

T H E S I S

on

THE DIPHTHERIA IMMUNIZATION CLINIC

submitted

to

THE UNIVERSITY OF EDINBURGH

for the degree of

DOCTOR OF MEDICINE

by

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October, 1937.



P R E F A C E.

Having been privileged to administer and conduct the clinic for Immunization against Diphtheria in the County Borough of Croydon from 1935 to 1937, I write this Thesis in the hope that, although I do not pretend to cover new ground, I may, by reference to the vast amount of literature available and to my own work, provide a strong case on behalf of Active Immunization against Diphtheria in general, and of the use of Toxoid Anti-toxin Mixture in particular.

I give, in Chapter 1, a brief account of work leading up to the introduction of the Schick Test, a description of the Test itself, and an outline of its value as brought out by the earlier work in this country and elsewhere.

In Chapter 2, I deal with the administration and conduct of an Immunization Clinic from my personal experience in Croydon. Three plans are included in the text.

Chapter 3 is devoted to the evolution of Toxoid Anti-toxin Mixture, the reasons for its adoption at this Clinic, and the dosage employed. The contra-indications to its use and resultant reactions are then/

then described.

The Propaganda employed is fully detailed, and other means described, in Chapter 4.

In Chapter 5, the Effects of Immunization upon the incidence of and mortality from Diphtheria are discussed, and some idea given of the cost of Immunization as compared with Treatment of the Disease. Subsequently the problem of Immunization and a theoretical increase in the Carrier-Rate is discussed.

Certain tables are included throughout the text, and in an Appendix will be found the various cards, forms, letters, etc. to which I have referred.

A summary of my conclusions follows Chapter 5, and I have, finally, listed the authors to whose work I have made reference.

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CHAPTER 1.

THE SCHICK TEST AND EARLY WORK ON
IMMUNIZATION AGAINST DIPHTHERIA.

The research of Roux and Martin (1894), Bolton (1896) and Cobbett (1899) showed protective substances against Diphtheria Toxin to be present in the blood of a percentage of horses; while Abel (1894) had demonstrated the presence of anti-toxic substances in the blood of normal man, using human serum to give protection against fatal doses of a diphtheria culture. This was confirmed and amplified by Wasserman (1895), Orłowski (1895), Passini (1896) and others. Karasawa and Schick (1910), further, showed that the presence of anti-toxic substances in normal persons varied with age, the number being high at birth and falling rapidly thereafter, again gradually rising during childhood. The work of V. Gröer and Kassowitz (1919) confirmed the former findings in a series of 1062 cases, showing 84 per cent. to contain anti-toxic serum at birth, the percentage falling to 40 at about eight months, 35 at one year and 28 at three years; it rose again to over 40 at four years and thence, with occasional minor fluctuations, slowly climbing again to over 80 per cent. at the age of seventeen years, at which level the anti-toxic serum content appeared to be/

be maintained.

Römer (1909) had introduced a technique of intracutaneous injection, which enabled him to watch the local effects of injections of Diphtheria Toxin in the guinea-pig. Gins (Knebel, 1912) further elaborated this procedure in Neisser's Institute in Frankfort.

Then Schick (1913) of Vienna described his test, by which he inoculated into the skin of the person to be tested a small measured dose of toxin and observed what, if any, local reaction followed. If no reaction was produced, he argued that the toxin which had been injected had been neutralised by the patient's serum, and that this serum contained, therefore, anti-toxin. Schick claimed also to identify by the application of this test those persons possessing such a natural immunity, and to be able in such persons to forego passive immunization by anti-toxin, or active immunization with a mixture of toxin and anti-toxin, thus saving time, trouble and expense.

The Schick Test is carried out by means of an intracutaneous injection of a fresh solution of diphtheria toxin, given into the flexor surface of the left forearm: this solution is so prepared that 0.1/

0.1 cc. or 0.2 cc. represent 1/50th of the minimal lethal dose for a 250 grammes guinea-pig. As a control, a similar quantity of toxin heated to 70°C. for five minutes is injected as above into the right forearm.

That results may be entirely satisfactory, Copeman (1921) maintained that certain conditions should be observed, namely, -

(1) The use of a standard toxin of definite strength:

In Schick's original test, the amount of toxin as above was contained in 0.1 cc., whereas Zingher felt that 0.2 cc. was an amount which could be more easily handled (Copeman, 1921). This latter dilution is now generally used and it has the added advantage that reactions resulting in susceptible individuals tend to be less severe and persistent than with the more concentrated solution. Although toxin may retain its potency for some months if stored in a suitably cold place and undiluted, it probably loses greatly in potency when diluted, and should be used as soon as possible after issue in diluted form ready for use.

(2) The correctness of the technique:

The skin of the flexor surface of the forearm should first of all be sterilised with alcohol, ether or surgical/

surgical spirit. Then the 0.2 cc. of diluted (test) toxin must be injected between the layers of the skin, and not underneath the skin. The control is given in exactly the same way. The needle, having been introduced into the epidermis, bevel upwards, is passed in parallel with the surface and so superficially that the bevel remains visible. Some degree of pressure is required in the giving of the injection, and the material when injected should show as a small white wheal, tacked down on the surface by the hair follicles and sweat ducts. The needle should be very slowly withdrawn, so preventing leakage along the needle track.

(3) Correct interpretation of the results obtained:

In regard to this and subsequent recording of results the utmost care and thoroughness on the part of the operator and assistant are required.

Four different results are possible:-

(a) Negative, - where there is an entire absence of reaction on both arms.

(b) Positive, - where, while the control shows no evidence of reaction, a red blush appears on the test arm after 24 to 36 hours, becoming more intense and reaching its maximum at about 96 hours. This shows/

shows as a round, slightly swollen area of about 2.0 centimetres diameter, usually bright red in colour. From this stage, the patch of reaction gradually fades, and by the seventh to the tenth day there is only a brownish circular patch of staining with, usually, definite signs of desquamation. The pigmentation may persist for weeks and perhaps months, at times leading even to confusion at the time of reading a Schick test carried out three months after immunization, if the presence of staining has not been noted at the time of giving that final test.

(c) Negative and Pseudo, or Pseudo-Reaction, - this, being an allergic phenomenon, develops equally on both arms, and rapidly reaches its height within twenty-four hours. While as red as the true positive, this reaction is not so definitely circumscribed and fades early, having in most cases disappeared at the end of seven days, only rarely showing a slight degree of desquamation, and that only central at the point of injection. This form of reaction is attributed by Copeman (1921) to the irritant action produced in the susceptible by the autolysed proteins of the diphtheria bacillus necessarily present in small amount/

amount in the test solution, and possibly related to the susceptibility of the same person to those skin rashes which follow the administration of anti-toxin. Dudley (1923) is of opinion that the cause is an anaphylactic or allergic condition of the skin caused by previous contact with Diphtheria Bacilli; that this condition may be of a few months' duration only and therefore indicate recent contact with the infection, and may be a step on the way to immunity. Bousfield (1936 b) also claims that it may be produced by various substances foreign to the body but contained in the Schick toxin and control solutions.

(d) Positive and Pseudo, or Combined Reaction, - this may occur also, and should be easily readable on the fourth or fifth day by which time the reaction on the control arm is fading, while that on the test arm is yet at its height.

Under the conditions existing at my clinic, I was able to read Schick Tests only on the seventh and, very rarely, on the sixth day, by which time the value of the control has almost always disappeared. The control, therefore, was omitted in my series of cases, and I maintain that it is not a difficult matter to distinguish between the fading pseudo- and a weak positive/

positive reaction, provided that the technique employed is accurate and constant. In any doubtful case, (if a primary test), treatment has been postponed for seven days, to allow of definite desquamation clinching the diagnosis of susceptibility, or of ^{to allow} giving a further test which is then kept under special and, if necessary, daily observation. This has seldom been necessary.

The material employed in my series was supplied by Burroughs, Wellcome and Co., and the syringes used for Schick-testing were of the long 1.0 cc. tuberculin type, graduated in 1/20ths, i.e. No. 3808, supplied by Allen and Hanbury, Ltd.: I have found these more easy to handle than the shorter-barrelled Nos. 3805 and 3822, which latter Allen and Hanbury Ltd. especially recommend. Burroughs, Wellcome and Co's Agla surgical needles, No. 214, were found to be very suitable for the intra-cutaneous injection and fitted the above syringes satisfactorily.

Certain disagreeable sequelae to the Schick Test are recorded, notable by Bousfield (1936 b) and have indeed been noted in my series (Martine, 1935 and 1936), as follows:-

1. One boy had an epileptiform attack with cyanosis and rigidity two minutes after receiving/

receiving the test injection; he was reported as always having been highly strung, but with no history of previous attacks of this nature. He completed a subsequent three injection course of Toxoid anti-toxin floccules and final Schick test without further mishap.

2. Another boy fainted on leaving the clinic; his mother gave a history of rheumatic endocarditis, with frequent similar collapses.
3. Three children complained of slight general malaise and being out-of-sorts for twenty-four hours.
4. One child showed a transient scarlatini-form rash.
5. A boy, in whom the test gave a very marked positive reaction, suffered from an acute cervical adenitis which persisted for four days.
6. A girl of ten years, in whom a pseudo-reaction appeared in about eighteen hours, had a swollen arm, dry throat, and within three days an urticarial rash of the extremities/

extremities, with temperature of 100°F and slight cervical adenitis. The temperature had not subsided by the seventh day but there was at that time no evidence of any local reaction at the site of the test injection. A history of asthma and hay fever was later elicited from the parent.

Testimony as to the value of the Schick Test has on many occasions been forthcoming. Blum (1920), for example, made observations in a large Home for Infants, where diphtheria had been endemic as late as 1915. When it was ascertained by the Schick Test that 37 per cent. of the inmates were susceptible, attempts were made to establish an immunity in this group by means of Toxin anti-toxin inoculation. It would appear that this was realised through the inoculation of the susceptible, as the institution is stated to have been diphtheria-free for a period of five years thereafter.

In this country, again, following up the work of Ker at the Edinburgh City Hospital, in immunizing all susceptible probationer nurses before commencement of duty in the wards, Benson (1928) quotes certain of Ker's results which are striking. During four years
up/

up to 1922, with an average nursing staff of 146 probationers, and an average of 985 diphtheria patients, 52 nurses developed diphtheria. In 1922 systematic immunization of the susceptible members of the nursing staff was instituted by Ker. Benson (1934) further reported that, from 1924 to 1927 inclusive, with an average of 147 probationers, 12 contracted diphtheria; 11 of these actually developed the disease before they had been considered definitely immune. Only one who had been successfully immunised, as shown by a negative Schick-reaction, contracted a mild form of the disease. During that period it is notable that an average of 800 cases of diphtheria was admitted annually to the hospital.

In Edinburgh, moreover, in 34 schools and 12 institutions, 6,452 out of 8,387 Schick-positive children from a total of 11,800 tested, had been immunised up to 1927 (Forbes, 1927).

