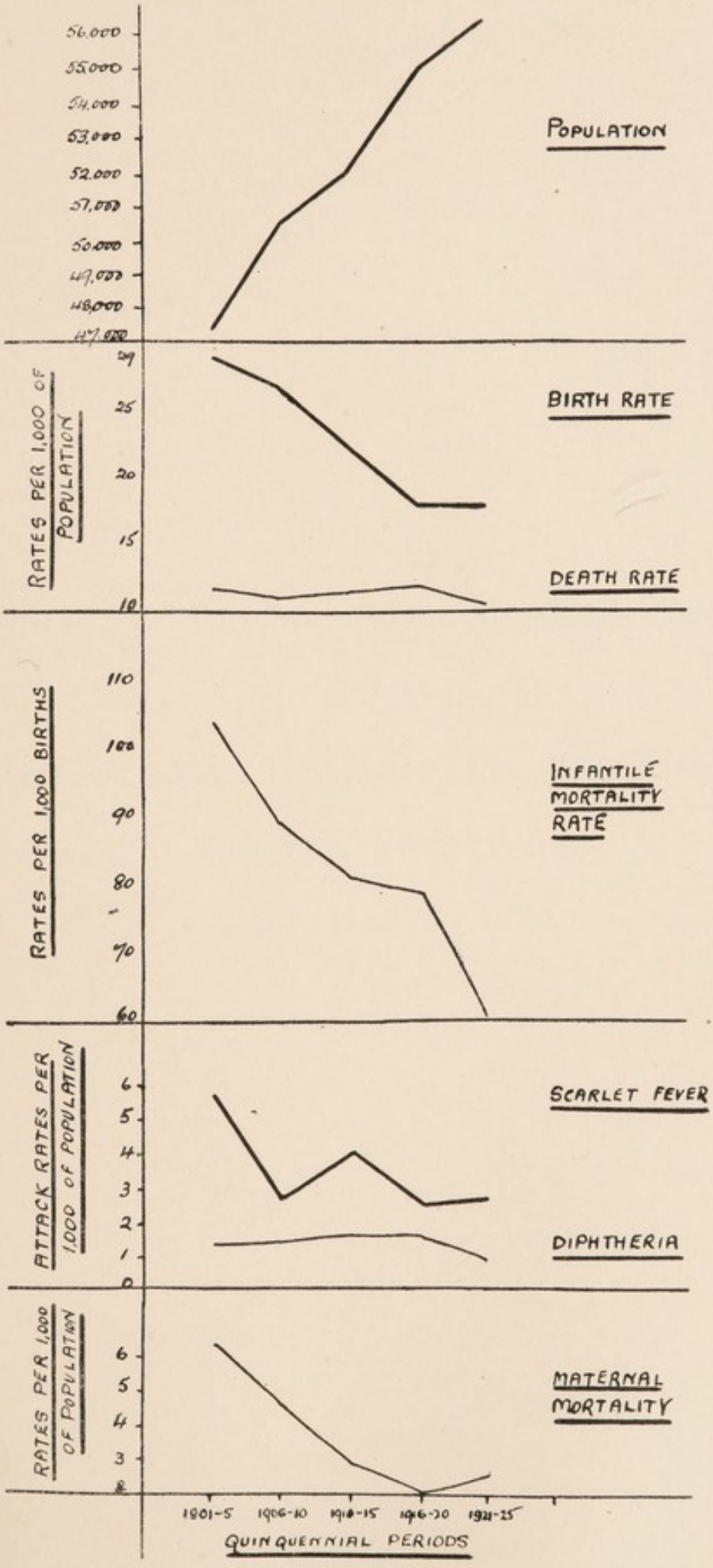
(a)	For Infectious Diseases (including Small-pox)	A Motor Ambulance is supplied by the Swindon and District Hospital Board.
(b)	For non-infectious and accident cases.	A Motor Ambulance is provided by the Swindon Town Council.

List of Local Acts, Special Local Orders and General Adoptive Acts in Force in the District.

Local Acts and Orders.

The Swindon Corporation Act, 1904.
Swindon Water Act, 1894.
Swindon (Water) Orders of 1902 and 1919.
Swindon Corporation Tramway Order, 1901.
Swindon New Town Electric Lighting Order, 1895.
Swindon Corporation (Wilts and Berks Canal Abandonment) Act, 1914.

Adoptive Acts in Force.	Date of Adoption.
Infectious Diseases (Prevention) Act 1890	11th March, 1902
Notification of Births Act, 1907	27th Oct., 1914
The Museums & Gymnasiums Act, 1891	6th June, 1905
The Public Health Acts Amendment Act, 1890	11th Nov., 1890


56,000
55,000
54,000
53,000
52,000
51,000
50,000
49,000
48,000
47,000
POPULATION
RATES PER 1,000 OF POPULATION
29
25
20
15
10
BIRTH RATE
DEATH RATE
RATES PER 1,000 BIRTHS
110
100
90
80
70
60
INFANTILE MORTALITY RATE
ATTACK RATES PER 1,000 OF POPULATION
6
5
4
3
2
1
0
SCARLET FEVER
DIPHTHERIA
RATES PER 1,000 OF POPULATION
6
5
4
3
2
MATERNAL MORTALITY
1901-5
1906-10
1911-15
1916-20
1921-25
QUINQUENNIAL PERIODS

EXTRACTS FROM THE ANNUAL REPORT

OF THE

SWINDON AND DISTRICT ISOLATION HOSPITAL

FOR THE YEAR ENDED

31ST MARCH, 1926.

SCARLET FEVER.

On March 31st, 1925, there were no cases of scarlet fever in hospital. The disease was absent from Swindon Borough and not prevalent in the district. There was no known source within the Borough whence the disease could arise afresh, but there were one or two suspected spreaders living in the contigious area.

During the hospital year, 231 cases were received under the notification of scarlet fever. Of these 10 proved not to have the disease. Two other cases were received under other notifications, so that 223 genuine cases were dealt with. Of these 5 died, 20 remained in hospital at the end of the year, and 198 were discharged cured.

18 cases had both measles and scarlet fever on admission; 1 case had scarlet fever, measles and whooping cough on admission; 11 cases developed Measles in hospital; 1 case developed whooping cough in hospital. 19 were septic scarlet fever, 124 simple scarlet fever.

The complications were numerous and severe:—

Enlarged glands, abscess and angina	36
Otorrhoea and peri-auricular abscesses	47
Jaundice	2
Nephritis	4
Rheumatism	6
Rhinitis	4
Secondary throat	14
Pericarditis and Endocarditis	1
Auricular fibrillation	1
Hemiplegia (thrombosis)	1
Pneumonia	4
Empyema	1
Vaginitis	1
Miliary Tuberculosis	1
Relapse	11

The cases that died were, 1 scarlet fever, measles and whooping cough combined, developed pneumonia and auricular fibrillation, the last being fatal. In all probability this was caused by whooping cough.

2 Septic scarlet fever with nephritis and suppression.

3 Miliary tuberculosis developing after simple mild scarlet.

4 Septic scarlet with pneumonia.

5 Septic scarlet fever with angina and pneumonia.

Of 47 cases of otorrhoea, 4 required Weil's incision. No case required the radical mastoid operation. All were discharged cured with the ear membranes healed, except 4 cases which were discharged before they were healed in order to obtain ionization treatment. One case was reported to have relapsed after discharge (there was no evidence of this). One case of otorrhoea did develope after discharge from hospital.

It is remarkable that no case in the hospital required mastoid operation. Nine cases of ear disease due to missed scarlet in Swindon had the radical operation done in 1925 (not in the isolation hospital). There is some mystery surrounding this. It cannot be accounted for by any special treatment given in hospital, for the majority of cases receive no special treatment. Possibly the early Weil's incision saves some cases, which if not incised early would require the radical operation. This is very doubtful.

Relapse is rare in scarlet fever, but eleven definite cases occurred in hospital and another occurred at home immediately after discharge from hospital. Though of great epidemiological interest, relapses are not clinically important, being quite trivial and apparently not infectious.

Rhinitis (running nose) is of great interest. It is rare in hospital (4 cases) but very common after discharge from hospital. It is to be remarked that children who for any reason are kept long in hospital, are apt to develop nasal discharge late. Cases with nasal discharge are credited with being specially liable to give rise to return cases. There is no real evidence of this. They have been looked upon as potential carriers, but the evidence of Swindon does not support this.

Considerable importance attaches to the dates on which the complications of scarlet fever occur. In the following tables, only those cases are considered where the evidence is completely reliable. It will be noticed that the numbers are slightly less than those appearing elsewhere in the report. This is due to the fact that in a few cases the dates of onset of the complications were not recorded.

The table of the duration of post scarlatinal otorrhoea is of great importance, as it has bearing upon many controversial points. Ear disease is not considered to be cured until the perfor-

ations in the membrane are completely scarred over. In some cases this never occurrs, the membrane being practically destroyed. These cases are considered as lasting to infinity. Four cases of otorrhoea were discharged from hospital for ionization treatment before they were cured. These cases are not included in the table. It would be desirable to consider these as infinity cases.

One case which had otorrhoea in hospital, discharged with membranes scarred, is reported to have had a relapse fourteen days later. Examined a week subsequently no evidence of this was visible. One case which did not have otorrhoea in hospital, developed it three weeks later (eighth week of the disease). It may be doubted whether this had any direct connection with the scarlet fever.

Otorrhoea has been extraordinary prevalent in Swindon for the past nine months. Many cases are due to measles. Probably as many or more are due to scarlet fever in which the initial symptoms were trivial or absent. As mentioned before, nine cases of acute mastoid occurred outside the hospital, of these seven for certain and the other two probably were due to missed scarlet fever.

The incidence of otorrhoea during the recent epidemic was very high—amongst the hospital cases it was 20%. Amongst the children of the Borough who were indefinitely ill during the time, but in whom a diagnosis of scarlet fever either was not, or could not, be made, the proportion was even higher. The cases which occur in hospital certainly do much better and last for a shorter period than those not so treated. Though this might have been expected, it is not so easy to explain. It may be due partly to treatment, but probably more to lack of treatment for syringing has been abandoned in hospital.

TABLE I.

COMPLICATIONS OF SCARLET FEVER.

Day of the Disease	Glands	Angina	Otorrhoea	Secondary Throat.	Albumin-uria and Nephritis	Pneumonia and Sepsis	Rheu-matism.	Relapse	Nasal Discharge
1—7	5	1	17	3	1	1	1	....	....
8—10	1	....	2	1	....	....	1	....	....
Negative phase of Leucocytosis 11	3	....	3	....	1	1	....	....	....
Negative phase of Leucocytosis 12	2	....	2	....	....	....	....	....	....
Negative phase of Leucocytosis 13	1	....	2	....	....	....	....	....	....
Negative phase of Leucocytosis 14	2	....	1	....	1	....	....	....	1
15—17	....	....	2	....	2	1	....	2	....
18—20	1	....	1	1	....	....	1	....	....
21—28	3	1	4	4	1	1	2	5	1
29—42	1	....	5	4	....	1	1	3	2
43	1	....	....	1	....	....	....	....	....
56	....	....	....	....	....	....	....	1	....
60	1	....	....	....	....	....	....	....	....
	21	2	39	14	6	5	6	11	4

TABLE 2.