In Birmingham, also, commencing in 1923, similar steps were taken by Harries to protect the staff of the city hospitals from infectious diseases, and in 1925 facilities were extended to certain residential institutions in the city. In April, 1926, a weekly clinic was opened at the Public Health Department, 426 Children/

children attending by the end of the year, and over 1,000 in 1927. In November of that year co-operation began with the school medical service, and by 1929 clinics came to be held at certain of the infant welfare centres in the city. Under that Authority, one medical officer has been employed whole time since 1934 in this work and it is estimated that some 12,000 are immunized annually. Burn (1936), moreover, reported that in ten residential institutions where, prior to 1925, diphtheria was prevalent, there have been no cases since that date. Burn stated further that some 85,000 children in Birmingham had been protected up to the end of 1936.

Such figures as are quoted above show a striking advance upon the general position in this country in 1927, when from the available figures Forbes (1927) stated that in England and Wales approximately 1 in 1,500 had been tested and 1 in 4,650 immunised, while in Scotland 1 in 175 had been tested and 1 in 275 immunised.

General statistics for the whole country for 1927 are shown in Table 1.

It is of interest to refer here to certain statistics from Canada and the United States also. In Canada/

T A B L E 1.

Tabulated Statistics of Schick Testing
and Immunization against Diphtheria
carried out in Great Britain 1921-26.

		<u>Nos. Tested</u>	<u>Schick Positive</u>	<u>Immunised</u>
General Population	E. and W. Sc.	4,239 20,744	3,016 14,207	3,008 16,324
Residential Institutions and Schools	E. and W. Sc.	11,671 514	4,193 234	3,861 75
Fever Hospitals: Staff and Patients	E. and W. Sc.	9,864 7,017	3,566 1,189	1,456 1,362
Total	E. and W. Sc.	25,774 28,275	10,775 15,630	8,325 17,760
Grand total		54,049	26,405	26,085

E. and W. = England and Wales
Sc. = Scotland.

Canada, Roberts (1931) reported upon the work done in Hamilton, Ontario. This resulted in 20,000 children out of a population of 120,000 being protected between 1922 and 1930. In the United States of America, Godfrey (1932) stated that between 1926 and 1930 an intensive campaign in New York State resulted in the protection of approximately 750,000 children; while in New York City between 1929 and 1932, 627,000 children were immunized.

Finally, to return to Europe, Tomcsik (1932) reported some 250,000 children in Hungary to have been immunized.

CHAPTER 2.

THE IMMUNIZATION CLINIC.

I propose to give here primarily my personal experience of the Immunization Clinic in a large County Borough.

Staffing.

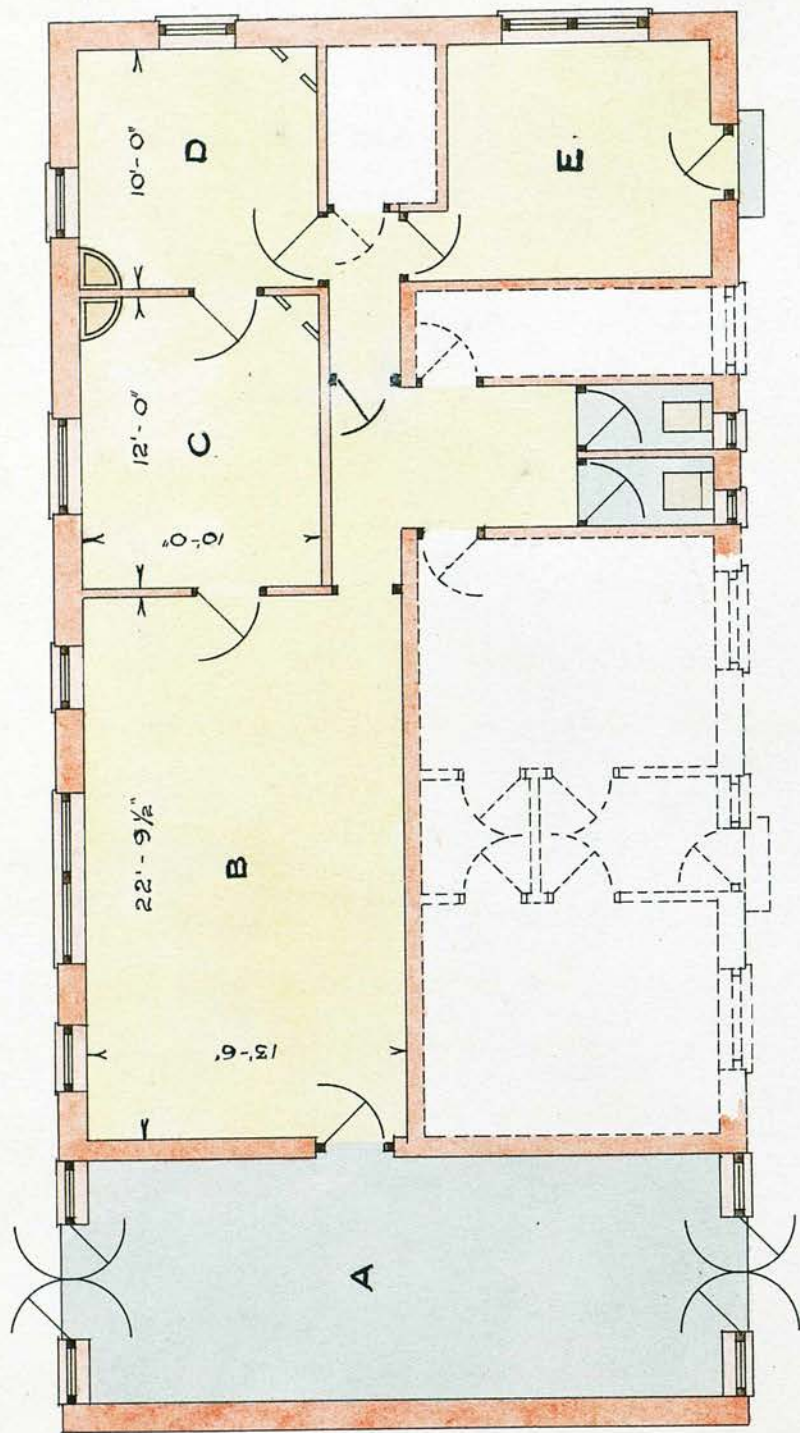
Shrewd judgment in appointing to the staff of a clinic devoted to this work is all-important. In the first place the Medical Officer in charge must be widely experienced in the handling of children, have natural sympathy for them, and be able to sense at the outset that one particular child, one in every twenty perhaps, who at first resents the treatment. He must also adopt a firm but tactful attitude with the parents who are, in my experience, more a source of trouble than their children. If the Medical Officer gains the children's confidence there will be little difficulty in the matter of re-attendance, however far away the clinic may be. I have found that a tin of plain boiled sweets will materially assist in the gaining of this confidence of young children. In the words of Bousfield (1936 a) in this connection, "Failure of re-attendance and recourse to one-shot immunization without subsequent Schick-testing mean almost certainly a round peg in a square hole." In the/

the second place the choice of assistant is of importance. Depending upon the amount of clerical work demanded, there should be one nurse to carry out the sterilization and assist with the preparation of children before treatment, and a clerk to do the remainder of the work. In the clinic referred to later the nurse did or was supposed to do both, with the resulting delegation of filing, etc. to the Medical Officer and consequent reduction of time available for treatment.

Such office work as keeping of the waiting list, filing of consents and correspondence, and the sending of appointments, was in the hands of one of the clerical staff in the central office of the Public Health Department.

Accommodation.

It is desirable to have, if possible, a room for the Medical Officer, one for the clerk and for sterilization, and a waiting room. A plan of one of my fixed clinics is attached - see Plan 1. The entrance hall (A) leads into the waiting room (B), off which is adequate lavatory accommodation; when very young children are treated, it is wise to have the Doctor's room (D) completely shut off from the waiting room/



SCALE : EIGHT FEET TO ONE INCH.

room (B), the sterilizing room (C) being between, as in Plan 1.; an emergency exit (E) is also shown, being helpful in the disposal of any child who has been upset. Although numbers of older children may wait quite happily together for their turn to come, one helping the other, where small toddlers are concerned, one family at a time is sufficient because a difficult child is more than likely to upset a nervous one.

When treatment is provided in a school, only one room will be provided, probably a class-room, as medical inspection rooms, if they exist in schools, seldom afford waiting facilities on the scale required here. A third of the space available can, however, be screened off, and the remainder used for waiting children and parents. I am not satisfied that it is wholly desirable that parents should be present and waiting accommodation provided for them, but I feel sure that an invitation will do more good than harm in the early stages of an immunization campaign in any district. Plan 2. shows the lay-out in such a room in one of my branch clinics. Here almost all children attending are over 5 years of age, only an occasional infant or toddler attending with older members of the same/

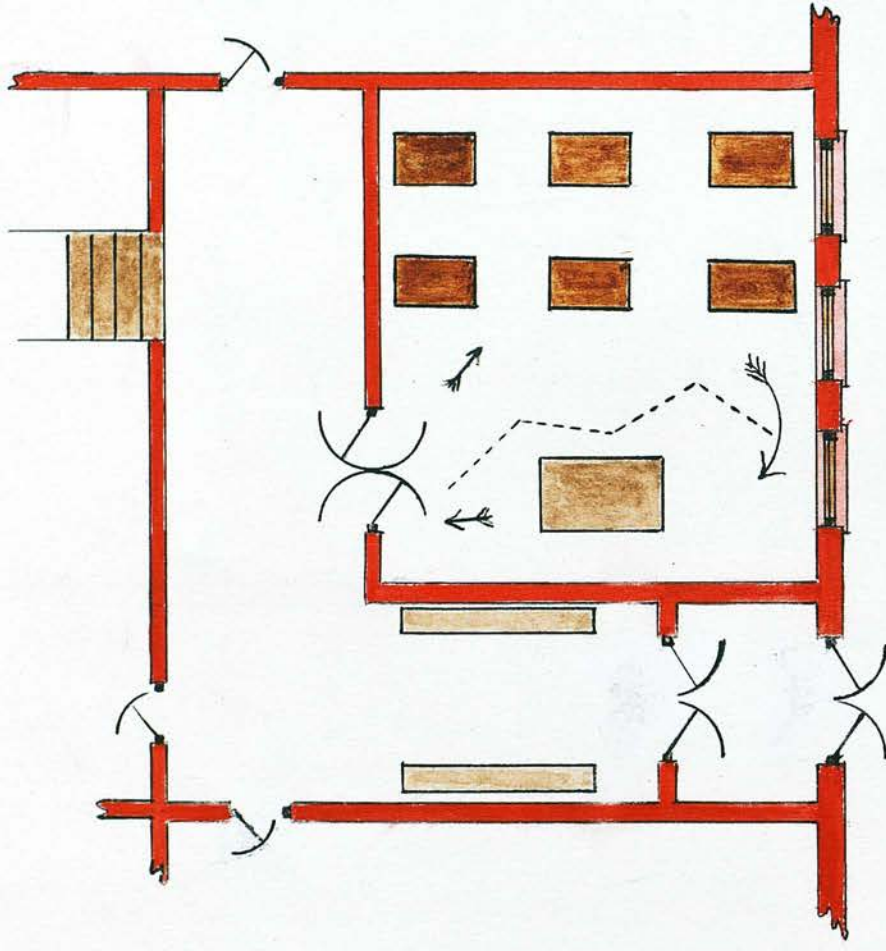
same family, and those waiting are less likely, therefore, to be upset by an unforeseen display of fright.

The lay-out of the treatment room I like to have as follows - see Plan 3. There must be sufficient table accommodation to contain all that is required for the giving of the treatment, and also for the treatment cards of those who have attended and received injections, where they can be written up and stacked according to the date of the next appointment. There must be chairs for doctor and parent; a mother must have her infant or toddler on her knee while the injection is being given, and though I prefer to give older children their injections standing up when possible, it is impossible to get down to the younger ones, and the work is much more easily done from the sitting position. And finally, hot and cold running water should be available; if not, the doctor must insist on relays of basins of hot water.

Attendance Records and Administration.

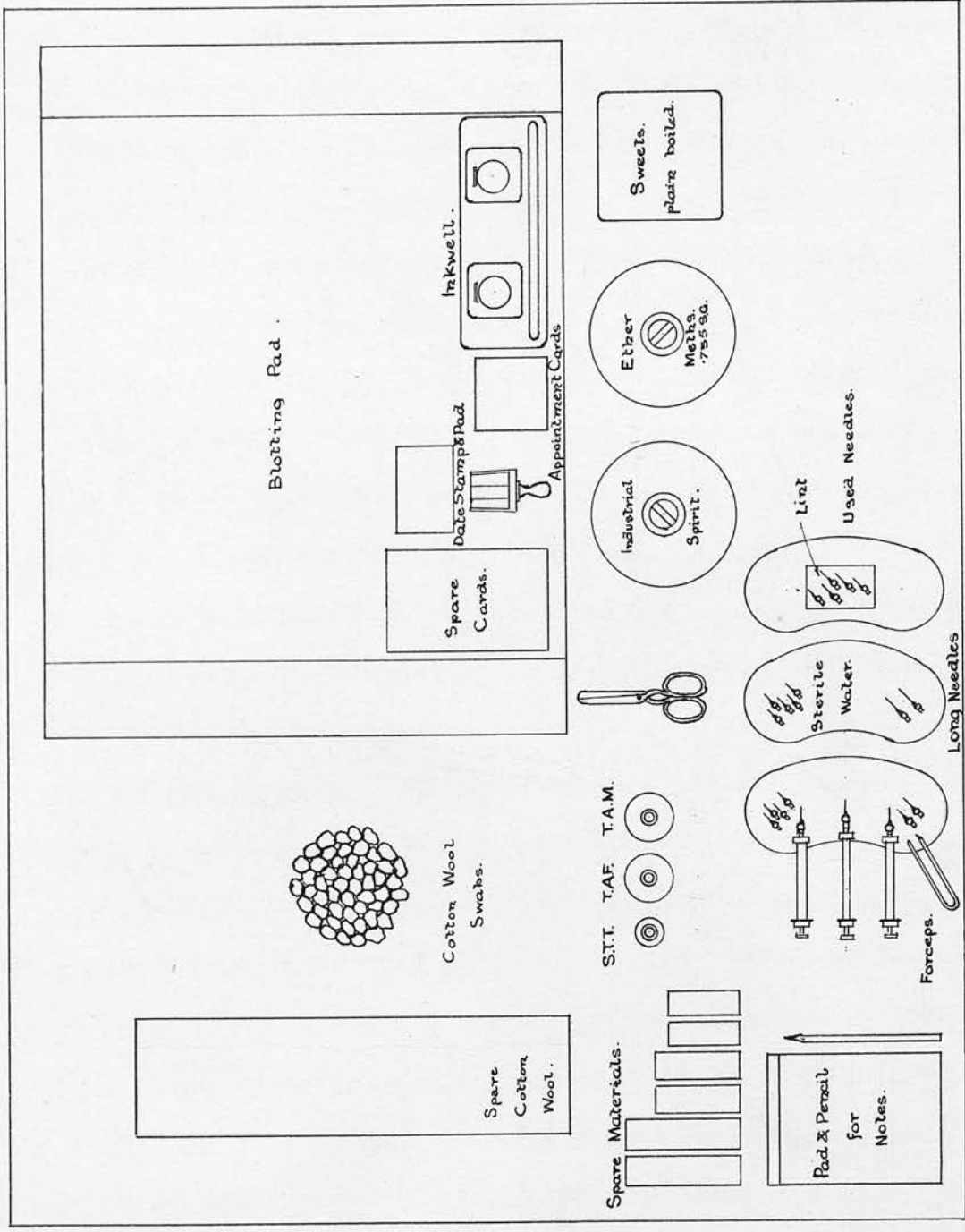
Names are put on the waiting list, in the first place, and the parent, when possible, given a consent form (A) beforehand for signature of approval. Names reach this list through the agency of parents direct, Health/

PLAN 2.



SCALE : EIGHT FEET TO ONE INCH.

PLAN 3.



Health Visitors, Head Teachers and Medical Officers on the staff of the Department, as a result of the various methods of propaganda detailed later. At this stage a treatment card (1) is made out for each child and filed in order of precedence, with the consent form attached for signature at the clinic if this has not already been done. No child receives any injection until this form has been signed by the parent or guardian. An office record card (2) is also made out, this being retained in the Public Health Department to prevent duplication of names on the waiting list, and serving also as a record of when name was put on list, when given first appointment (card 3), and whether completed or not at date of final attendance.

The treatment card is sent to the clinic in time for the date of first appointment, and remains there, being filed after each session under the date of next required attendance, a re-appointment card (4) being issued showing date and time given. When the treatment card is completed it is filed at the clinic in the appropriate cabinet, and may be referred to on any later occasion as required.

When attendance is broken through illness or other cause, and appointments are not kept, the treatment/

treatment card is returned to the central office and a postal re-appointment (card 3) made, for the following week where possible. If the child is again absent a non-attendance form (B) is issued to the District Health Visitor who investigates the reason and reports. She arranges, if possible, that the parent will accept the next appointment given, and suggests in her report when this may be convenient. In such a case the treatment card is retained at the clinic as the child is sometimes brought without a further re-appointment before the Health Visitor has been able to investigate, and because, also, all re-appointments are arranged at the clinic dependent upon the number of cases expected on the particular date.

The treatment card, besides containing the name, address, age, school etc., notes re attendance, and appointment dates, treatment given and results, is used for brief notes of any reaction suffered, and of any history of previous diphtheria or "Carrier-state".

At the end of each year there are three different sets of filed cards, - those originally schick negative, those schick negative after treatment, and those lapsed or not completed treatment. There are/

are also the current treatment cards carried over to the next year for completion and retained in the current treatment file according to the date of the next appointment given.

Other clerical work at the clinic may entail the completion of a clinic work-sheet by the nurse or clerk if one is available, or merely an attendance-state giving numbers only. The less of such work done the better, as it curtails the time available for treatment. Further, as any information for the purposes of Annual Report must be taken almost entirely from the treatment cards, only total numbers of school children, and children under the age of five years attending, need be notified after each session. Such latter figures may be required by the Medical Officer of Health for incorporation in monthly or quarterly reports to Maternity and Child Welfare or Education Committees.

While it was found that 65 was quite a reasonable attendance to handle in just over two hours, with one assistant, who was conversant with the routine, 75 to 85 could frequently be undertaken without any great difficulty. And, indeed, there were several instances of over 90 attending as shown in/

in Table 2. Such numbers are not advisable, however, as there is some risk of a falling off in that technique of safety and thoroughness which is so all-important, or in that explanation and sympathetic understanding which are such big factors in the success of an immunization clinic.

Treatment given at the clinic.

For the most part children under the age of five years were never given a preliminary Schick Test, unless known to have been definitely in contact at some time with a case of diphtheria. Much work has been done to suggest this course, Zingher (1921) in New York, for example, stating that children of six months to five years should be immunized without such test. Benson (1934) again suggested that in any large immunization scheme preliminary Schick-testing should be dispensed with in all younger children. The Medical Research Council, moreover, recommended (1923) that all preliminary Schick-testing could be omitted in younger children.

The results of 1,849 Primary Schick Tests in my series covering 242 sessions are shown in Table 3, and it will be seen that the results of testing 97 children under the age of five years certainly endorse this/

T A B L E 2.A t t e n d a n c e .

Total attendance 1935-36	14,410
Number of sessions	242
Highest attendance	94
Lowest attendance	14
Average attendance	59.5

T A B L E 3.Summary of Results of 1,849 Primary Schick Tests

	<u>Positive</u>	<u>Negative</u>	<u>Total</u>
Under 5 years	92	5	97
Over 5, under 6 years	227	33	260
Over 6, under 7 years	198	26	224
Over 7, under 8 years	220	37	257
Over 8, under 9 years	214	45	259
Over 9, under 10 years	149	55	204
Over 10 (all ages)	<u>345</u>	<u>203</u>	<u>548</u>
	<u>1,445</u>	<u>404</u>	<u>1,849</u>

this recommendation. The high percentage of schick-positive children is striking, as compared with the work of some observers, but are strictly on a par with the results of Allardyce (1935), when he showed over 70 per cent. to be schick-positive, inclusive of all ages.

All found to be positive reactors were thereafter given three injections of 1.0 cc. Toxoid Anti-toxin Mixture (T.A.M.), supplied by Burroughs, Wellcome & Co., with the exception of a few adults, older children and special cases, including marked pseudo-reactors, who received a similar course of Toxoid Anti-toxin Floccules (T.A.F.), supplied also by Burroughs, Wellcome & Co.

A classification of those attending the clinic in 1935-36 is given in Table 4, and in Table 5 the complete work of the two years is summarised. The failure of only 39, as shown in this latter table, to complete treatment over a period of two years, 23 of whom only required a final Schick Test and of whom 10 failed for the sole reason that they had left the district, indicates that, given the right staffing there is no difficulty whatsoever in arranging and running a clinic where three-injection treatment with preliminary/

preliminary and subsequent Schick-testing can be given with a large measure of success.

T A B L E 4Classification of those attending Clinic 1935-36

School children	2,564
Pre-school children	1,020
Adults	<u>24</u>
	<u>3,608</u>

T A B L E 5.

Summary of work done 1935-36.

Attending 1:1:35	265	Primary Schick test	1849	Number positive	1445	Percentage positive	78.1	Number not given Primary Schick Test	954	Number completed T.A.M. or T.A.F.	2403	Number re-tested after treatment	2045	Number negative	2020	Percentage negative	98.7	Uncompleted 31:12:36.	608	Left district or defaulted	39
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CHAPTER 3.