Duration of Post-Scarlatinal Otorrhoea.

Duration.	No. of Cases.
1— 7 Days.	2
8—21	6
22—35	11
36—42	3
43—49	3
50—56	4
59	1
60	1
62	1
64	1
69	1
81	1
Infinity	2

SCARLET FEVER AND MEASLES.

19 cases were admitted to hospital suffering from both diseases. In 8 the rashes of both diseases were present at the same time. In four the rash developed, 3, 7, 9, 10 days after admission. In the remaining seven cases the dates could not be determined with certainty as the measles rash appeared before the scarlet rash had faded, or vice versa. (In three cases treated at home measles and scarlet fever were concurrent).

Eleven cases are presumed to have been infected in hospital. In one case Koplick's spots were seen on the 10th day after admission. If this case was truly infected in hospital, it gives an incubation period of 9 days. One other case showed Koplick's spots on the 13th day (incubation 12 days), one case showed the rash on the 14th day and one on the 16th day. It is doubtful whether these two last were infected before or after admission. The remaining cases showed Koplick's spots on the 18, 22, 26, 28, 39, 40 and 50 day, and were undoubtedly infected in hospital.

RELAPSE OF SCARLET FEVER.

At the end of the nineteenth century, when scarlet was a severe disease, relapse was given as 7% by Caiger, 3% by Mac-

Collom and 1% by Neusholme, but none of these rest upon such evidence as we should be prepared to accept to-day. Since scarlet fever has been a mild disease, relapse has been rare. So the figure for Swindon for 1925, namely 5%, calls for comment. All developed in cases which had been obvious scarlet fever on admission, and who were typically peeling (except one) at the time of the relapse. The times at which the relapses occurred are noteworthy—16, 17, 21, 22, 23, 24, 26, 27, 30, 31, 56 days after admission. (Cases are almost invariably admitted on the second day of the disease). The suspicion that there are different varieties of scarlet fever, or several different diseases included under the same name is an old one, less entertained than it was in the last generation. It might be argued that the alleged relapses were new infections by a different strain of the disease. The relapses were remarkably constant in character, very mild, never lasting above 36 hours, and did not appear to have much influence upon the progress of the original infection. They were apparently non-infectious, so far as can be told.

INFECTION WITH SCARLET FEVER IN HOSPITAL

Four cases admitted under notification of scarlet fever, but which were not considered to be such on scrutiny, subsequently developed scarlet fever.

1. admitted with no obvious disease, developed scarlet fever 12 days later. This might have been a relapse, but the date is too early and the symptoms were different from those of the relapse cases.

2. doubtful on admission, developed typical scarlet fever rash 72 hours after admission. This was probably infected before admission, as a 48 hour incubation period has not been observed in the present epidemic, though in some epidemics it is common.

3. and 4 both admitted with obvious measles, developed scarlet fever 8 days later. The only time of contact was the first hour of admission to hospital. This gives a 7 day incubation period, a most exceptionally long one.

DEVELOPMENT OF COMPLICATIONS AFTER DISCHARGE FROM HOSPITAL.

1 case developed otorrhoea 14 days after discharge (8th week of the disease). 1 case had a relapse 2 days after discharge (30th day of the disease). 1 case is reported to have developed a measles rash 4 days after discharge.

CROSS INFECTION.

The subject of cross infection—the conveyance of a disease from one patient to another who was not admitted with that disease—has been studied mainly in connection with infectious hospitals, but it is of equal or even greater importance in the surgical and maternity wards of general hospitals. The infections dealt with in isolation hospitals being in general more specific and definite than those which are liable to spread in general hospitals, their study is simpler in the former than in the latter, and has enabled us to establish certain facts which can be utilized in dealing with the more obscure infections.

Cross Infection of Diphtheria in Scarlet Fever Cases.

Post-scarlatinal diphtheria is one of the bugbears of large infectious hospitals, and in smaller poorly managed institutions has produced serious evils. In the past it was always presumed that such cases occurred from infection of the scarlet wards from the diphtheria wards. But in a well managed establishment, it is difficult to see how this could occur and in order to explain it, propositions have been put forward such as conveyance of infection by air, clothes, doctors, nurses, etc., which most modern authorities repudiate. The occurrence of post scarlatinal diphtheria can be explained quite logically upon another basis. In large centres of populations, a certain proportion of persons persistently harbour virulent diphtheria germs in the throat. Such persons are immune to diphtheria, but can infect others. Should such a person be admitted with scarlet fever to a scarlet fever ward, he would be able to spread diphtheria in that ward although he himself would be incapable of developing the disease. Infection in this way is abundantly proved, not only in isolation, but in general hospitals. Recently in Victoria Hospital Swindon, a little girl with mastoid disease was admitted. She gave rise to three cases of diphtheria, two patients and one nurse, in the same ward with herself. Virulent diphtheria germs were grown from her throat. Probably in the larger hospitals, post scarlatinal diphtheria always arises in this way. In inferior institutions it might arise from carelessness, from the admission of both scarlet and diphtheria patients to the same ward or from the admission of a mixed infection. Cases of concurrent diphtheria and scarlet fever are not uncommon, but in larger institutions are looked for and detected and are unlikely to be sent into a ' clean ' ward.

In Swindon, where chronic diphtheria carriers are very rare, an attempt is made to prevent the development of post scarlatinal diphtheria, by a bacteriological examination of the throats of all scarlet fever patients. In the last 300 cases of scarlet fever,

no diphtheriods were found in 297, in the remaining three cases diphtheriods were found, but on virulence testing proved to be harmless. No case of post scarlatinal diphtheria has occurred in Swindon during the past five years.

Cross Infection of Diphtheria upon Scarlet Fever.

This is never so common as the converse, though theoretically it should be, as it is much more difficult to guard against. No such cross infection has occurred in Swindon during the past five years.

Cross Infection of Measles upon Scarlet Fever.

The differential diagnosis between scarlet fever and measles is sometimes extremely difficult, so that it happens frequently that cases of measles are notified and removed as scarlet fever. It is necessary to prevent these from being placed in the scarlet fever wards direct. Generally this can be managed, but in times of great pressure on the isolation accommodation it may be difficult. Indeed it is only in times of pressure that any danger need be anticipated, for if the wards are fairly free, the introduction of a case of measles may not cause any untoward results. Cases of concurrent measles and scarlet fever may occur, and during 1925 several such cases did occur in Swindon. Here a correct diagnosis may be impossible and the predominant disease may, for a time, be the only one suspected. Generally the measles is the most obvious, so most cases will at first be considered as simple measles and treated as such. Sometimes it is the other way about and such cases will very probably be considered as simple scarlet, and be admitted to the scarlet wards direct and infect other patients with measles. (This is rare as measles infection is slight after the rash appears).

In some cases of measles there is a first rash two or three days before the typical rash appears. This is sometimes much like scarlet and may be mistaken for it. Cases of scarlet fever may be admitted who are incubating measles, though not at the time suffering therefrom. This is the commonest way in which measles is introduced into scarlet fever wards. It is quite unpreventable* and is the cause of nearly all the trouble experienced in connection with the cross infection of measles upon scarlet fever.

Lastly, there may be carriers of measles as there are of scarlet fever and diphtheria. This lacks proof and so is, at present, unacceptable. But some evidence was gathered last year in Swindon, which suggests that it is a possibility.

* That is, it was when this was written, it may no longer be so.

Cross Infection of Scarlet Fever upon Measles.

Where measles is treated, the same difficulty occurs in excluding scarlet fever as in excluding measles from scarlet, but scarlet fever is the less contagious infection, so it is somewhat rarer. Still it does occur. In Swindon measles is admitted into hospital, purposely, if it is complicated with pneumonia or croup. These cases are treated in the open air, which practically excluded cross infection of all kinds. But a considerable number of measles cases are admitted, not purposely, as scarlet and these always cause difficulty.

Cross Infection of Diphtheria upon Measles.

This never occurs, for although the concurrence of measles and diphtheria is common and children suffering from measles may be admitted to the diphtheria ward every case so admitted is injected and so rendered incapable of developing diphtheria unless he has already got it.

Cross Infection of Measles upon Diphtheria.

This might be expected to occur. In practice it is very rare, for a doubtful case, a croup for instance, might be admitted into the diphtheria ward—but it would only be admitted into an acute ward where all the patients are in bed and its stay there would be short.

Cross Infection of Complications.

This is exceedingly important. There is reason to believe that the complications of acute infections are added infections capable of spreading. Otorrhoea in scarlet fever and pneumonia in measles are examples of this. The dangers here can be minimised by proper administration—they are abolished altogether by open air isolation, and very nearly so by bed isolation when this is practicable.

Cross infection in Swindon Isolation Hospital 1/4/25 to 31/3/26.

Cases found to be Scarlet fever on admission	223
Infected with Diphtheria	0
Infected with Measles	11
Cases found to be measles on admission	26
Infected with Diphtheria	0
Infected with Scarlet Fever	2
Cases found to be Diphtheria on admission	131
Infected with Measles	1
Infected with Scarlet Fever	0

MIXED INFECTIONS.

Nothing in the administration of a fever hospital causes greater trouble and anxiety than the admission of patients suffering from two or more concurrent diseases. The diagnosis of such cases always offers considerable difficulty and as a clinically severe, but not highly contagious affection may mark one which is clinically slight but highly infectious, the danger of fouling clean wards and so upsetting isolation completely is always before us. The advance in our knowledge of the phenomena of infection has taught us that given adequate spacing and completely efficient nursing the dangers of mixing infections in one ward can be reduced to an almost insignificant figure, producing the somewhat surprising result that cross infection is less common in wards in which numerous various infections are dealt with than in those which (theotretically) are rigidly kept apart for a single specified infection. Everything depends upon obtaining a precise knowledge of what has to be dealt with. In mixed scarlet fever and measles, for instance, the problem presented is comparatively simple if the presence of both diseases is known from the start. But it is a very different matter when one disease is obscured by the other, and only becomes known after the case has been treated as if it were a simple infection. Such admissions as croup or pneumonia can always be presumed to be mixed infections, and from the start treated as such. So that though most pneumonias in children prove to be co-incident with whooping cough or measles, cross infection from these does not occur as it is guarded against from the start.