INTRODUCTION OF TOXOID ANTI-TOXIN
MIXTURE; REASONS FOR ITS ADOPTION;
DOSAGE ETC.; CONTRA-INDICATIONS AND
REACTIONS.

The Toxin Anti-toxin method of immunization was introduced by V. Behring (1913), though previously suggested by Theobald Smith (1907) as a result of his work among guinea-pigs. This immunizing agent was employed extensively in New York by Park (1913) and by his co-workers, notably Zingher.

Park and Williams, when describing a technique of immunization with Toxin anti-toxin (T.A.T.) (1920) stated - "The local reactions at the site of injection are generally mild; in the older children and adults redness and swelling are usually more marked. General symptoms of malaise with a temperature of 100° - 102° F. were noted in ten to twenty per cent. of cases; in a few the temperature rose to 104° F. The symptoms generally last from twenty-four to forty-eight hours, and then rapidly subside. Both local and general symptoms were especially evident in some of those who showed a susceptibility to the protein by giving a combined pseudo and true schick-reaction. No harmful after effects were noted, except that in certain cases/

cases superficial abscesses developed. All made a good recovery."

Zingher (1921) found with T.A.T. that local and constitutional disturbance varied considerably. Generally children who had given a plain positive schick-reaction showed no ill effects from the injections, but the combined or pseudo-positive reactor often experienced local tenderness and swelling with constitutional disturbance and some rise of temperature for one or two days. In all cases, however, the reaction subsided without ill effects. It was to be noted that younger children seldom showed any such disturbance, while adults, especially the combined reactors, might have considerable reactions.

Copeman was one of the pioneers in this country. He stated (1921) that, in the case of adults, especially those giving strong pseudo-reactions, it is important that they should be warned of the risk of more or less severe constitutional disturbances following upon injections of T.A.T. Along with co-workers, Copeman (1922) showed that out of 102 children, 8 had a rise of temperature to 102° F., and 4 a rise to 101° F. Local reactions occurred in about 58 per cent. though constitutional disturbance was slight. At the same time, an arm which looked tender, red/

red and swollen, appeared to have little effect upon the activities of the child. And in his report (1921) Copeman finally said that it was obviously desirable that facilities should be afforded for the fullest investigation of the Schick Test, and, thereafter, of the system of immunization by means of T.A.T. inoculation, with a view especially to deciding on the advantages which might result from its adoption in this country for the protection of school children and other "community" population, as also of nurses working in the diphtheria wards of an Infectious Diseases Hospital.

In 1926 Park stated that probably over two million injections of T.A.T. had been given in New York State alone, and that without any disastrous results. At the same time it is fully realised now that most accurate standardisation and the highest guarantee of freedom from all possible error are essential. Accidents may occur, and have been reported - it is not denied that in a few instances serious results have followed the use of material which has been incautiously prepared or improperly stored.

Forbes (1927) quotes two accidents which occurred/

occurred in America in previous years, and which are clearly understood to have been due to errors in technique of preparation and storage of the T.A.T.

In the one instance, a fact, well known as the Danysz phenomenon, was overlooked in the mixing of Toxin and Anti-toxin, namely, that if the required amount of Toxin be added to the Anti-toxin in two separate portions, a toxic mixture results. By mistake, at Dallas (Texas) in 1919, this unequal mixing had been employed, and the resulting toxic mixture had been used, causing some five deaths and forty cases of severe reaction. The second case was the result of using T.A.T. which, after distribution, had been exposed to temperatures below freezing-point and later thawed. Severe local inflammatory and marked constitutional reactions followed in some forty children at Concord and Bridgewater, Massachusetts, where they had been inoculated with this particular material in 1924. There was, however, no such reaction to other material made under the same conditions and at the same time, and Park's investigations led to the conclusions that the results following the injection of frozen and thawed T.A.T. could not have been foreseen, and the occurrence/

occurrence was treated as a discovery which in no way contra-indicated the use of T.A.T. as a prophylactic. This action of intense cold on the mixture of Toxin and Anti-toxin has more recently been clearly demonstrated by Glenny, Pope, and others (1925).

Again in Vienna (Baden), following the use in 1925 of a local preparation of supposed T.A.T., six infants in a Children's Home died. It has been shown by Grassberger (1926), and also in the Lancet (1926) that the cause of this disaster was that the material used contained only pure toxin through omission to add the necessary Anti-toxin - a mistake which should and could have been guarded against by adequate supervision of the process of preparation.

The disadvantages, however, attending the use of the earlier type of T.A.T. mixture in this country have been to a large degree overcome by the use of later preparations known as Toxoid and Toxoid Anti-toxin mixture which can be claimed to give rise to but little local or general reaction. In both the toxicity has been reduced by treatment of the toxin with formalin, and we have now, in general use, Formol Toxoid (F.T.), Toxoid Anti-toxin mixture (T.A.M.), Toxoid Anti-toxin Floccules (T.A.F.), and Alum-precipitated/

precipitated Toxoid (A.P.T.). In France similarly, Ramon introduced a preparation known as Anatoxin, which is in common use in France and elsewhere.

It was decided in the first instance at my clinic to use T.A.M. for the sound reason that it was a proved immunizing agent. It was thought, when the clinic opened under my predecessor in 1934 that, there being no question of emergency, or for that matter of necessity to do anything, as the treatment offered a freedom from later danger, rather than the relief from suffering obtained by usual medical treatment, such treatment was only justified if absolutely safe in technique and as reliable and consistent in results as possible. That more than one immunizing injections are required, if T.A.M. is the chosen antigen, has made for no difficulties in obtaining attendance - see Table 5 - and this is backed up by many workers in this country. Even in a rural district such as Oxted, Butcher claims (1936) to have been able to Schick-test 2,353 since 1929, and to have given a full course of three injections to 1,259 children.

The dosage adopted was 3 x 1.0 cc. in almost every case, though this was occasionally modified where there had been any untoward reaction, or where
a/

a marked pseudo-positive reaction to the Schick Test had occurred.

Injections were given intra-muscularly or subcutaneously in the left arm high up and posteriorly, usually as close to the shoulder as possible.

Methylated ether, of specific gravity 0.735, was used to sterilize the skin, and the injected area was gently massaged immediately afterwards as recommended by Lees (1931). I would submit that this rotatory massage, by dissipating the injected material through the tissues, goes a long way towards preventing those local reactions which have, in the case of the clinic under my care, been such a rare feature.

Injections were given at weekly or fortnightly intervals, the longer interval being rigidly adhered to in the case of younger children where it has been shown that there is less natural immunity, and, therefore, a longer time taken in developing a basal immunity. Dudley and his co-workers at the Greenwich Hospital School (1934) have stressed the fact that the longer interval is necessary for there to be a good response to a secondary stimulus such as comes from the later injections. Zingher in New York (1922) previously/

previously found that some children failed to react to the first or first two doses, but when again injected after six months responded as satisfactorily as his original successes.

The syringes used for the T.A.M. injections were supplied by Allen and Hanbury Ltd., - No. 2822, of 1.0 cc. capacity, and the No. 214 needles supplied by Burroughs Wellcome & Co., for the Schick-Testing, being found to fit the syringes very satisfactorily, were used for the immunizing injections also on account of their small bore, and, therefore, minimum resultant discomfort to the children. A longer and wider-bore needle was used for filling syringes, and in a crowded clinic it was found that using a 5.0 cc. syringe, graduated in half cubic centimetres was a great saving of time. Needles and syringes were sterilised by boiling and then laid in sterile kidney basins, containing surgical spirit, until required. Prior to use both were run through sterile water (frequently changed during the course of a session), and needles were always applied to syringes by means of forceps which had also been sterilised beforehand. Hands were scrubbed under running water when available. If not, two changes of hot water were always provided/

provided. White coats were always worn by Medical Officer and Nurse.

Contra-indications and
Disadvantages of Toxoid
Anti-toxin Mixture.

While T.A.M. is undoubtedly a mild antigen as compared with T.A.T., and even F.T., it is known at the same time that reactions can occur and have occurred. However slight and rare the reaction, it is nevertheless true that as long as anti-toxin is used, there is risk of sensitization in a small number of cases, and children immunized with T.A.M. have a degree of serum-sensitization. Gammie, working with Nash and Bousfield (1935) over a period of four years from 1931 reported that out of 82 immunized children given serum for scarlet fever, cerebro-spinal meningitis, etc., 54 (65.8 per cent.) had rashes of which 13 were severe, and that out of 1,015 unprotected children, 239 (21.7 per cent.) developed rashes of which 24 were severe. In regard to these figures, however, it was pointed out that the proportion of cases receiving scarlatinal serum was higher amongst the immunized. Of those who had rashes, none had serious symptoms, but those noted as severe had an intense or wide-spread rash, or a rash associated/

associated with a definite rise of temperature, some localised oedema and joint pains. Gammie was convinced, however, that discomfort and not danger was the result to be expected, and while it would be desirable to employ a serum-free prophylactic there are no records available in this country to show that such preparations are more free from reaction, give a more certain or even as certain a protection, or finally, give as lasting a protection.

Nash and Bousfield further stated (1935) that out of a series of 3,523 children actively immunised with T.A.M., reactions of an undesirable nature were rare and trivial, and only in two cases was it necessary to abandon the attempt to produce active immunity because of excessive reaction. These two were brother and sister, who appeared to have an extraordinary idiosyncrasy to the immunizing material.

In my series, reactions were noted in 43 cases, and that out of a total of 6,963 injections of T.A.M. Referring to my reports for the years 1935 and 1936, 8 children showed some general reaction which may be summarised as follows:-

- (a) Acute headache, lasting up to 24 hours in two cases, and accompanied by general malaise/

malaise and anorexia, both after first injections.

- (b) In two children, typical attacks of asthma after first injection, both giving an allergic history, though this was only divulged later.
- (c) In one child a scarlatiniform rash appeared 4-5 days after second injection, transient in nature, and accompanied by no systemic disturbance.
- (d) One case of sore throat and general discomfort following upon second injection.
- (e) Slight peripheral adenitis, in one child after first, and in another after second, injection; both children of the same family.

Twenty-five children showed some degree of local reaction, - three, following first injection, being severe, showing redness extending from shoulder to elbow, with some swelling and tenderness, and persisting for from 3-5 days. It is of interest to note that none of these children felt ill enough to remain in bed, and none showed any reaction to subsequent injections. Twenty-two showed a mild reaction at the site of injection at about forty-eight/

eight hours and lasting for perhaps twenty-four hours.