The main troubles of mixed infections arise from the combination of diphtheria or scarlet fever with chicken pox, whooping cough, rubella, and especially measles. In 1925 great trouble was caused by concurrent measles and scarlet fever—a combination which was unusually frequent. Both diseases may be manifest at the same time, when, if the preliminary difficulty of diagnosis can be surmounted, the problem being known can be dealt with appropriately. But more often the diseases are not quite concurrent, and a case obviously pure measles may be incubating scarlet fever or more frequently a case obviously scarlet fever may be incubating measles. In such cases the patient will be treated as if the manifest disease were the only one present. Of course, when he shows symptoms of the second disease he will be treated forthwith as a mixed infection, but he will be loose during the first few hours of the second disease, which in all diseases is the most highly infectious period—and during those few hours he may infect other patients . The difficulties can be appreciated by considering the case of a child admitted with obvious scarlet fever but incubating measles which later disease will not begin to

exhibit symptoms until he has been in hospital for some days. Measles is not infectious until it begins to exhibit symptoms, but its period of greatest infectivity is the first day of symptoms. The typical rash of measles does not appear until the fourth day of the disease (it is sometimes delayed to the seventh day) but the disease can be recognised three days earlier, if an unique symptom of measles (Koplick's spots) is looked for. But by no possibility whatever can it be detected on the first day, for then the only signs are slight pyrexia and certain changes in the blood, both of which will be completely masked by the later stages of scarlet fever.

The most perfect administrations cannot prevent the occasional outbreak of measles in a fever ward, or indeed in any children's ward or anywhere where children are congregated, but it can do very much to minimize it by eliminating all sources of infection except the incubating cases and the danger even from these can be reduced to a very small quantity provided spacing and ventilation are perfect. But in times of epidemic, particularly in Winter time when infections are chiefly to be expected, such perfection of spacing and ventilation as are requisite to insure isolation are not easy to obtain.

During 1925 the following multiple infections occurred:—

Diphtheria and Measles	....	....	1	
Diphtheria and Scarlet	....	....	0	
Diphtheria and Whooping Cough	....	....	1	
Scarlet Fever and Rubella	....	....	1	
Scarlet Fever and Whooping Cough		....	1	
Scarlet Fever and Measles	....	....	—	
Both present together	....	....	7	
Measles present, incubating Scarlet	....		2	20
Scarlet present, incubating Measles	....		11	

When in the course of one disease, another infection becomes manifest, the question always arises, when and where the second infection was contracted. To guide us in forming an opinion, we utilize our knowledge of the incubation period or interval which occurs between infection and the development of symptoms. This differs in every disease, but unfortunately it varies considerably in the same disease so that there is always a certain proportion of cases in which the question cannot be answered upon this count alone. The incubation period of scarlet fever varies from one to seven days; the rash appears on the second day. In Swindon, recently, the incubation period has been almost invariably between 60 and 80 hours, so that if a child is seen with the rash of scarlet fever it can be concluded that infection occurred from $3\frac{1}{2}$ to $4\frac{1}{2}$ days previously. No case has occurred in Swindon in which the incubation period has been proved to be shorter than

this, but there have been two or three cases, where it is probable that it was longer, though in these the evidence is open to question.

In measles the normal incubation period is 12 to 15 days, and as the rash appears generally on the fourth day, when a child is seen with the rash of measles it can be concluded that he was infected 16 to 19 days previously. Recently in Swindon several cases of measles have occurred in which the incubation period was proved to be as short as ten days and one in which it was nine (not quite conclusive). It follows that if a case of measles develops Scarlet fever within two days of admission to hospital, he was infected outside; if he does not develope scarlet fever until he has been in hospital five days, he was infected inside; if he developes it between 2 and 5 days, the place of infection remains doubtful. If he develops measles (Koplick's spots) within eleven days of admission, he was infected outside, if later than 16 days probably infected inside; between 11 and 16 days the place of infection is doubtful. The doubtful cases may be freed by ambiguity by other factors, but not by any means always.

RETURN CASES.

The question whether patients discharged from fever hospitals do or can carry infection back again to their own homes is one of great interest and importance. Unfortunately the subject usually has been rasied to prove or disprove the value of isolation hospitals and, becoming political rather than scientific, the evidence is liable to be tainted and the conclusions worthless. But it is not for this that critical inquiry into return cases is of value, it is essential for the determination of the variations of incubation period, for the proof or disproof of carriers, for deciding the period during which infectious diseases normally maintain their infecting power and for another and still more important reason which the next five years will reveal. We have a standard definition of a return case, namely a fresh case of any infection occurring in a house to which a patient has been discharged from a fever hospital within twenty eight days. It is clear that such a return case may have no connection with the case returned from hospital, but it calls for investigation of a somewhat searching character. It is also obvious that a case might be returned from hospital in a highly infectious condition and yet not give rise to return cases, because the home to which the patient returned contained no susceptible person. It is therefore necessary to find out, if possible, if patients returned from hospital have infected their neighbours, playmates or school companions, and if so how and where and especially when. Another class requiring investigation is that of a child discharged as cured from one disease, developing another disease within a short time of discharge, as the question whether the second disease was infected before or after discharge from hospital is of importance.

The experiment that was carried out in Swindon last year of attempting to free the town of endemic scarlet fever by eliminating spreaders, and a similar experiment in connection with diphtheria started after the epidemic of 1920, were based on the supposition that there existed spreaders—namely persons who having had scarlet fever or diphtheria and completely recovered may still remain infective for long and indefinite periods and that it is from such persons that new cases arise. If the supposition is true, then it follows that return cases must exist and it is only by collecting and sifting the evidence with meticulous care, that, such spreaders could be detected and followed.

In times of epidemics, the testing of the evidence of return cases is surrounded with difficulties which may prove insurmountable for the cases will be returned to districts where the chances of infection are numerous; but when the disease is not very prevalent the evidence becomes easier to gather and much more reliable. Consequently it is in periods of comparative quiescence that this aspect of epidemiology is easiest to study, and it was upon evidence obtained at such times that the Swindon experiments were carried out.

During the past hospital year there were the following further cases of infectious disease occurring in houses to which cases had been returned from the fever hospital within 28 days.

Case 1. D.B.
Discharged 28/7/25. Return case 2/8/25. Accepted.

Case 2. I.G.
Discharged from hospital 28/7/25. Return case 14/8/25. This is not a return case. Traced to another source (26).

Case 3. G.B.
Discharged 24/9/25. Return case admitted 23/11/25. This is not a return case, both these cases being part of a smouldering epidemic in the Coate district.

Case 4. F.M.
Discharged 26/9/25. Return case 10/10/25. There had been a new batch of lodgers in this house between the first and second cases. Accepted as a return case.

Case 5. R.
Original case discharged from hospital 15/10/25. His mother was admitted to hospital 28/10/25 peeling. She was taken ill on 17/10/25, 40 hours after return of the original case. It is therefore unlikely that she was infected by him. Another boy,

admitted 28/10/25 with definite scarlet fever (second day of disease) was doubtless infected by his mother. This cannot be accepted as a return case.

CASE 6. F.

Admitted 13/10/25. Discharged 14/11/25. On the request of the parents. There was some reluctance to let this child go, but as there was nothing obvious the request was agreed to. On the day she returned home a brother who had been away from home for some time returned. On 19/11/25 the whole family of father, mother and son were admitted with scarlet fever. They must all have been infected immediately the first case returned home, giving an incubation period of 72 hours. They were undoubtedly return cases. The original infector was taken back into hospital at the same time and retained for some weeks. No cases were subsequently traced to this case, which is therefore not a spreader.

CASE 7. (H).

H1 and H2 admitted on 26/9/25. Two cases of simple scarlet fever. Both discharged 23/10/25. 3/11/25 H1 developed measles at home. An older boy H3 and the father H4 developed measles at the same time. November 10th, H2 developed measles. 1/11/25 H3 developed scarlet fever. 3/11/25, H3 removed to hospital with concurrent scarlet fever and measles. 4/11/25, H4 admitted to hospital with definite scarlet fever and measles. The house in which these people lived is in the very centre of the epidemic area, and at the time measles and scarlet fever were rampant in the neighbourhood. At first it was accepted that H1 had been infected with measles in hospital before he was discharged. The further history of the measles in this family shows, however, that this could not have been so, for H1, H3 and H4 developed measles at the same date, *i.e.*, Nov. 3rd. H2, developed measles on the 10th. It would appear in this family that the incubation period of measles was 7 or 8 days. It is to be noted that the four members had both scarlet fever and measles, 2 concurrently and 2 at different dates.

CASE 8. T.W.

Returned home 28/11/25. Return case admitted 1/12/25. This is not a return case as the second case was notified before the first went home.

CASE 9. B.

Admitted to hospital with measles only and treated on the diphtheria side. Discharged 191/11/25. L.B. admitted to hospital 23/11/25 with typical scarlet fever. His brother had not been in contact with scarlet fever while in hospital. More-

over, L.B. must have developed the disease on the 20th November, 1925 or the day after his brother was discharged. This cannot be accepted as a return case.

CASE 10. E.

This family consists of father and mother, grandfather, grandmother and 6 children, aged 13 (E1), 11 (E2), 7 (E3), 5 (E4), 3 (E5) and 1 (E6).

11/12/25 E2 admitted to hospital notified as diphtheria. No obvious disease found, 11/12/25 E4 admitted to hospital, notified scarlet fever. No obvious disease found. 31/12/25 E4 admitted to hospital with true diphtheria. 7/1/26 E2 and E5 sent home. 21/1/26 E3 admitted to hospital, definite scarlet fever. 27/2/26 E3 discharged. 4/3/26, E4 admitted hospital definite scarlet fever. 10/4/26 E4 discharged. 10/4/26 E1 admitted to hospital with definite scarlet fever. At first these were considered as return cases. Subsequently the scarlet fever cases were traced definitely to a known highly active spreader, who had had scarlet fever and was treated at home and lives next door (Case 64). The diphtheria of E4 was not traced with certainty.

CASE 11. S.

Three children S1, S2 and S3 admitted to hospital on 16/10/25. S1 had definite scarlet fever. S2 had scarlet fever and measles. S3 had uncomplicated measles. These are not return cases as they were all admitted at the same time.

CASE 12. J.H.

Admitted to hospital with scarlet fever 18/10/25. Discharged 10/12/25. H.H. admitted on 21/10/25 with scarlet fever. Discharged 28/11/25. M.H. admitted 6/12/25 with concurrent scarlet fever and measles. Discharged 9/2/26. H.H. re-admitted to hospital 24/2/26 with virulent diphtheria but no sign of measles or scarlet fever. This family does not live in Swindon Borough. It is difficult to know what to make of this complex history.

CASE 13. H.F.

Discharged 1/1/26. Had been in hospital three months with discharging ears. Return case admitted 1/1/26. This is not a return case as the second case was admitted into the hospital before the first had left.

CASE 14. R.S.

Discharged 7/1/26. Had been in hospital two months with otorrhoea. Cured on discharge. His brother admitted to hospital 12/1/26. Accepted as a return case.

CASE 15. T.T.

Discharged 21/1/26. Return case admitted 27/2/26. This is not a return case according to the definition as it did not occur within the prescribed period. In this house some new lodgers were taken in between the first and second cases. It is believed that T.T. did infect the second case.

CASE 16. A.B.

Discharged 19/1/26. Was in hospital six weeks for post-scarlatinal rheumatism. Before admission four cases were traced to her. Return case admitted 26/1/26. There had been several lodgers in the house between the times of the first and second cases. There is strong suspicion that this same person caused four other cases in the neighbourhood. Accepted as a return case.

Therefore cases 1, 4, 6, 12, 14, 15 and 16 (or 7 cases altogether) can be accepted as return cases. The others cannot be so accepted.

During the course of the epidemic there were numerous multiple cases in the same household, often occurring on different dates.

The following batch of return cases in connection with diphtheria must be considered :—

CASE W.

In hospital with diphtheria. Discharged 3/10/25. A boy (R.W.) living in the same house, admitted with diphtheria on 10/10/25, but there was no contact between these two cases as the first on discharge from hospital did not go back to that address.

I.Y., a case of scarlet fever, discharged 26/9/25.
D.Y., from the same address, admitted 11/10/25 with diphtheria. The Y's live two doors away from the W's. These are not return cases but are part of a small local epidemic in the neighbourhood.

B. Case of diphtheria discharged 6/11/25.
I.B. Admitted with diphtheria 17/1/26.
D.V. Discharged 30/1/26.
P.W. Admitted 23/2/26.

All these live in the same house. They were not return cases and were not directly connected with each other, but form part of a somewhat serious epidemic in connection with a local school. As a matter of fact return cases in connection with diphtheria do not occur, and with the precautions that are taken to prevent it, it is practically impossible for them to occur..

There were 3 cases of children sent out of the hospital cured of one disease who developed another disease within one month of discharge.

R.C.

In hospital with diphtheria. Discharged 15/2/26. Re-admitted with scarlet fever 23/2/26. While in hospital he was confined to the diphtheria side and did not come into contact with scarlet fever. He was discharged into a highly infected neighbourhood. The incubation period, had he been infected in hospital would be 8 days, which cannot be accepted.

A.M.

Was in hospital with measles. Sent home 7/11/25. He was treated on the diphtheria side and did not come into contact with scarlet fever. He was re-admitted 11/11/25 suffering from scarlet fever. The patient was discharged into a non-epidemic area. The incubation period here of 4 days does not exclude infection in hospital.

Another case is reported to have developed measles four days after discharge from hospital. He certainly developed a rash. If it were measles he must have been infected in hospital, which is quite possible, but it may have been a relapse of scarlet fever.

MEASLES.

The cases of measles dealt with in hospital are those admitted under the notification of pneumonia or croup, cases mistaken for scarlet fever or concurrent with other diseases. But there are a few cases which, infected in hospital, during convalescense from other diseases, run their complete course within the hospital walls. These cases though few in number (12) are of exceptional importance, as affording material for determining the special features of epidemics, the only safe ground upon which preventive measures can be based.

The epidemic of measles which visited Swindon in 1925 was widespread and of exceptional virulence. Unlike scarlet fever, measles was generally of a severe type, but the visitation to Swindon was somewhat early for whereas here it began to wane in December, in most districts of England it was at that time only starting. The damage done by measles in Swindon in 1925 was very serious. Thirteen deaths directly attributed to it occurred in the Borough and in addition it caused indirectly nine further deaths, one case of total blindness, one of total deafness and an unknown number (certainly over fifty) of chronic diseases of the ear and throat.

Traditionally the incubation period of measles is twelve to eighteen days, and a period of four days elapses between the start of the disease and the appearance of the rash. Such meagre means as are available to stem the spread of measles are based upon the assumption that these two time periods are reliable. It was not until the cases occurred in the hospital that we were cognisant that the current epidemic was peculiar, both in its incubation period and in the interval before the rash appeared. Of the 12 cases watched throughout at the hospital, 5 had an incubation period of 10 days, 1 case of nine days, 2 of 11 days and 1 of 14 days.

The diagnostic feature of measles is the presence of peculiar spots in the mouth (Koplicks). These appear invariably on the second day, and were the only feature which was constant. The rashes commenced on the 3rd day in 2 cases, 4th day in 2 cases, 5th day in 1 case, 7th day in 4 cases.

It may be argued that as these cases developed in the convalescence of other infections, mainly scarlet fever, their course may have been varied by the former infection. But this is unlikely for the blood changes of these cases were those of measles only, and showed no evidence of interference by the scarlet fever which had passed. Moreover as soon as these deviations from the usual times were apparent, it became possible to explain many phenomena in the epidemic which before had been inexplicable.

All the cases which were infected in hospital recovered, though some of them were severe and caused considerable anxiety. The 9 cases admitted under the notification of scarlet fever which proved to be measles only call for no comment. And the same may be said of those cases which admitted with scarlet were incubating measles, which showed itself later, except that some of these were very severe, and complicated. They all recovered except one.

7 cases were admitted with scarlet fever and measles, running concurrently. Of these 4 were adults. In all of these, measles was the predominant disease during the early part of the illness, but the later complications were mainly those of scarlet fever, though in some cases it was impossible to determine to which disease complications, common to both such as otorrhoea, should be credited. The blood changes are those of both diseases, but those of scarlet fever which are more constant always predominate. They all recovered.

The cases of measles admitted for pneumonia are dealt with under the latter heading.

HISTORY OF THE SWINDON SCARLET FEVER EPIDEMIC 1925—26.

With all the available evidence before us, it is now possible to discuss the epidemic of Scarlet Fever which swept over part of Swindon and the adjacent district in 1925-26. In the chronological order adopted, events are recorded in the time of their occurrence although the evidence upon them may not have come to hand until a later date.

The visitation can be divided into pre-epidemic, mid-epidemic and post-epidemic periods with a free period before the onset and a comparatively free period afterwards.

In February, 1925, Swindon was free from scarlet fever. During the year previous to this, a determined effort had been made to free the town from endemic scarlet fever and as far as possible the relics of previous epidemics. So long ago as February, 1924, no known carriers of the disease, except two who were under treatment, existed in the town. Until the present epidemic started in May, only one case of scarlet fever in which the diagnosis could be sustained, had been notified during 1925, and this case was traceable to an outside source and remained single (March, 1925). Not only was clinical scarlet fever absent, but all chronic sequatae resulting from former epidemics had been hunted up, cured or otherwise disposed of. The general condition of Swindon especially of the child population, during the Winter and early Spring of 1925, was highly satisfactory, and there was nothing to suggest any smouldering or latent epidemic. The condition of the surrounding districts was not quite so certain. There certainly was not and had not been any scarlet fever since November, 1924, but two carriers were suspected. However there was nothing very suspicious in the outlying district and Hurst Park, (the children from which attend Ferndale Road School, and the infants and school children of which attend the Swindon clinics) presented nothing in any way exceptional. A mild epidemic of scarlet fever had occurred diffused through Swindon and its neighbourhood in 1922-23, terminating July, 1924. Such was the. the soil.

The Nature of the Evidence and the Method of its Collection.

The outbreak was not limited to Swindon Borough, and though the majority of the cases belonged to the Borough itself, its start was outside and many of its extensions overflowed the Borough boundary.

As regards that part of the epidemic which occurred within the Borough boundaries, the writer being Medical Officer of Health, School Medical Officer and Superintendent of the Fever Hospital, has all the threads in his hand, but as regards the outlying districts this is not so. All cases in the outlying districts treated in hospital while they are in hospital, come directly under the writer. As regards the Hurst Park district, the majority of the children

attend Swindon schools, so the school factors will be known to the writer directly as School Medical Officer of the Borough. Those children in the surrounding districts who do not attend the Swindon schools will come under the County School Medical Officer as rega ds their school and under Dr. Bea ty, Medical Officer of Health of the Highworth Rural District as regards their general epidemiology. Neither the County Medical Officer o Health nor the district Medical Officer would be in a position to make anything out of this epidemic, for the evidence they possess would be too fragmentary and diffused to be put into form. My colleague, Dr. Beatty, would know of the notifications of scarlet fever in his area but he would have no means of correlating them. The epidemic may be likened to a large spider, of which the rural district Medical Officer would see nothing but the tips of the legs. On the other hand to write the history of the epidemic devoted exclusively to that part of Swindon included in its Parliamentary boundaries would also be unintelligible. It is for this reason that this report is issued in the Annual Report of the Infectious Diseases Hospital and not in the Annual Report of the Medical Officer of Health of Swindon. I am much indebted to Dr. Beatty for the information he has given me regarding those cases which occurred within his district.

The first notification of scarlet fever was received on 29/5/25, but the epidemic had started before that outside the Borough, apparently somewhere between the end of April and the end of the first week in May. The numbers of cases dealt with from May 1925 up to the present (31st March, 1926) were :—

Notified in the Borough of Swindon (adjusted for withdrawals).	194
Notified outside the Borough of Swindon.	52

or 246 notified cases altogether. But in addition to these there was a large but unknown number of cases which were not notified. The epidemic was therefore by no means alarming in extent, the incidence of scarlet fever in Swindon during the period not being above the average for the last ten years ; but it was highly concentrated in one district, and the fact that it developed in a district in which endemic scarlet fever had been absent for over a year, and that its start and course could be traced with a fair degree of accuracy, render this epidemic of particular interest. Of the 246 cases, 223 were treated in hospital, and their records have already been discussed. 23 cases in the Borough of Swindon were treated at home.

Scarlet Fever Treated at Home.

23 Notified cases of scarlet fever were treated at home.

In 8 cases the infection remained solitary. In 1 there were 2, in 1 there were 3, in 1 there were 7 members of the household

attacked. In 3 though there was only 1 notified case in each household, there were in addition 1, 3 and 6 cases which were not notified. In 3 of these cases every person in the household developed the disease. Case 64* apparently gave rise to 4 other cases, 2 in contiguous houses. Case 162 supplied a very potent carrier (No. 176) who was eventually traced and removed to hospital (Return case No. 16).

This evidence is of value in proving the extraordinary infectivity of the recent epidemic, but is not acceptable for any other purpose. Evidence from Swindon cannot be used in argument for or against hospital v. home treatment, for there is always a reason for leaving cases at home.

Mention is made of various cases which were not notified. Failure of notification is the greatest stumbling block in the tracing of human epidemics, but it is quite unavoidable when dealing with a disease which cannot be diagnosed by tests which are completely reliable. There was no failure of notification on the part of anybody; every case being notified in which a diagnosis could be made with comparative certainty. But in an epidemic of such a disease as scarlet fever there is always a very considerable proportion of people who become ill but who cannot be diagnosed owing to lack of symptoms upon which a correct opinion can be formed. It sometimes happens in such cases that a diagnosis can be made later, but in many cases even this is impossible. The matter is one of fundamental importance, for there is reason to believe that in all epidemics a vastly greater number of persons become infected than are ever recognised. Of those exposed to infection, a certain proportion will exhibit signs and symptoms which are typical. A greater proportion will develop indefinite illness which cannot be differentiated except by biological tests, where these are available, and a considerable number, being quite immune, will exhibit no symptoms whatever. But all of these are equally capable of continuing the infection.

The Infectivity of the Epidemic.

In the early days the infectivity was extremely high, after December it declined and towards February it became insignificant. Witness the cases treated at home, the outbreak in Victoria Hospital, the two cases of measles which developed scarlet fever in hospital after one hour's exposure. In many streets of the epidemic area, every susceptible person appeared to be attacked. In one street not a single child escaped either definite scarlet fever or evidence of having had it.

* The numbers which appear here and throughout the report are the index numbers in the register.