There were ten children who showed a combined local and general reaction in all following the first injection, and none being serious in character:-

- (a) One showing slight local effects with an urticarial rash and cervical adenitis; an asthmatic history was admitted at the next attendance, and no further complaint was received (T.A.F. being given to complete the course).
- (b) One child with nausea the same evening, later vomiting, and next day a temperature of 101° F. with some redness of the arm. He had completely recovered by the third day, and showed no further ill-effects from subsequent injections of T.A.M.
- (c) Following a pseudo-positive reaction to the Schick Test, this child complained on the day after his first injection of T.A.M. of having a dry throat, headache, vomiting and slight tenderness with a localised redness. The temperature was 102° F. On the following day the temperature/

temperature was still raised, but the tongue was moist and clean, appetite good, sleep restful and no complaint. He had fully recovered by the end of three days. Further treatment was cautiously given and injections of 0.3 cc., 0.6 cc. and 0.8 cc. led to only a slight and transient local reaction following the last, and sufficed to produce a negative schick-reaction after three months.

- (d) One child showed localised redness with squeamishness after first injection, followed by a more severe local but no general reaction after second injection.
- (e) A case of temperature rising to 101° F. on second day after first injection, settling within twenty-four hours, and accompanied by localised redness and tenderness lasting until the fourth day.
- (f) A case of localised redness with a degree of axillary adenitis, settling in two to three days.
- (g) Four cases of malaise with local redness and some tenderness.

It/

It is of interest to note that in 39 out of the 43 cases in which these reactions occurred, the reaction followed the first injection, and further that 37 of the 43 children were over 8 years of age.

Again the giving of three or more injections may be considered by some medical man to be a waste of time, energy and expense, besides being difficult under certain conditions to carry through to a finish. Particularly is this true of the general practitioner who has less time available than a Public Health Official with fixed hours; the former is, moreover rather at the mercy of the plausible traveller who represents firms producing new, up-to-date, one-shot preparations. If, however, children are submitted to clinic conditions as shown in Chapter 2, and if that clinic is staffed with the right doctor and nurse, tears are a rarity even among small children, and non-attendance only results because of illness, leaving the district, and occasional forgetfulness.

CHAPTER 4.

P R O P A G A N D A.

In the County Borough of Croydon the policy adopted during the second and third years of the clinic's existence has been to immunise those asking for treatment, and not in any way to attempt the conversion of those antagonistic or apathetic: A policy, moreover, of allowing immunization to conduct its own propaganda has brought about successful results, in that many families have been introduced to the clinic by friends and neighbours who have previously had, or are having, the treatment. Indeed, from the numbers of requests by parents for the immunization of their children, it would appear that this work, once begun in a district, tends to become more and more popular.

The only propaganda undertaken by the Health Department in Croydon has been to bring the facts to the notice of parents attending school medical examinations, school clinics and infant welfare centres. This has been accomplished for the most part by the distribution of Leaflet C., by the insertion of an article in the Health Magazine which is published by the Department each month (Article D), and/

and by Notice E., showing time and situation of clinics, also indicated in the same magazine along with other such information.

In Birmingham more is done, and that, too, of a more personal nature. Parents are circularised by means of Letter F. with enclosed Leaflet G. (and Request Card 5.), when their babies are eight months old; again, shortly before a child reaches school age by Letter H., and finally when the child has begun to attend school the parent receives Letter I. from the Education Department, enclosing Letter K. and Consent Form L. from the Medical Officer of Health. Such methods of approach will undoubtedly score as against more impersonal methods, but it must be remembered that in Birmingham an immunization scheme has now been in operation for twelve years, as compared with three years, for example, in Croydon, and that any active antagonism in the former from members of the Council or other quarter has largely broken down; also, that public opinion has come to look upon protection against diphtheria as one of the most valuable of the health services in that city.

I am fully aware of the objection, which exists at the Ministry of Health, towards any intensive persuasion/

persuasion by medical officers, in view of the possible occurrence of severe reactions in the children of persuaded parents, and I have, indeed, found great difficulty in the course of other routine duties, such as school medical examination, clinic and welfare work, in not appearing prejudiced to the extent of being persuasive. The result has probably been that I have usually said less even than may be justified, and sometimes nothing at all, merely being satisfied that the parent has received Leaflet C.,

When, however, I have been asked for information, I have always enlarged upon the subject, and if asked whether I believe in immunization against diphtheria, invariably speak very strongly of the need in the pre-school child and in those attending infant classes. I consider it is the duty of every medical man to lay the facts before the public by any means that may be available. In the case of the Public Health Officer, this may even include meetings of parents in schools and elsewhere, when the procedure may be explained to any who are sufficiently interested to attend. At the same time I believe that it is only right to tell every parent who brings a child to a clinic exactly what is being done, and why, and what/

what to look for in the way of possible reaction, and what the result will be. All this will take time, but it will be time well spent, especially during the early years of an immunization campaign. During the course of treatment, moreover, should there be complaint of even the slightest local reaction, or perhaps some coincident rash or sore throat, it is imperative that full attention should be paid to the complaint and the matter tactfully and sympathetically considered.

While meetings of parents may prove to be very profitable in certain more enlightened areas, it would, I am satisfied, be mere waste of breath and organisation in certain others, which, fortunately, do not as a rule contain such a large percentage of schick-positive reactors as do the areas where there is less overcrowding, better general sanitary measures and, for the most part, a better and more sheltered type of home. Much, however, can be accomplished by selecting an occasional parent in the poorer areas, especially when her confidence has already been gained in some other direction, and giving her, personally, the facts and asking her to discuss the matter at home. In my experience, three out/

out of every four mothers, when approached in this way, give their consent within the week, and in the fourth case it is the father or grandmother who turns out to be the stumbling-block and not the mother.

Head teachers, again, many of whom are notoriously sceptical of anything which may interfere with schooling, can be of the greatest assistance in propaganda and I should like to record the methods of two head teachers with whom I have had the pleasure of being associated.

One, the Head of a mixed senior, junior and infant church-school serving what has proved to be a highly Schick-positive population, actually discusses the question with each parent when a child is first admitted to the school. At the time of routine medical examinations, also, he carefully brings together parents whose children have been protected and those whose children have not. The result is that his school is now virtually closed to diphtheria.

Another, the Head of a Junior Girls' Department in a large school of three separate departments, has been similarly interested, has arranged meetings of parents which the Assistant Medical Officer concerned attended, and finally succeeded in bringing her colleagues/

colleagues in the other departments to her way of thinking. As this school serves part of a relatively well-to-do area, and as the parents are particularly well-informed on most matters although there is, locally, a marked prejudice against vaccination, there has been a flood of requests since the Summer of 1936. It is indeed no exaggeration to state that this one localised area has supplied at times more than half of the waiting list, which once reached 600 and is normally about 300.

When such a response can be obtained if the Head Teacher is interested, I am of the opinion that in enlisting the support of the Heads of the Infant Departments lies the ultimate solution of all successful immunization. Only a percentage of children attend Infant Welfare Centres, but they all eventually go to school, and I have shown elsewhere that if they can only be protected by their first year in school, the morbidity and mortality from diphtheria would both be definitely reduced.

It is interesting to note that Rae (1936) in his annual report for the County of Aberdeen for the year 1935 goes so far as to suggest that apathy on the part of the Head Teacher is one of the chief factors in/
in/

in decreasing the percentage of consents received.

Other sources of propaganda available are the support of the general practitioners in an area, and the assistance of district nurses in regard to the toddler and the pre-school child.

Posters are employed, notably in Birmingham, but must be very clever and well executed to be of real value.

Films, again, are coming to the fore in this connection, and in Birmingham two have been prepared, one of which is in colour. Arrangements are made for showing them to parents at schools and elsewhere, free of charge, on application to the Public Health Department (Form M.).

Finally, I am aware that, in America, broadcasting is extensively used in all branches of medicine. While this is foreign to accepted British methods, it is not unlikely that this means may be employed at no very distant date to ensure that propaganda does reach the home itself.

CHAPTER 5.

THE EFFECTS OF IMMUNIZATION UPON THE INCIDENCE
OF, AND MORTALITY FROM, DIPHTHERIA: THE COST
OF IMMUNIZATION AS COMPARED WITH THE TREATMENT
OF DIPHTHERIA: THE INFLUENCE OF IMMUNIZATION
UPON THE CARRIER-RATE AND THE POTENTIAL DANGER
OF CARRIERS.

The question that may well be asked is - What good has come from all the work done in regard to the incidence of, and mortality from, diphtheria? While in this country figures are not readily available even in 1936, Forbes (1927) showed that in Edinburgh, when over 6,000 children had been protected, there had been a very apparent reduction in incidence and a complete absence of mortality among immunized children. During the five years to 1925 it was found that, of the total child population, 1 in 170 suffered from the disease and 1 in 1,630 died; of the immunized, however, only 1 in 555 took diphtheria and none died. Joe, moreover, stated (Forbes, 1927) that 4 of the 9 cases which occurred in Edinburgh among the immunized occurred within three months and three within six months of the final injection, and, therefore, before full immunity had been established. Only one of the nine cases was severe.

In Birmingham, again, Burn (1936) reported that
in/

in 1925 there were 1,600 - 2,000 cases and 80 - 200 deaths annually. Since 1925, however, the numbers of cases and deaths have decreased steadily to 417 cases in 1933, with 33 deaths. The year 1934 saw a general increase of diphtheria of virulent type throughout the country, and in 1935 a rise, in the number of cases for England and Wales, from 47,000 to 69,000, the fatality rate rising from 5.5 to 5.9, there being no fewer than 4,085 deaths from the disease in the former year. Birmingham, in 1934, showed 1,015 cases and 84 deaths, yet there were only 9 mild cases and no deaths among the 60,000 protected persons. Again, for the ten year period from 1925, there were 10,000 cases and 660 deaths in children under fifteen years of age who had not been immunised, while in the same period there were 36 cases and no deaths among 75,000 immunized.

Forbes (1927) has shown, moreover, that in America, where immunization was undertaken earlier than in this country, the statistics of the Health Department of New York indicate that, coinciding with the Schick-testing of almost 630,000 since 1916 and the immunization of over 400,000 since 1918, the diphtheria death-rate fell from 22.7 per 100,000 in 1918/

1918 to 11.9 in 1924, 10.8 in 1925, and 7.9 in 1926. In Chicago between the commencement of the campaign in 1918 and the end of 1925, 69,414 persons had been Schick-tested and 17,453 had been immunized. At the same time the case-incidence was reduced from 5,708 to 2,926, and deaths from 723 to 239, while in Boston between 1922 and 1925, 160,808 persons had been Schick-tested and 57,699 immunised, with a drop in case-incidence from 2,992 to 1,256, and deaths from 143 to 99.

While it is unlikely that there would be any more satisfactory response to a National Immunization Campaign than has been accorded to the Vaccination Acts in this country, and that, therefore, no scheme of general national immunization of the pre-school child and of those attending infant classes would be carried out, at the same time certain schools and institutions can without doubt be closed to diphtheria as the result of an intensive campaign which is maintained. New arrivals must be Schick-tested at once, and where found to be susceptible, immunized. The work of Dudley in the Greenwich Hospital School is sufficient proof that this is possible. In fever hospitals, also, it has become possible/



possible, by means of active immunization of all members of the staff showing a positive Schick-reaction on commencement of duty, virtually to stamp out diphtheria amongst all those working in hospital.

And whereas work in Edinburgh, Birmingham, Aberdeenshire and elsewhere has shown that the incidence of diphtheria in inoculated children can be reduced to a fraction of what it is in the unprotected, even though the community may be a semi-closed or open one, immunization has not yet been practised on a sufficiently wide scale in this country, or elsewhere in Europe, to supply adequate evidence of its effect in reducing the diphtheria-rate in the country as a whole.

The degree of reduction would appear to depend upon the proportion of immunized to unprotected individuals, and the success of a broad scheme must depend upon the degree of response in the community as a whole to the protective treatment offered. Benson (1934) was of the opinion that to have any statistical effect on diphtheria morbidity in a large community, it had been calculated that at least 33 per cent. of the 1-5 age group, and over 50 per cent. of school children must have been protected. It is necessary/

necessary also that the immunized proportion should be evenly distributed throughout the population. The safety threshold in the pre-school age group must be evenly distributed and constantly maintained. There has been no concerted drive to render the pre-school population immune in this country, and it is only in North America where mass-immunization has been practised in several large cities, that a definite or marked fall in incidence has been recorded. Working in Hamilton, Ontario, Roberts (1931) reported that out of a population of 120,000, nearly 20,000 children were protected between 1922 and 1930, and that there was a fall of over 80 per cent. in the incidence of diphtheria in the years 1925-29. In 1929, there were only 14 cases with one death, while in 1932, according to Deadman and Elliot (1933), 100 per cent. of the pre-school population in relation to live births were protected, and it is calculated that about 70 per cent. of the school population were immune in 1933. The real proof here is that in 1932, with a population of 153,301, one case of diphtheria occurred, with no death.

Again, in New York State, Godfrey (1932) states that 750,000 children, including 185,000 of pre-school/

school age, were protected between 1926 and 1930. Cases dropped from 4,370 in 1920 to 1,600 in 1930, and deaths from 337 to 144. In New York City also, a diphtheria case-incidence of 13,507 in 1927 fell to 10,776, 8,548, 3,794, and 3,999 in successive years while the number of deaths fell from 717 to 642, 463, 198 and 186. Wynne (1931) reported also that 93 per cent. of the total cases occurred in unprotected children and a further 2 per cent. in children whose protection had not yet become complete. Only four of the 198 deaths occurred in children who had received a full course. The mortality was less than one-fifth of that in unprotected children. It was realised, however, that some 750,000 unprotected children still afforded a large loop-hole for danger, and that efforts must be sustained.

Somewhat similar results are reported in Philadelphia, and after studying these and the New York City figures, Lee (1931) came to the conclusion that after 1930 there was a striking change in both cities from the time when the campaign was extended to the pre-school child. Where the expected death-rate in Philadelphia would have been 10.5 per 100,000, the actual rate was 2.86.

In/

In Newhaven, Connecticut, with a population of 162,670, 50,000 children were protected between 1923 and 1931; four cases of diphtheria with no death were recorded in 1931, and that where incidence had averaged 313 for ten years prior to the commencement of immunization, with an average, moreover, of 20 deaths.

European work has never been on this wide scale, but there is convincing evidence in this country of the protective power of Toxoid preparations and this has been endorsed by Tomcsik in Hungary (1932) and by Doyer in Holland (1931). And Benson (1934) concludes that such results indicate that so far as the protection of the individual is concerned, active immunization is as effective in an open as in a closed community.

There is no question but that in any mass-immunization scheme, attention should be paid first and foremost to the pre-school child - to children over one and under five years - and, thereafter, to entrants in infant classes during their first school year. This work should be undertaken in as short a time as possible, and, if necessary, extra part-time staff employed. Where practicable, also, other children/

children up to ten years should be protected, and Benson (1934) considered that no real results could be expected until some 50 per cent. of the age group, one to ten years, had been protected. He suggested, further, that the general practitioner should be asked to assist, being provided with the materials by the Local Authority, and paid for his services accordingly. In Edinburgh, however, the response of the general practitioner has been very disappointing, there being only an outlay of about £100 in the first year against an estimate of £1,000; while a scheme recently inaugurated in Croydon on somewhat similar lines shows, although as yet it may be rather early to speak authoritatively, a marked failure on the part of the family doctor to rise to the occasion. While the Croydon general practitioners were invited through the instrument of the local division of the British Medical Association to co-operate early in 1936, only nine doctors had made application by the end of the year, and that in respect of only 37 children. This is especially to be regretted in view of the closing words of Carnwath (1935) in his presidential address to the section of Preventive Medicine/

Medicine at the 46th Health Congress of the Royal Sanitary Institute at Bournemouth. He said that he wished to emphasise the importance firstly of educating parents, and secondly of enlisting the support of the local medical profession, and in that connection drew particular attention to the valuable report prepared by a committee of the British Medical Association under the chairmanship of Professor Picken. Carnwath also advised concentration upon the younger children, stressing the age of maximum incidence as six to eight years, and expressing as his view that at least 30-40 per cent. of children below that age would have to be protected to ensure against any serious outbreak.

And now it is of interest to consider the cost of immunization as compared with the outlay involved in treating a case of diphtheria in hospital. In both cases greater numbers will lead to a lower average cost. The question was very fully discussed in the Hull Special Report of 1924. Here an analysis of the scheme then in operation in Edinburgh was made and an estimate of 4/3d. to 5/3d. per child arrived at. In regard to my clinic in Croydon I was able to assess for a period of twelve/

twelve months my average cost at 4/8d. per 1,350 ^{2 each of} children of whom 71 per cent. proved to be Schick-positive, were immunized and satisfactorily passed a subsequent Schick-test. The detail of my expenses for the period is shown in Table 6. (p 59)

In Leicester, again, in promoting a scheme recently for that city, Macdonald (1937) has estimated that if 5,000 children are immunized in any year, the cost will be £1,100, or just over 4/- per child.

Against this, one must consider the other side of the story, and while the cost of treatment of the individual case of diphtheria must vary from case to case, and from hospital to hospital, it is at the same time reasonable to estimate the cost at something over £20 for the average five to six weeks spent in hospital.

A possible reason, I think, that there is still half-heartedness towards immunization shown by certain members of the medical profession is the problematical increase in the virulent carrier-rate, in that protected children may become a danger to the unprotected as spreaders of virulent infection.

Dudley (1934) has shown that after artificial immunization/

T A B L E 6.Cost of Immunization Clinic for twelve months ending 31:3:36..

Sera, drugs, and appliances.	£ 161. 6. 7
Printing	14. 13. 6
Towels, filing cabinets, contribution boxes, sweets etc.	<u>7. 9. 1</u>
	£ 183. 9. 2
Proportion of salaries:-	
108 sessions - say ten weeks	
Medical Officer 10/52 of £500.	96. 6. -
Health Visitor 10/52 of £255.	<u>49. -. -</u>
	£ 328. 15. 2
Less cash in contribution boxes	<u>12. 15. -</u>
	<u>£ 316. -. 2</u>

immunization of the boys in the Greenwich Hospital School, higher virulent carrier-rates were recorded than previously, and that there was no significant difference in the virulent carrier-rates between boys who were found to be Schick-negative primarily, or secondarily to immunization. Dudley considered that the virulent carrier is almost invariably Schick-negative; he stated (1923) that he had not experienced the Schick-positive virulent carrier but in the light of more recent results in 1928, and subsequently, he now considers it to be a rare phenomenon. He suggested further (1934) that a latent immunization is caused by virulent carrier-infection and that active immunization is no protection against such infection; also that it may, under certain conditions, increase the number of virulent carriers. He instances a community of fifty immunes, of whom two are carriers, and fifty susceptibles, with a carrier-rate for the whole group of two per cent. If 25 of the susceptibles are immunised and the frequency of virulent infection remains constant, the rate for the group will rise to 3 per cent., and if such a community is completely immunized the virulent carrier-rate will be/

be doubled, unless the risk of infection is diminished by the prophylactic measure itself.

The likelihood is that this is so, as there is no doubt that eminent writers with the necessary material at their disposal are convinced that in practice the theoretical danger does not materialise. Newsholme (1935) claimed that the danger was entirely unfounded, on the basis of his work in Birmingham. The greatest drive in that city took place between 1930 and 1934, and while the prevalence of virulent carriers should have risen steadily according to theory, and the incidence of diphtheria risen also among the unprotected, this was not the case. The incidence-rate among the unprotected population under 15 years of age diminished steadily from 1930 to 1933 (5.8, 4.0, 2.2, and 1.6 per 1,000 population 0 - 15 years of age). The incidence rose again in 1934, as in most parts of the country, but to a level lower than in 1930 (4.4 as against 5.8), and to a lower level than in most large areas. There is also in the succeeding years no suggestion of an increased prevalence of infection among the un-immunized, whether as a result of increase of virulent carriers or otherwise.

Some/

Some 2,200 unprotected children, moreover, have been admitted to residential institutions in Birmingham since these became fully immunized communities, and have been retained there in daily contact with the immunised residents as well as with children attending outside schools for periods up to six months and more before themselves undergoing immunization. Here, according to theory, were circumstances under which fresh admissions would be exposed to acute risk. And yet, during the three to ten years during which the various institutions may be considered immunized communities, and over which the 2,200 unprotected children were admitted, three developed diphtheria, - a rate of 1.4 per 1,000 in these unprotected children. That rate is lower than the diphtheria incidence-rate for any one year during the previous ten years for the population of Birmingham as a whole. Whatever this may mean, it certainly does not suggest increase of virulent carriers in an immunized community.

And more recently, Lillico and Haig (1936), in reference to Derby, argue that any Local Authority sponsoring an Immunization Campaign will undoubtedly exercise the most rigid control on any prevalence of/
of/

of diphtheria occurring in any open group, and that as regards semi-closed communities such as orphanages the safeguarding is usually perfect. They suggest, moreover, that if fever hospital nurses, who are either naturally immune or are rendered immune by inoculation, were more likely to become virulent carriers, evidence of such infectivity would be revealed by occasional cross infections in hospitals and among their non-immune friends outside.

S U M M A R Y.

The Schick Test, given an accurate and constant technique with some degree of practice in interpretation of results, gives a reliable indication of the state of immunity or susceptibility of persons in relation to diphtheria.

It is possible, moreover, to create in the susceptible that state of immunity which is found to exist naturally in others.

The reliability of the Test is proved by the results obtained in lowering the incidence of diphtheria in institutions, fever hospitals, and various closed and semi-closed communities in this country and in America.

An immunization clinic may be held in special clinic premises or in a school classroom or welfare centre. Where schools are concerned, little upset of the daily routine need occur. Shrewd staffing of such a clinic is advisable and records must be accurately made and filed, and general clerical work reduced to a minimum. The more clerical work the doctor and nurse have to do, the less time will be available for treatment and the greater will be the/

the cost of this treatment in consequence. Efficient co-operation between the staff of the clinic and the district health visitors goes a long way towards completion of the injection course.