Yet its limitation was equally curious. The sporadic cases outside the epidemic area were comparatively few (110) of these (7) are known to have been infected away from the town, or in the Victoria Hospital (5) and the Kingshill outbreak (11) was probably and the Coate outbreak (9) possibly without connection with the primary focus. Of the isolated cases 6 were undoubtedly infected from the original area, no definite opinion can be expressed of the remaining 72 cases.

The Virulence of The Epidemic.

The death rate was 2%—about normal—for the present time, but the complications were very numerous, and much above the average. At first the virulence was very high; then followed a long period in which it was trivial (June—October). Then it again became severe (November). Since the New Year it has been slight. Hurst Park and the district around Ferndale Road furnished almost all of the serious cases.

Spreaders were apparently not numerous, but cases W.C., 26, 20, 37, 64, 75, 61, 86, 87, 96, 116, 114, 138, 176 were potent spreaders. Three of these, 176,C, 64, are still spreading the disease.

Return cases were exceptionally few (7), and occurred mainly late in the epidemic. It is to be anticipated that they will be more numerous at the end of the epidemic.

A period of vague uneasiness began in the middle of May, 1925. Child mortality began to increase especially in the Ferndale Road School, where the register of the infant department commenced to fluctuate; Hurst Park children began to go sick and infants from that district came to the infant clinic with various septic manifestations. Inquiry at Ferndale Road School revealed numerous absentees from Hurst Park. On investigation it was found that these absentees were reported as being sick from sore throat (8) and jaundice (6). A few were reported as having measles (4) or German measles (2), none as having scarlet fever.

A scrutiny of the infant department was taken. The following was the result:—

Absent	....	63
Showing definite signs of scarlet	....	3
Showing indefinite signs of scarlet	....	11

Inquiry into conditions at Hurst Park showed clearly that epidemic disease was prevalent and though, up to this time, no case clinically identified as scarlet fever had been reported, it was fairly certain that the disease was in fact scarlet fever. We had not to wait long for decisive proof.

Suspicion centred upon a boy (W) as the introducer of the disease. This boy had been away at the seaside, where he had a vague illness (April). He returned to his home in Hurst Park and to school at Ferndale Road (early May). On the scrutiny he was found in that school with typical peeling (May 30th).

The first batch of definite cases were all playmates of W.

On 2/6/25 a boy with acute mastoid was admitted to Victoria Hospital from Hurst Park. On 17/6/25 he got out of bed for the first time. On 22/6/25 every patient in the ward except one, who had been admitted on that same day, developed scarlet fever. One case was sent home. (Nothing further developed from this case or in the neighbourhood to which it was sent). The others, including the original mastoid, were transferred to Gorse Hill. It was then elicited that eleven days previous to the mastoid, he had had a rash presumed to be measles. At the time of admission to Gorse Hill he was peeling typically of scarlet fever.

As has been said, the first batch of definite clinical cases were traceable to W. The times of contacts could be settled with some certainty. The incubation period was 68-70 hours. Throughout the epidemic the incubation period 60-80 hours, was demonstrated in all cases where reliable evidence was obtainable. The type of this first batch of cases was very severe. The second case died (nephritis). Co-incidentally with the first crop of cases, much indefinite illness occurred amongst children in the neighbourhood, especially ear discharges and enlarged glands. Apart from the Ferndale Road area, the child health of Swindon continued good although measles was prevalent, though at that time not severe.

Feeling that an extensive epidemic was probable, the decks were cleared for action both in the health department and at the fever hospital. Unfortunately sickness amongst the staff forced the curtailment of many lines of action, which had been decided upon, notably serological diagnosis and immunisation. The evidence being conclusive that prolonged stay in hospital for scarlet fever cases is useless, it was decided before the epidemic started to curtail the normal stay in hospital from 42 to 28 days. Unfortunately, owing to the severity of the cases, this did not relieve us as much as was expected. The maximum number of cases to be accommodated in each ward was fixed and a rigid determination not to exceed it on any pretext whatever was registered. Special attention was devoted to children requiring tonsils operations, to see that no such case, possibly still infectious from scarlet fever, found its way to the General Hospital. What was possible

(it is at present very little) was done to limit the epidemic to its original site. As a matter of fact it will be seen that such limitation to the original area was very nearly achieved, but nature, not art, must be thanked for it!

The Epidemic Period.

The actual start in the Borough itself was abrupt, in the last week in May, with the group 15, 16, 17, 18, 20, 22, 23, 24, 25, 26; but at that time the condition in Ferndale Road Infant School suggested that there might have been numerous points of contact. However, of this first group, Nos, 16, 18, 23 do not go to School, No. 26 was not attending and the others are in diffierent classes. Contact with the Case W, was proved in cases No. 15, 16, 18, 20, 24, and the incubation periods were calculated from those dates.

The child in the sweetstuff shop (No. 26) was not infected either by or with this first group, but must have been infected on 28/5/25. Contact with W about this date on several days was proved.

The small outbreaks at Highworth, Chiseldon, Moredon, Blunsdon and Wroughton, may or may not have spread from Swindon. No evidence either way is obtainable. The outbreak at Stratton probably was an extension from Swindon for points of contact were abundant and Swindon is continuous with Stratton. But proof is lacking. The same may be said of the outbreak at Coate. The boatman, the first case notified, was not the first case to occur so the disease could not have been introduced through him. Coate is an isolated straggling hamlet, mainly without the Borough, and is altogether unfavourable for scientific exploration The Kingshill outbreak was probably not connected with the. Ferndale Road cases, and the isolated cases, No. 91, 47, 52, 53, 54, 56, 49, for certain were not. Of the other isolated cases and groups, Nos. 28, 27, 31, 35, 66, 69, could be traced to the prime focus. The remainder could not.

The fact that the first cases were young children, * many being toddlers is significant. It exonerates the school from being the spreading ground; important because the infant department is much overcrowded and was immediately open to suspicion. It is far more important for the light that it throws upon epidemiology. It may now be taken as proved that the introduction of new blood into an epidemic area increases the epidemic prevalence, both for the new introductions and for the older hands, many of which may be partly immune. In the present case, the introduction

*1 (ages of 1st twenty cases :—6, 4, 5, 3, 5, 5, 9, 3, 6, 5, 6, 4, 4, 4, 6, 8, 2, 5, 3, 5).

into the school did not give rise directly to infection of the school children, but it did so afterwards. In the later days of the visitation the majority of the notified cases were children and adults who had passed through previous epidemic periods of scarlet fever and escaped; the first cases (with few exceptions) had not previously become acquainted with the disease.

Distribution of the known cases of scarlet fever.

7 cases were definitely infected away from Swindon whilst on holiday. They were all isolated and all mild. 5 cases were infected in Victoria Hospital.

THE COATE CENTRE. Coate is a village on the confines of Swindon. The reservoir is a pleasure resort of Swindon. The village of Coate is partly within but mainly without the Borough. It is isolated, but some of the children attend Lethbridge Road School (2 miles). The first notified case (8/8/25), was a boatman employed on pleasure craft. He was not the first case. 9 cases were notified from Coate. 4 cases are known to have existed, but were not notified.

THE KINGSHILL CENTRE. 11 Cases occurred in this neighbourhood. In former years there had lived in this neighbourhood a known carrier (officially known as C). He left Swindon 1924, but returned, April 1926. It is significant that the cases in this district occurred after his return to Swindon. 6 cases were traced to him (evidence good in 2, faulty in 4). The cases from Kingshill were generally mild, somewhat different in type from those in the main district, and the incubation appeared to be longer, +80hrs (evidence faulty).

RODBOURNE CENTRE. 12 Cases connected together in groups of 2, 2, 3, 3, 1, 1, apparently formed a small outbreak of itself. How this district became infected is not known.

SCATTERED CASES. 66 Cases occurred scattered throughout the town.

THE MAIN CENTRE. 115 Town Cases and 20 Hurst Park Cases or 135 in all, occurred in the epidemic area. This area is quite small, separated into 4 parts by the Great Western Railway and the Isolation Hospital and allotments. Its total area is about 620 acres, of which only about one-third is covered with houses.

METHODS OF SPREAD.

Milk and ice-cream were considered, but early exonerated, upon conclusive evidence. Early in the epidemic, attention was drawn to a sweetstuff shop as a possible focus. 6 cases seemed

to originate from this shop. It was visited 8/6/25, and a boy in the shop was discovered who was suspicious of having had scarlet fever. He was removed to hospital 22/6/25, released 25/7/25. During the time he was in hospital the epidemic definitely declined, but after his release it increased considerably. Several cases (8) were subsequently traced to this boy, so he is probably a chronic carrier. Too much must not be made of this, because the time the boy was in hospital, corresponded with the annual Trip holiday, which of itself should cause the epidemic to ease off temporarily, and cases subsequently traced to him may exhibit bias. It is noteworthy however that of the scattered cases, 4 used to buy their sweets from this shop. The shop is in the centre of the epidemic district.

Case to case infection was proved conclusively in many of the early cases, and in the later cases. The accepted return cases should be considered. In the height of the epidemic it was impossible to trace the cases. In many of the streets in the centre of the affected area nearly every house furnished notified a suspected case, so points of contact were innumerable.

Though the scholars in Ferndale Road Infant School furnished a large proportion of the cases, the evidence is against any extensive spreading in the school itself. There was no evidence of class spreading, the cases occurring indiscrimately in all classes of the school.

In the early days, the age incidence was very distinctly young (average 4.9 years). But this passed, and in the latter days of the visitation the age distribution was about normal for scarlet fever.

In September, diphtheria put in an appearance in the epidemic area. The type was virulent. It never assumed epidemic prevalence, but cropped up in small local outbreaks at first confined to the epidemic area, but later in different parts of the Borough and district. It is to be noted :—No case of concurrent scarlet fever and diphtheria occurred. No case of scarlet at any time during the epidemic developed diphtheria, one case of diphtheria developed scarlet remotely. In no case of scarlet fever examined (all admitted to hospital, 223), were virulent diphtheroids present in the throat (two cases which showed diphtheroids were proved avirulent).

Diphtheria nearly always, sooner or later, complicates an epidemic of scarlet fever ; the converse practically never. It is to be noted also that in large fever hospitals in the past, post-scarlet diphtheria used to be very frequent, post-diphtheria scarlet, rare.

These facts are significant for scarlet fever is more highly contagious than diphtheria. There is no direct connection between the two diseases, they differ in all particulars from each other as widely as any two infections can differ.

What influence did the epidemic prevalence of scarlet fever have upon measles which was prevalent at the same time? The facts that many cases of measles were sent into hospital as scarlet fever and many of the scarlet fever cases were found to be incubating measles are not significant. But can the same be said of those cases (11) mainly adults (7) in whom measles and scarlet fever, neither of which is very common in adults, were present concurrently? Are the cases of complex infection, given in the 'return cases' significant? Do the grave increase in the severity of measles which occurred during the height of the epidemic of scarlet fever and the peculiar course of the post scarlatinal measles cases which occurred in hospital bear any epidemiological significance?

The health of Swindon during the epidemic period which lasted from May to February was unsatisfactory and gave rise to much anxiety. Cases of streptoccal septicaemia amongst new born infants occurred; puerperal pyrexia was prevalent to an extent never before experienced during the tenure of the present medical officer of health; general surgical cases did badly. Have these any meaning or are they mere coincidences?

The Post Epidemic Period.

It is when an epidemic is declining that it becomes possible to recognize carriers or those individuals who, having been infected, retain the power of infection indefinitely and act as foci for spreading cases. At present there can only be recognised by experience, *i.e.*, by their infecting others. Doubtless before long bacteriology will enable us to recognise them at once. It is uncertain whether they must of necessity harbour the specific germ about them in a recognisable form (the researches of Pryor and what is known of swine fever and some similar diseases of animals require consideration). It seems likely that carriers cannot infect individuals who have been previously exposed to the same infection and escaped, but that they infect new blood and having started a fresh focus in this way take no further part in the process. (This is generally observed in epidemics of the typhoids traced to carriers and to a less certain extent in diphtheria). Consequently carriers do not necessarily give rise to return cases, unless they are returned home to houses in which individuals are present who were not there when the original case occurred. But they infect their

playmates, especially new comers, often at a remote period. Whether a person can be a carrier who has not suffered from the disease clinically is doubtful. The research work done in Swindon in 1924-25 tells against it.

Return cases in which the second case occurs long after the normal incubation has elapsed have puzzled us for a generation. It is generally found that in such households some new member has been introduced prior to the occurrence of the return case. Evidence upon this point is furnished by return cases No. 4, 6, 15, 16.

Topley has shown that in mice epidemics the introduction of fresh blood restarts the epidemic, not only amongst the new members, but also amongst the old members who originally (apparently) escaped.

We can now see why return cases should be rare in the earlier days of the epidemic and become increasingly more prevalent as the epidemic wanes. It is also easy to see why return cases should be apparently more common after hospital treatment than after home treatment, and that the longer cases are retained in hospital the greater is the probability of return cases.

It is too early at present to form any definite opinion as to what carriers are left in Swindon, but the following list is believed to contain the probables and are marked for observation, 26, 20, 37, 61, 64, 86, 87, 96, 114, 138, 176.

The post epidemic period may be dated from the end of Feb., 1925. After that date cases were notified in much fewer numbers, and irregularly, the general health of the district improved. But an amount of wreckage is left for clearing up. So far as is definitely known :—

24 tonsils requiring operation.
23 tonsils probably requiring operation.
34 enlarged glands.
4 ear discharges.
45 damaged ears and hearing.
2 endocarditis.
1 paralyses.
35 chronic ill health.

remain to remind us that Scarlet Fever is still capable of being å not insignificant enemy.

By reviewing the history of scarlet fever in Swindon during the past five years, we can explain the principles which underline the effort made for the control of the disease locally. During

those five years an enormous advance was made in our knowledge of epidemiology and though the most striking addition (Professor Topley's experiments), was not published until March, 1925, the main deductions which can be drawn from those experiments had already been vaguely apparent from the consideration of human epidemics. Scarlet fever is a typical epidemic disease to study; it is both notifiable and notified; it is sufficiently frequent to afford abundant material to study; it is always more or less present and its epidemices are periodical and well marked.

In 1921 scarlet fever was very low in numbers, until the Autumn, when a sharp epidemic occurred which lasted until July, 1923. The cases which occurred early in 1921, were in many cases traced to local foci which suggested that there existed carriers who were capable of spreading the disease. The epidemic was apparently introduced by holiday makers returning to Swindon. It was not until the closing months of this epidemic (June, July, 1923) that anything definite regarding its means of spreading could be traced with accuracy. But from then onwards, the cases were traced to certain citizens who, having had scarlet fever, apparently retained indefinitely the power of infecting others. As has been stated on a previous occasion, all such spreaders as were traced except two who were under continuous supervision, were got out of the town. This was completed by February, 1924. From February 1924 to February 1925, exceedingly few (9) cases of Scarlet Fever occurred in Swindon, and these were traced to outside infection. One small batch of 3 cases was of particular importance as demonstrating what was suspected; that epidemics arise, not directly from carriers locally but from introductions from without into centres where there was human material which had not previously been exposed to infection. In February, 1925, the first part of the experiences being complete, the measures, no longer being necessary, were abandoned. At that time it was predicted that the Borough would remain free from scarlet fever for about six months—until after trip time, when the disease would certainly be introduced from numerous sources and would possibly get going before every new introduction could be stopped. As a matter of fact the immunity of the Borough lasted only until May, 1925, owing to the introduction of the disease into Hurst Park, where it had got well on the way before it became apparent in the Borough itself. The first evidence of this introduction came to the notice of the Borough Medical Officer of Health through the irregular attendance at Ferndale Road School. It was recognised at once that a pre-epidemic period was already in existence, although no case of scarlet fever had been notified either in the Borough or the contiguous area for many months, and that an epidemic was no longer avoidable.

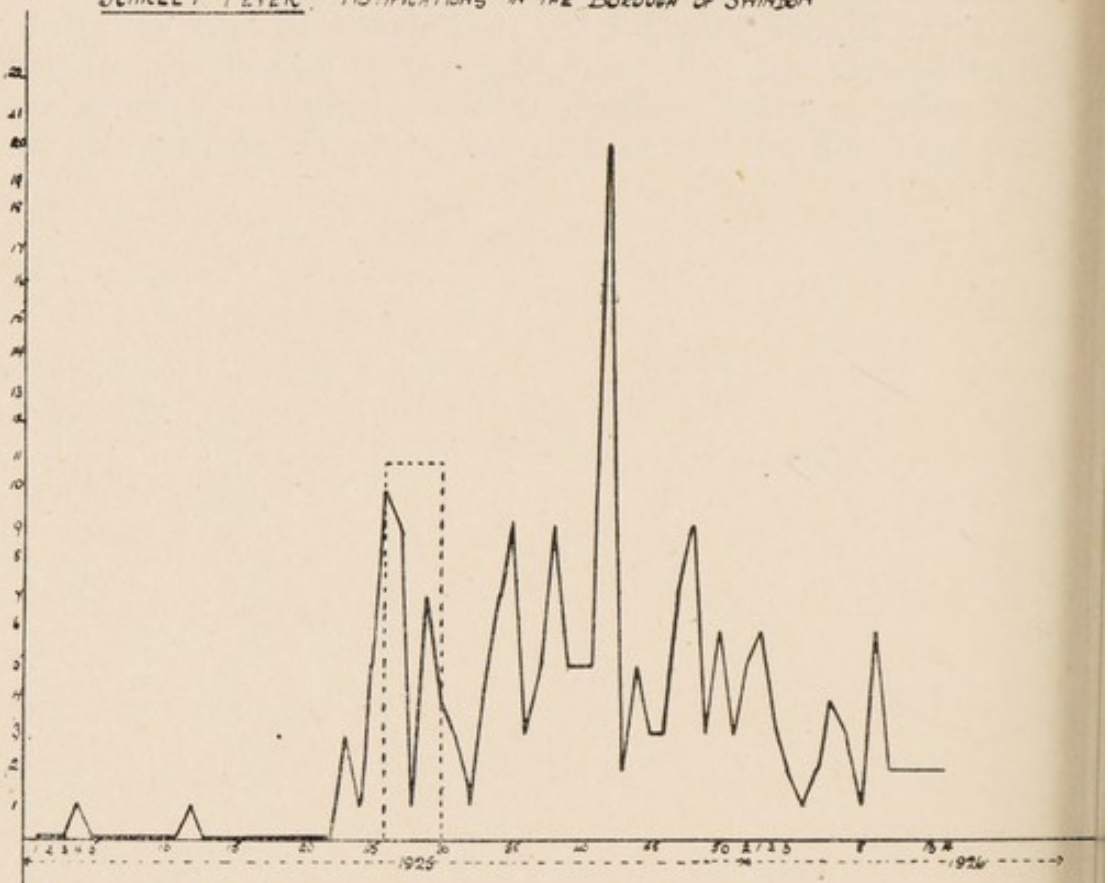
Now (April 1926) that the epidemic is waning, it again becomes possible to continue the tracing of carriers, (of which several are already known, two of which are very active), but owing to the near approach of trip week, there is no prospect of Swindon being freed from scarlet fever during the present year.

It appears that the disease is kept up during non-epidemic periods by spreaders resulting from past epidemics; that these spreaders give rise to sporadic cases but not to epidemics in their own neighbourhood. Epidemics arise from new importations or from carriers entering a new district where there are children who so far have not been exposed to the infection. It is essential for epidemic spread for there to be an introducer and new blood to infect. Once the new blood becomes infected the disease spreads also amongst those who have already passed through previous epidemics and escaped (or apparently escaped). Exposure to infection if it results in definite clinical scarlet fever, usually produces immunity which is practically life long, but not always. (There is a boy in Swindon who has had definite scarlet fever three times in six years. He has never infected anybody else). Exposure to infection which does not produce definite clinical scarlet fever apparently gives comparative immunity which resists the original infection, but yields to it if it is 'relaid' through cases which have never been previously exposed. This carries a possible explanation why epidemics die down instead of lasting for ever. In a neighbourhood where an epidemic is on the wane, the introduction of new blood into that neighbourhood, if any spreaders are left there, immediately restarts the epidemics not only amongst the new comers, but amongst the old residents as well. This phenomena has been observed in Hurst Park and the Ferndale Road district, where new blocks of houses have been erected recently. To a slight extent only has it been observed in the developing parts of Old Town, for though there are spreaders there, the new tenants are not suitable soil. In the Groundwell Road estate there is suitable soil, but at present no known spreaders. It may be repeated that the cause of so much epidemic sickness in Hurst Park is not due to the soil, the situation nor the construction of the houses, nor to the contiguity of the fever hospital, but to known epidemiological factors which produce their inevitable result. If the Council built palaces in Elysium and filled them with young people and introduced a scarlet fever spreader, there would be the same need for a fever hospital as there is for Hurst Park.