The Schick Test should be dispensed with in children under the age of five years.

Toxoid anti-toxin mixture is a reliable product and rarely gives rise to untoward reactions. These may be either general, local, or general and local, but seldom lead to discomfort, and are transient. They are less frequent than with Toxin anti-toxin, and less severe. While, moreover, it may be a weaker antigen than Formol toxoid, and necessitates the giving of three injections as compared with one or two of Alum-precipitated toxoid, time taken in acquiring immunity is of no particular importance, the chief consideration being certainty of protection with a minimum of upset. In my series 0.6 per cent. of injections gave rise to reactions, the majority occurring after the first injection and in older children.

The first step to be taken towards the success of any immunization scheme is the gaining of the support/

support of Head Teachers. Once this is obtained, lectures, film demonstrations, posters and even broadcasting may be employed. General practitioners and nurses, thereafter, can do more perhaps than they realise in encouraging those who may rely upon their advice from day to day in regard to medical matters.

Statistics show that immunization leads to a marked reduction in incidence among inoculated as compared with unprotected children, and while it is possible through immunization to decrease the incidence-rate very considerably, and even to reduce the death-rate, it is the inclusion of the pre-school child in any scheme which is the really important factor in this reduction.

The cost of immunization is about one-ninetieth of the cost of treatment in hospital.

While there is a theoretical risk of increase in the virulent carrier-rate following upon immunization within a community, this, in practice, is not of necessity true.

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A P P E N D I X.



County Borough of Croydon.

OSCAR M. HOLDEN
M.D., D.P.H.
MEDICAL OFFICER OF HEALTH
SCHOOL MEDICAL OFFICER.

PUBLIC HEALTH DEPARTMENT,

TOWN HALL,

CROYDON.

Telephone No. Croydon 1964.
(during Office Hours)
Telephone No. Thornton Heath 1766.
(after Office Hours)

Date sent to }
District Health }
Visitor }

Name of Child

Address

School

Clinic

District Health Visitor

Report (1)

„ (2)

.....193
To the DISTRICT HEALTH VISITOR.

It is reported to me by the Health Visitor in charge of the Clinic that
..... of
attending School.....Dept.
and referred to Clinic re :— Immunization (State disease or
reason of appointment)
did not keep appointment for treatment at :—

- Iye } Clinic*
- Dental }
- Throat }
- Minor Ailments }
- X Ray }
- Inspection }
- Ionization }
- Remedial Exercises and Massage Clinic
- Light Clinic
- Orthopaedic Clinic
- Rheumatism Clinic

Please let me have a brief report on this overleaf, giving reason of non-attendance

Oscar M. Holden.

* Strike out the Clinics not required.

NOTE.—To be returned completed to S.M.O.'s office not later than 7 days
after.....193.....

COUNTY BOROUGH OF CROYDON.

DIPHTHERIA PREVENTION

TO PARENTS AND GUARDIANS.

Diphtheria is a dangerous infectious disease causing great loss of life, particularly amongst young children. There are some children and grown up people who do not catch diphtheria because they are protected by nature against it. By a simple test it is possible to find out whether your child is so protected. Other children who are not protected may contract the disease. Your children need not have diphtheria, they can be protected very easily.

HOW CAN THIS PROTECTION BE SECURED?

Diphtheria can be prevented in nearly every child by three simple injections into the arm at intervals of a week or two; after about ten weeks these injections protect the child for many years, if not for life. A few children may require more than three injections if they are unusually liable to contract the disease.

WILL THE PROTECTING INJECTIONS UPSET THE CHILD?

It is a very rare occurrence for a child to be unwell after the injection. There is no sore at the site of the injection and no scar is left. A number of children in a large school in Croydon were having injections at the same time, and they were able to take part in the school sports. It did not inconvenience them in the least.

GIVE YOUR CHILDREN ALL THE ADVANTAGES YOU CAN.

In England and Wales eighty out of every hundred deaths from this disease occur in young children under ten years of age.

It is your duty to consider whether your child should be protected against this disease. This method of diphtheria prevention has been tried now for a number of years and has proved its great value. In Croydon, the children in various residential schools have been protected and, whereas diphtheria was common before this method of prevention was begun, it has now been wiped out in these schools. No child who has been fully protected by the methods used in Croydon has contracted diphtheria. The nurses in our hospitals who nurse diphtheria cases are also protected in this way.

Why not have your child protected?

WHERE CAN TREATMENT BE OBTAINED?

This preventive treatment can be obtained at the School Clinic, Lodge Road, Croydon, on Mondays or Tuesdays, from 2 to 5 p.m., by appointment.

Any further particulars can be obtained from the MEDICAL OFFICER OF HEALTH, TOWN HALL, CROYDON.

OSCAR M. HOLDEN, M.D.,
Medical Officer of Health.

HOW TO PROTECT AGAINST DIPHTHERIA

WHILE Diphtheria is, despite the progress in treatment since the close of last century, still feared by the general public as a scourge, which even if quickly and efficiently treated is liable to lead to complication of a lasting and serious nature, it is not yet generally realised that it is possible simply to discover those amongst us who are susceptible to the infection, and, further, to protect against that infection a very high percentage of those found susceptible.

Immunity to Diphtheria may be acquired by meeting, over a period of years, small doses of infection, insufficient at the time to cause Diphtheria, and yet sufficient at the end of that period to have built up in the body of the individual a lasting protection; again it may, though not always, result from an actual attack of the disease. Work done in this country and elsewhere has shown that while infants under 6 months are largely immune, susceptibility increases rapidly from that age until the child is 18 months, remaining thereafter at a more or less high level until the age of 5 years when a natural immunity begins slowly to be developed, and by the time adult life is reached, a large percentage of people are definitely insusceptible.

Whether the individual is susceptible or not may be easily demonstrated by means of the Schick Test (first introduced in 1913), a minute injection being given in the surface layers of the skin of the forearm. This causes little or no discomfort, and leaves no permanent mark.

Immunization of those found by the Schick Test to be susceptible may be easily carried out. The most satisfactory method is one whereby three small injections are given at weekly or fortnightly intervals into the upper arm, such a course giving protection in 95-98% of cases. The one injection method, which has recently achieved some popularity, and which should admittedly be the method of choice, were it justified by the results obtained, has not yet been perfected sufficiently to give protection in more than 85-88% of cases. It may be stated here that, owing to the almost universal susceptibility of children between the ages of one and five, Schick Testing of this age group may be and is usually dispensed with. And, finally, subsequent to the Immunization Course, a Schick Test should invariably be carried out, preferably three months after the last injection. Such a test will show up those few who require a further one or two injections. Moreover, the test gives a certain knowledge as to whether the desired result has been obtained.

Parents who bring their children for this treatment usually ask about the duration of the protection given and are always told that while the immunity provided is perhaps slowly lost, the child is at the same time adding to his own natural immunity the longer he lives, and that immunized children very rarely

gh of Croydon

LTH SERVICES

clearing house for the arrangement of such cases into the various groups for special classes of treatment.

CLINICS.

Maternity and Child Welfare.

Ante-Natal.—Lodge Road.
Mon., Tu., Wed., Th. & Sat., 9 a.m.

Post-Natal.—Lodge Road.
Tu., 2 p.m., Fri., 10 a.m.

Infant Welfare. (List will be forwarded on application).

Massage.—Lodge Road.
Daily 2—5 p.m.

Maternity.—Block of 20 beds, Mayday Hospital. St. Mary's Hospital, St. James's Road, 30 beds retained.

School Medical Service.

Minor Ailments.—Lodge Road, Selhurst Road and Goodwin Road. Daily 9 a.m.

Inspection.—Lodge Road.
Wed. and Sat., 9 a.m.

Dental.—Lodge Rd. & Selhurst Rd. Daily, 9 a.m. & 2 p.m.

Ear.—Lodge Road. Fri., 2 p.m.

Ophthalmic.—Lodge Road.
Tu., & Fri., 9 a.m.

Speech Defects.—Tavistock Grove School.
Mon. and Thurs., 9 a.m.

Orthopaedic.—General Hosp'l.
Thurs., 10 a.m.

Throat.—General Hospital.
Mon. & Wed., 2 p.m.

Remedial Ex.—St. Andrew's Hall. Daily.

Rheumatism.—Lodge Road.
Wed., 2 p.m. Thurs., 9 a.m.

Tuberculosis Dispensary.—
13, Katharine Street, Croydon.
Consultations daily (by appointment).

Venereal Disease.—General Hos.
Women and Children. Wed.,
4.30 p.m. Men and Boys,
Tues., 7 p.m., Sat., 2.30 p.m.

Synthetic Sunlight.—General Hospital. Tu. & Th., 2 p.m.

Schick Testing and Immunization against Diphtheria.—
Lodge Road. Mon. & Tues.,
2 p.m.

Selhurst Road. Thurs. 2 p.m.

Maternity Outfits, Sick Room Requisites, &c.—The former can be purchased and the latter hired from the Public Health Office.

Clean, So Easy, So Cheap,

Visit our Showrooms and see the latest designs of Electric Cookers fitted with two enclosed type boiling plates and one rapid heating SUPERSPEED PLATE.

Installation and Maintenance Free of Charge.

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held on Wednesday Afternoons at 3 o'clock.

Electricity Showrooms:
DON.

Telephone: 1152 CROYDON.

"take" Diphtheria; moreover that, if they do, the attack is a mild one, affecting the throat locally and giving rise to none of the general poisoning associated with Diphtheria, and so leading to none of the dreaded complications which so commonly follow the disease in the unprotected. It may be said here that no child found to be Schick negative after Immunization carried out as stated above by the Local Health Authority has developed Diphtheria.

Parents again will ask what risk there is of reactions occurring during treatment. These are very rare and usually of a local nature at the site of the injection, for example a little redness, stiffness or tenderness lasting for perhaps 24 to 36 hours. They occur in just over 1% of cases and, almost invariably, in older children.

Another and final question asked is "How soon may I have my child immunized?" The answer is "as soon as your child is one year old." The great advantages of treatment at this early age are that the risk of reaction is virtually nil and that protection is being obtained at the time when susceptibility is approaching its highest, when again the risk of Laryngeal Diphtheria is greatest and finally when the death rate in the unprotected is highest.

Croydon's Health During March, 1936.

Births: 249, birth-rate, 13.4 (per 1,000 head of population); **deaths:** 252; death-rate, 13.6 (per 1,000 head of population); deaths of children under one year of age, 11; infantile mortality rate, 44 (per 1,000 births); the number of cases of infectious diseases notified was 135; the number of cases of infectious diseases in hospital was 157; houses inspected for sanitary defects, 351; number of complaints received and attended to, 409; number of samples of milk taken for analysis, 105; number of samples of other foods taken for analysis, 40. The chief causes of death in Croydon during the month were: Pneumonia, 34; Cancer 32; diseases of the Heart, 43.