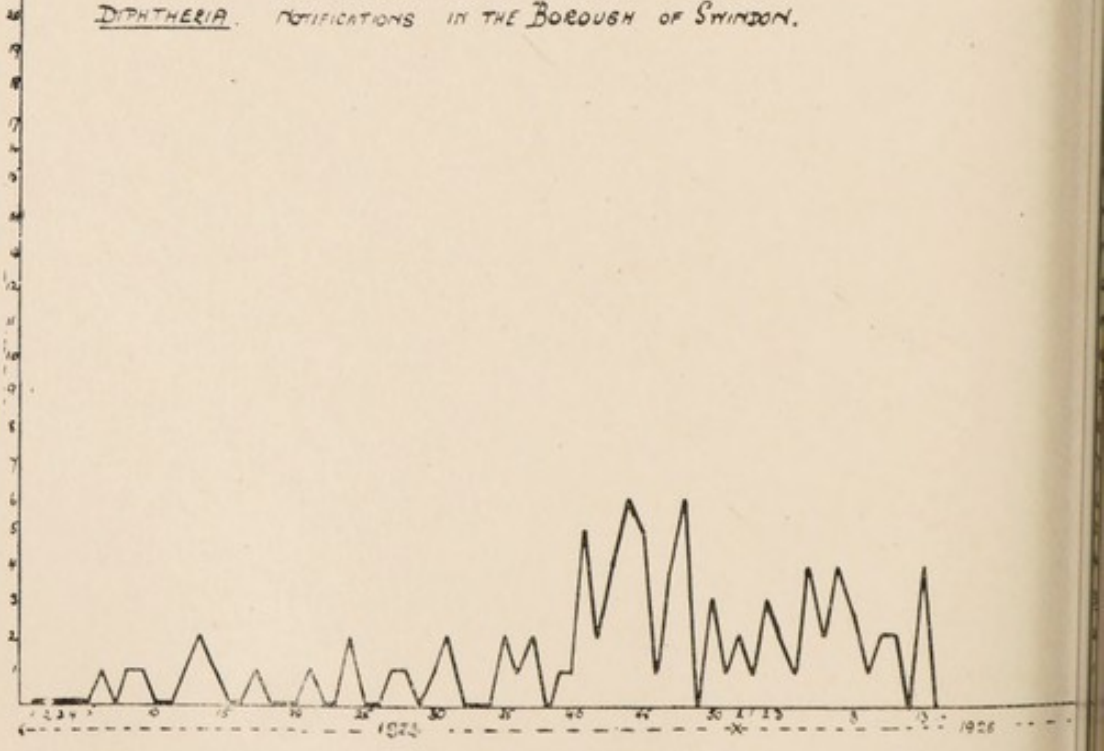
Whether epidemic scarlet fever can ever be abolished, cannot at present be foretold, but experimental work at present in operation will probably give us the answer within the next ten years

or so. But that sporadic scarlet fever can be suppressed seems highly probable from the records of Swindon. And if this can be assured one of the great difficulties of administration is cleared. Epidemics never start suddenly and if the pre-epidemic phase of an outbreak can be recognised, no difficulty should arise in preparing for the height of the epidemic. But the pre-epidemic cases are generally atypical, as in the present instance when the epidemic was well on its way some time before the first case was notified.

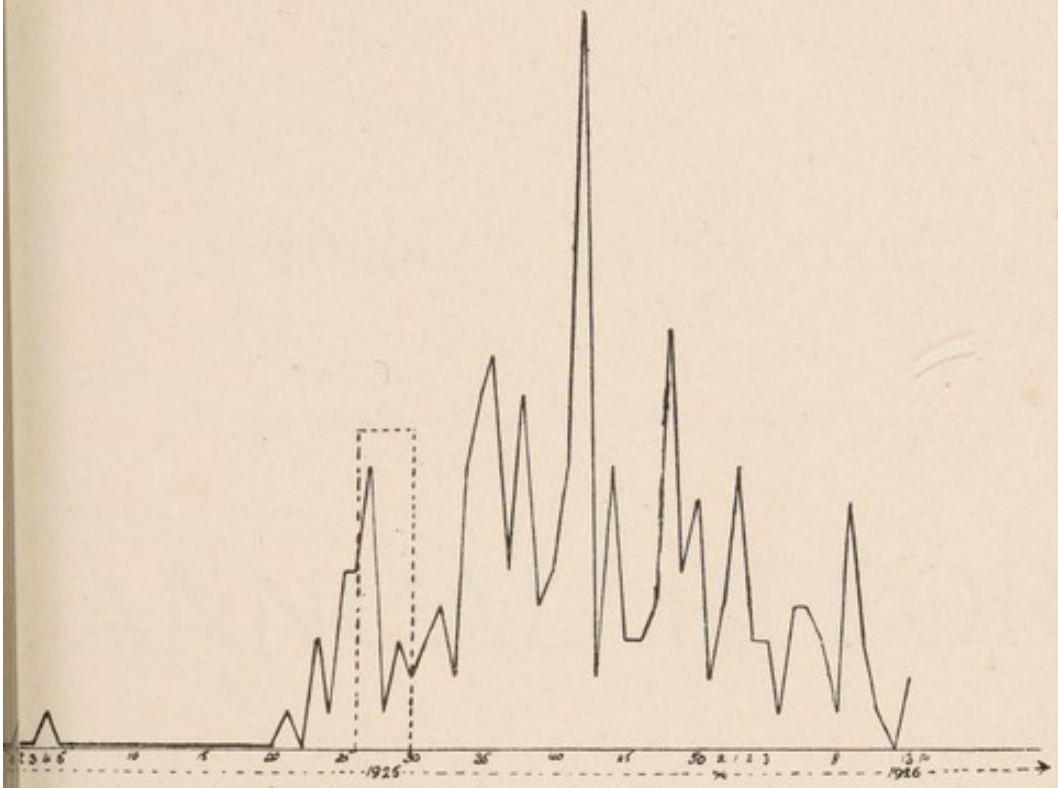
SCARLET FEVER. NOTIFICATIONS IN THE BOROUGH OF SWINDON



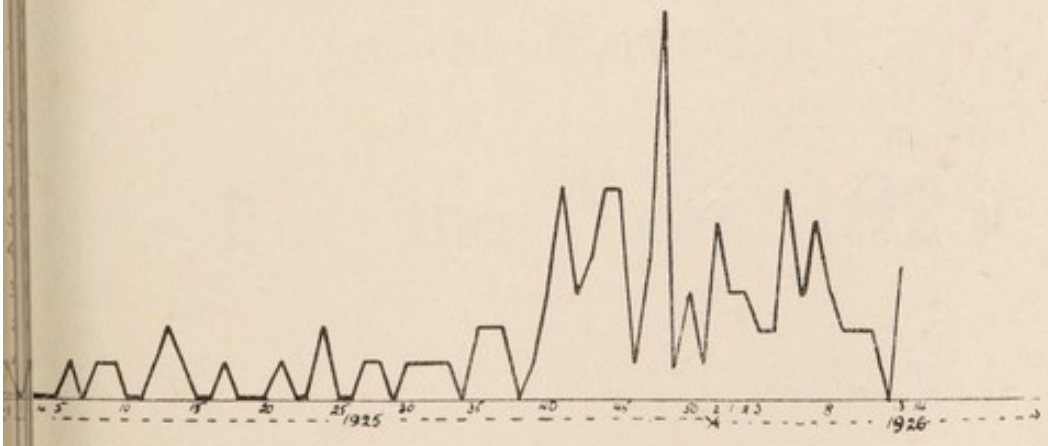
DIPHTHERIA. NOTIFICATIONS IN THE BOROUGH OF SWINDON.



Scarlet Fever Amended by Inclusion of Cases in the Contiguous Area and the Exclusion of Cases known to have been infected away from Swindon.



Diphtheria Amended to include cases occurring in the contiguous area



APPENDIX.

BOROUGH OF SWINDON.

ANNUAL REPORT

OF THE

Chief Sanitary Inspector,

A. E. BOTTOMLEY,

For the Year 1925.

To the Chairman and Members of the Health, etc., Committee.

LADIES AND GENTLEMEN,

I have the honour of submitting my 25th and final report as Sanitary Inspector to your Authority. As an official with nearly 40 years public service, this report will have to be somewhat retrospective.

A complete survey of the past 25 years is out of the question, but it will be readily understood that Swindon in that period has become very dear to one's memory. On many occasions in presenting before different societies, papers on hygiene in general and the ideal home in particular, Swindon, what it is, and what it might have been, has been the basis of my remarks.

The situation of our town is ideal. We are at a good elevation above the sea, and we are wind-swept by the two prevailing winds, namely east and west. As a result of the foresight of our forefathers we are well provided with a good water supply and sewerage system. Again our town in many features is well planned, the greatest drawback to the ideal has been the failure to carry out those excellent by-laws on which we are supposed to have built up these structures in our midst.

DRAINAGE WORK.

From a drainage point of view, our houses are protected. In this sense there is hardly a dwelling in our midst that has a drain actually within its walls, and our sewage system is absolutely a water borne one. The construction of these drains and sanitary appliances is quite another question, and I can say it almost without doubt, that there is not another town in the kingdom where the failure to properly supervise the construction of the drains, has resulted in such jerry constructed drains as we have in this town. This is further aggravated by the fact that in many cases the re-construction of these drains actually cost more than they would have done, had they been properly constructed in the first place. I refer more particularly to the connection of the W.C.'s to the drains. The prevalence of the practice was inconceivable to me when first I was introduced to the method.

During the past 25 years much alteration has been carried out, and an effort has been made to record these alterations which are depicted on plans prepared and filed in the office, and which will serve for reference on future occasions. Our present method of drainage provisions for our houses, in my opinion, is a retrograde step. A combined drain serving, let us suggest, twenty or thirty houses and intercepted by one common intercepting trap is going to be a source of trouble and vexation at a future date. If the property belongs to one landlord it would not be so vital, but as there are perhaps as many different owners as there are houses, the puzzle will be on whom to settle the onus of unchoking blocked drains. I can see great trouble for my successor in this direction.

Housing.

Another question which is a difficult problem in spite of the drastic efforts made by our Authority, is the housing question. We have still in our midst many cases of overcrowding, and although Sanitary Inspectors are supposed to be pretty well adamant to sentiment and feeling, one is bound to acknowledge a pull of the heart strings when called in to deal with this type of complaint.

Food Supply.

The new Meat Regulations which came into force on the 1st April, 1925, are yet in their experimental stage, and it is too early for one to comment very thoroughly on their operation apart from this remark :—if every Authority could efficiently carry out the provisions of the Regulations it would eventually mean a drastic alteration in the quality of the meat consumed in this country. There is only one method, in my opinion, in which it can be done and it is drastic. That is, the introduction of public abattoirs and clearing centres, where animals can be slaughtered, their condition being then under direct supervision. The meat could then be distributed from these centres.

Extermination of Rats.

In dealing with this subject one can only reiterate what has been said in previous years. When Swindon ceases to tip its refuse in the manner that is at present adopted, and when some means of exterminating the rats in our sewers is found, then, and only then, can we hope to eradicate the trouble, damage and mischief done by rats.

I have nothing but praise to offer in support of the work done by the rat catcher and his dog. He is a man who has diligently carried out his duties, which are not at all of a pleasant character.

The number of rats actually destroyed during the period under review was not so many as last year. This is partly accounted for by the fact that the rat catcher's work has to some extent been spread over a larger area than in previous years. Again, the numbers accounted for do not represent the amount actually destroyed. I mean by this that from time to time we have ample evidence that large numbers of the rats are destroyed by poisoning, which cannot be accounted for because we are unable to collect them.

Appended to this report are the usual tables which are required by the Ministry of Health. They are simplified to show in a very precise manner the actual work done by your officers.

Ladies and Gentlemen, I cannot bring this report to a close without tendering to you my sincere and grateful thanks for the many kindnesses I have received at the hands of the Health Committee.

My pen is not capable of expressing the sentiments of my mind in a manner equal to my feelings.

I remain, Ladies and Gentlemen,

Your obedient Servant,

A. E. BOTTOMLEY,

Chief Sanitary Inspector.

SANITARY STATISTICS.

TABLE OF NUISANCES RECORDED AND ABATED 1925.

Nature of Complaints registered.	Defects brought forward from 1924	Complaints received and visited during 1925	Total	No. of complaints abated during 1925	No. o cases not abated at end of year.
Defective drains	37	24	61	59	2
,, traps	2	8	10	10	....
,, spouts and eaves troughing	9	27	36	29	7
,, roofs	58	57	115	99	16
,, and dirty W.C. Pans	25	29	54	52	2
,, floors	77	37	114	111	3
,, and unsufficient yard paving	7	20	27	19	8
,, walls	29	7	36	35	1
,, flushing cisterns	7	15	22	17	5
,, ceilings	5	22	27	22	5
,, forecourts	....	1	1	....	1
,, sinks	6	5	11	10	1
Offensive animals	18	6	24	24	....
Offensive accumulations	7	35	42	41	1
Choked drains	34	72	106	105	1
Damp walls	16	17	33	32	1
Dirty rooms	86	252	338	303	35
Overcrowding	11	22	33	33	....
Absence of Covered receptacle at butchers' premises.	....	29	29	29	....
Miscellaneous	38	281	319	302	17
TOTALS	472	966	1438	1332	106

VISITS AND INSPECTIONS, 1925.

Infectious Disease	372
Work in course of construction	1118
Slaughterhouses	3445
Bakehouses	64
Milkshops, Dairies and Cowsheds	137
Markets	208
Outworkers	76
Common Lodging Houses	25
Fried Fish Shops	127
Re-visits	884
Miscellaneous	1852
Workshops	412
Ice Cream Shops	43
Butchers' Shops	550
Contacts with Small Pox	9
Pig-killing on private premises	33
House to House Inspection	271
	9626

DEFECTS IN OUTWORKERS' PREMISES.

Dirty Ceilings	4
Dirty Walls	3
Defective Coppers	1
,, Sash Cords	2
,, Roof	2
,, W.C.	1
,, Door	1
,, Eaves gutter	1

INSPECTION OF FACTORIES, WORKSHOPS AND WORK-PLACES.

Including Inspections made by Sanitary Inspectors or Inspectors of Nuisances.

Premises (1)	Number of		
	Inspections (2)	Written Notices (3)	Prose-cutions (4)
Factories .... (Including Factory Laundries)	72	Nil	Nil
Workshops .... (Including Workshop Laundries)	338	4	Nil
Workplaces .... (Other than Outworkers' premises)	137	Nil	Nil
Total	547	4	Nil

DEFECTS FOUND IN FACTORIES, WORKSHOPS AND WORKPLACES.—Continued.

Particulars. (1)	Number of Defects. Found (2)	Remedied (3)	Referred to H.M. Inspector. (4)	Number of Prosecutions (5)
Nuisances under the Public Health Acts:—*				
Want of cleanliness	23	19	....	....
Want of ventilation	....	....	....	....
Overcrowding	....	....	....	....
Want of drainage of floors	1	0	....	....
Other nuisances	9	9	....	....
Sanitary accommodation (insufficient	3	0	....	....
Sanitary accommodation (unsuitable or defective	4	4	....	....
Sanitary accommodation (not separate for sexes	2	1	....	....
Offences under the Factory and Workshop Acts:-				
Illegal occupation of underground bakehouse (s.101)	....	....	....	....
Other offences (Excluding offences relating to outwork and offences under the Sections mentioned in the Schedule to the Ministry of Health (Factories and Workshops Transfer of Powers) Order, 1921).	.. .	....	....	....
TOTAL	42	33	....	....

* Including those specified in sections 2, 3, 7 and 8 of the Factory and Workshop Act, 1901, as remediable under the Public Health Acts.

DISINFECTANTS.

Number of Applications	1893
Number of Applications Granted	1893
Quantity given Fluid	235 galls
Powder ..	2cwt. 1qr. 4lbs.

DISINFECTION.

Cases of Infectious Disease	396
„ Cancer	30
„ Consumption	148
Verminous Rooms	63
Number of Lots of Bedding destroyed	44
Number of Lots of Bedding disinfected	765
School Shawls disinfected	31
Library Books disinfected	40
Animals destroyed	23
No. of School Rooms disinfected	27
Miscellaneous Articles disinfected	20

DAIRIES, COWSHEDS AND MILKSHOPS.

Dairies and Milkshops	48
Cowsheds	15
Milk Purveyors from outside the Borough	16
	79

1 subsidiary license only was granted for the Sale of Grade 'A' (Non Tuberculous) Milk.

Inspections	140

NUISANCES FOUND—

Dairies requiring limewashing	22
Cowsheds requiring limewashing	8
Dirty yards	1
Defective paving	5
Offensive accumulations	2
Defective plaster to ceilings	2
Unsuitable and dirty utensils	6
Milk and containers uncovered	3
	49

SLAUGHTERHOUSES.

Registered	9
Licensed	10
TOTAL	19
Number of Inspections	3445

NUISANCES FOUND—

Requiring limewashing	17
Want of cleanliness	5
Insanitary condition of pens and yards	2
Offensive accumulations	11
Choked drains	5
Other defects	6
TOTAL	46

COMMON LODGING HOUSES.

On Register		1
Inspections		24
	Adults.	Children.
Number of persons for whom accommodation is provided	116	10

TENTS, VANS, SHEDS, ETC.

The caravan life of the town is, as can be surmised, of a fluctuating nature.

During the year action has had to be taken in several cases. In one case circumstances occurred which were really deplorable; a man his wife and several children were living in an old dis-used van covered with a very old tarpaulin. Pressure was brought to bear, and the wife and children were removed to the Workhouse.

Another source of trouble has been the piece of land on the south side of Chapel Street, which of late has become a rendez-vous for travellers passing through Swindon. On several occasions we have had to threaten the occupier of the land with statutory proceedings for breaches of the by-laws. Up to the present we have not had a case before the Magistrates, as the occupier at the last moment has always complied with our notices. The inhabitants of this district would be glad to see this yard used for other purposes, instead of a lot of squatters. They are a source of annoyance to the public.

What is known locally as Kembrey's Yard off Cricklade Road, a piece of land that has long been used from time to time by gipsies, has now been purchased by one of the fraternity and proper steps are being taken to comply with our by-laws. This might be termed a private movement on behalf of this individual. As representatives of a class, they are of a superior stamp.

THEATRES, CINEMAS, ETC.

There are in the Borough of Swindon :—

1 Theatre
5 Cinemas
1 Billiard Saloon
3 Dancing Halls, Etc.

Owing to pressure of other work these places have not had the attention one would like, and it was my intention to make a complete survey at an early date of the whole of the places under review.

BAKEHOUSES.

Factory Bakehouses	10
Workshop Bakehouses	19
Domestic Bakehouses	1
TOTAL	30
Number of Inspections	64

NUISANCES FOUND—

Limewashing overdue	12
Dirty yards	1
Ceilings requiring re-painting	1
Choked drains	1
Broken W.C. pan	1
No separate accommodation for sexes	1
Accumulations of manure	1
TOTAL	18

FOOD SUPPLY

There are on the registers of the Department—

Butchers Shops	76
Butchers Stalls (in covered market)	3
Wholesale Meat Store	1
Fried Fish Shops	29
Ice Cream Shops	101
Cooked Meat Shops	21

and these premises are regularly inspected by your officers.

MEAT AND FOOD DESTROYED.

	Tons.	Cwts.	Qrs.	Lbs.
41 Carcases of Beef and Offal	11	6	2	25
23 Quarters of Beef	1	17	0	22
Portions of Beef		13	0	19
18 Beasts Heads and Tongues		4	1	18
62 Beasts livers		6	3	13
22 Beasts lungs		1	3	4
3 Carcases of Veal and Offal		1	0	10
32 Carcases of Pigs and Offal	1	13	3	9
36 Pigs Heads		4	1	23
46 Pigs Plucks		2	3	8
6 Carcases of Mutton and Offal		2	1	14
Portions of Mutton			2	8
10 Sheeps livers				21
Other Offal, etc.		8	2	26
Fish			1	16
59 Rabbits			2	3
7 Tins Preserved Meat			1	0
	17	5	1	15

PUBLIC HEALTH (MEAT) REGULATIONS 1924.

The following table gives the numbers of carcases inspected during the year, together with the averages per week prior to, and since the Regulations enforcing notification of intention to slaughter came into force.

	Beasts	Calves	Pigs	Sheep	Totals
Total Inspected	1324	1816	4419	2034	9593
Average per week prior to Regulations	10.83	20.25	43.65	20.16	95
Average per week since Regulations	31.4	41.4	102.5	46.1	222.4

HOUSING.

Number of new houses erected during the year :—

(*a*)	Total (including numbers given separately under (b))	414
(*b*)	With State Assistance under the Housing Acts :—	
	(i) By the Local Authority	* 2
	(ii) By other bodies or persons	364

I. UNFIT DWELLING-HOUSES.

INSPECTION—

(1)	Total number of dwelling-houses inspected for housing defects (under Public Health or Housing Acts).	162
(2)	Number of dwelling-houses which were inspected and recorded under the Housing (Inspection of District) Regulations, 1910, or the Housing Consolidated Regulations, 1925	5
(3)	Number of dwelling-houses found to be in a state so dangerous or injurious to health as to be unfit for human habitation	Nil
(4)	Number of dwelling houses (exclusive of those referred to under the preceding sub-heading) found not to be in all respects reasonably fit for human habitation	162

II. REMEDY OF DEFECTS WITHOUT SERVICE OF FORMAL NOTICES.

Number of defective dwelling-houses rendered fit in consequence of informal action by the Local Authority or their officers	108

III. ACTION UNDER STATUTORY POWERS.

A. Proceedings under Section 3 of the Housing Act, 1925.

(1)	Number of dwelling-houses in respect of which notices were served requiring repairs	5
(2)	Number of dwelling houses which were rendered fit after service of formal notices :—	
	(a) by owners	1
	(b) by Local Authority in default of owners	Nil
(3)	Number of dwelling houses in respect of which Closing Orders became operative in pursuance of declarations by owners of intention to close	Nil

B. Proceedings under Public Health Acts.

(1)	Number of dwelling houses in respect of which notices were served requiring defects to be remedied	23
(2)	Number of dwelling houses in which defects were remedied, after service of formal notices:—	
	(a) by owners	23
	(b) by Local Authority in default of owners	Nil

C. Proceedings under Sections 11, 14 and 15 of the Housing Act, 1925

(1)	Number of representations made with a view to the making of Closing Orders	Nil
(2)	Number of dwelling houses in respect of which Closing Orders were made.	Nil
(3)	Number of dwelling-houses in respect of which Closing Orders were determined, the dwelling houses having been rendered fit.	Nil
(4)	Number of dwelling-houses in respect of which Demolition Orders were made	Nil
(5)	Number of dwelling-houses demolished in pursuance of Demolition Orders	Nil

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*80 new houses were erected by the Swindon Corporation under the Housing Acts on their Hurst Park Housing Estate, which is outside the Borough.