11,189 attendances of mothers and babies were made at the child welfare centres during the month.

There were 1.11 inches of rain. The average air temperature was 46.4° F. The highest temperature in the shade recorded was 63° F.; the lowest was 31° F. There were 77.6 hours of sunshine recorded.

POPULATION OF CROYDON.

The Registrar General's estimate of the population of the County Borough of Croydon at midsummer 1935 was 242,100, an increase of 1,500 over the figure for the preceding year.

Keep clean and don't worry. Go Steady! Don't hurry.

HAMMETT'S are members of the Institute of Hygiene

Hammett's Meat for Strength and Health

MEAT EVERY DAY STRENGTHENS THE BODY AND PROVIDES "FOOD FOR THOUGHT." MAKE A POINT OF GETTING **YOUR** MEAT AT HAMMETT'S, WHERE IT IS SERVED UNDER THEIR FAMED HYGIENIC ARRANGEMENTS. BE YOUR CHOICE BEEF, MUTTON, LAMB OR PORK, ETC., BY SHOPPING AT HAMMETT'S YOU CAN SELECT FROM THE VERY PICK OF THE WORLD'S MEAT

A HEALTHY PROPOSAL—SHOP AT

HAMMETT'S

THE BUTCHERS OF DISTINCTION

243 LONDON ROAD, CROYDON. Thornton Heath 1036

117, NORTH END, CROYDON. Croydon 1258

61, SOUTH END, CROYDON. Croydon 1178

of Croydon H SERVICES

clearing house for the arrangement of such cases into the various groups for special classes of treatment.

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Mon., Tu., Wed., Th. & Sat., 9 a.m.

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Tu., 2 p.m., Fri., 10 a.m.

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Wed. and Sat., 9 a.m.

Dental.—Lodge Rd. & Selhurst Rd. Daily, 9 a.m. & 2 p.m.

Ear.—Lodge Road. Fri., 2 p.m.

Ophthalmic.—Lodge Road.

Tu., & Fri., 9 a.m.

Speech Defects.—Tavistock Grove School.

Mon. and Thurs., 9 a.m.

Orthopaedic.—General Hosp'tl.

Thurs., 10 a.m.

Throat.—General Hospital.

Mon. & Wed., 2 p.m.

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Tuberculosis Dispensary.—

13, Katharine Street, Croydon. Consultations daily (by appointment).

Venereal Disease.—General Hos.

Women and Children. Wed.,

4.30 p.m. Men and Boys,

Tues., 7 p.m., Sat., 2.30 p.m.

Synthetic Sunlight.—General

Hospital. Tu. & Th., 2 p.m.

Schick Testing and Immunization against Diphtheria.—

Lodge Road. Mon. & Tues., 2 p.m.

Selhurst Road. Thurs. 2 p.m.

Maternity Outfits, Sick Room

Requisites, &c.—The former

can be purchased and the

latter hired from the Public

Health Office.

lean, So Easy, So Cheap,

Visit our Showrooms and see the latest designs of Electric Cookers fitted with two enclosed type boiling plates and one rapid heating SUPERSPEED PLATE.

and Maintenance Free of Charge.

AT REASONABLE RENTALS

on Wednesday Afternoons at 3 o'clock.

City Showrooms :

Telephone : 1152 CROYDON.

CHILD DICTATORS

“COME here!” called a North-country mother to her two small girls who were playing a little distance away.

Without a second's hesitation, both children obeyed. They were obviously accustomed to obey as a matter of course.

One frequently hears that North-country people are better disciplinarians than parents “down South.” Whether this is true or not, one wonders how many mothers are confident of eliciting such instant obedience as this; or in many cases, even of being heeded at all.

“I can't do anything with the children. They are wearing me out!” is a complaint that is constantly heard.

In the majority of cases, parents whose children get the upper hand of them, are paying for slackness in early training.

“He's so little, I can't be cross with him!” is a natural but a fatal attitude. Children can sum up their parents at a surprisingly early age. Before they can talk they not only know exactly what liberties they can take, but are usually adept in the art of “getting round” their elders.

Always to insist upon prompt obedience right from the start may be a tiresome task, yet it saves twice the amount of worry and nerve-strain in the long run.

The toddler who persistently disregards what is said to him, soon becomes the unmanageable child whose parents can “do no good with him”; simply because he has never been taught to do as he is told.

This does not mean that parents should be forever nagging and scolding. Often, too much limelight on a misdemeanour can have the reverse of the desired effect.

Sometimes, children will deliberately misbehave simply for the sake of creating a “scene.” In such cases their attempts will usually fall flat if they are ignored. And despite certain modern ideas to the contrary, a sound, old-fashioned smack has been known to work wonders!

Be sure, however, before administering punishment, that it is really deserved. So often, children do apparently mischievous things without having meant any harm. And an unjust punishment, even though it may be unintentionally so, can embitter a child, and lessen its respect for and faith in its parents.

It has been said that parents should never issue a command without an accompanying reason. This may be satisfactory in theory, but it is not always so in practice.

Too often, this method results in a fruitless discussion of whys and wherefores, started solely for the purpose of leading an unsuspecting adult into a blind-alley argument in order to evade the point at issue.

As to the frequently-voiced idea that obedience and discipline make a child weak-willed and hinder its self-expression, there is little danger of such disastrous results.



CITY OF BIRMINGHAM
PUBLIC HEALTH DEPARTMENT
CONGREVE STREET, BIRMINGHAM 3

Dear Sir or Madam,

As your child born is now approaching the age when diphtheria can become a serious danger, you are invited to read carefully the enclosed leaflet and to take advantage of the means of protection offered therein.

This protective treatment can be obtained for your child in one of three ways:-

1. Either by asking your own family doctor to give the treatment; the material will be supplied to him free by the Public Health Department, or
2. By applying at any Infant Welfare Centre, or
3. By attending the Special Clinic at the Public Health Department, Congreve Street, Birmingham, Tuesdays 3 to 4-30 p.m.

If you wish to have this protective treatment provided for your child either at the Public Health Department Clinic or at an Infant Welfare Centre, please fill up the enclosed post card.

H. P. NEWSHOLME,

Medical Officer of Health,
City of Birmingham.

CITY OF BIRMINGHAM PUBLIC HEALTH DEPARTMENT

DIPHTHERIA SOME FACTS FOR PARENTS

- (1) **Nearly 3,000 children die every year from diphtheria in England and Wales. In 1934 nearly 4,000 children died.**
- (2) **The greatest number of cases and of deaths occur in children under seven years. In Birmingham most of these are in five-year-old children who have not had protective treatment.**
- (3) Among children aged five to ten years diphtheria is the most common cause of death, even more so than all accidents.
- (4) Diphtheria is spread from person to person by germs and is not caused by bad drains and smells.
- (5) However healthy and well cared for a child may be he is still liable to catch diphtheria germs from someone else.
- (6) Vaccination gives no protection from diphtheria.
- (7) **Protective inoculation has been carried out in Birmingham for over eleven years, and 89,000 children have received this treatment.**
- (8) **Only fifty-six of those thus treated have developed diphtheria, and not one of them has died from the disease, while over 11,300 cases of diphtheria and 745 deaths have occurred among children who have not been protected by inoculation.**
- (9) The treatment for protection consists of three injections, given at intervals of about two weeks.
- (10) These injections need only the prick of a needle ; they are practically painless, and rarely cause the slightest discomfort.
- (11) There is no scab or scar.
- (12) The protection takes from three to nine months to develop ; and, therefore, such protective treatment should NOT be postponed until diphtheria is prevalent.
- (13) **The best age for treatment against diphtheria is from eight months to two years. In any case, it should be done before the child goes to school.**
- (14) This treatment is given free of charge at schools and welfare centres, and you need only fill in and post the postcard provided, when an appointment will be made.
- (15) There is a free clinic every Tuesday at 3-0 p.m., at the Public Health Department, Congreve Street, for children of all ages from eight months.
- (16) The material is also supplied free to your own doctor if you wish, and he makes his own charge to you for the actual injections.
- (17) **WILL YOU NOT BLAME YOURSELF IF YOU DO NOT HAVE YOUR CHILDREN INOCULATED AND THEY CATCH DIPHTHERIA ?**



CITY OF BIRMINGHAM
PUBLIC HEALTH DEPARTMENT
CONGREVE STREET, BIRMINGHAM, 3

Dear Sir or Madam,

Your child is now approaching school age and I write again to urge the importance of protection against DIPHTHERIA.

This disease kills more than twice as many children as are killed in street accidents. It causes more deaths in children between 5 and 10 years of age than any other condition. Diphtheria can easily be prevented by three injections at fortnightly intervals. The injections are practically painless and do not give rise to either sore or scar. 86,000 children have been so treated in Birmingham within the last eleven years; and not a single one of these has died from diphtheria, although during the same period there have been over 11,000 cases of diphtheria with 722 deaths among the children who have not been thus protected.

The medical officer carrying out this work can visit the schools only at intervals of eighteen months or two years. It is, therefore, advisable for the treatment to be given before the child goes to school.

A special clinic will be held shortly at the Welfare Centre and I strongly advise you to FILL IN THE ENCLOSED CARD, for children over 8 months of age to be provided with this protective treatment.

For further information apply to Public Health Department.

Yours faithfully,

H. P. Newsome

Medical Officer of Health.

All Communications to be addressed to THE CHIEF EDUCATION OFFICER.



P. D. INNES, M.A., D.Sc.
Chief Education Officer.

CITY OF BIRMINGHAM
EDUCATION DEPARTMENT
COUNCIL HOUSE, MARGARET ST.
BIRMINGHAM 3



TELEPHONE
CENTRAL 7000

In your reply please quote:

Dear Sir or Madam,

I wish to commend to your careful attention the attached letter addressed to you by the Medical Officer of Health regarding diphtheria. I am sure you will realise the extremely serious nature of this disease and will consider carefully the offer contained in the letter of the Medical Officer of Health, which is sent to you with the approval of the Education Committee.

Yours faithfully,

P. D. INNES,

Chief Education Officer.

PUBLIC HEALTH DEPARTMENT,

B

Congreve Street,

Birmingham 3.

Dear Sir or Madam,

Nearly 3,000 children die from diphtheria in England and Wales every year, and thousands of others undergo this distressing and often prolonged illness which may cause permanent damage to the heart.

The majority of these cases of, and deaths from, diphtheria occur in children between 3 and 8 years of age. The greatest number of cases occur in Birmingham during the early school years.

Now all this illness is unnecessary for it has been proved that over 90% of children can be protected against diphtheria by preventive treatment. The treatment consists of three small injections into the upper arm at suitable intervals. The injections are painless, rarely cause even the slightest soreness, and leave no scar. The treatment has no relation to vaccination, and vaccination will not prevent diphtheria.

The protection takes some months to develop, therefore it should not be left until diphtheria is about.

It is best for the children to have this treatment before they go to school; if, however, they have not already had it, they can receive the treatment at school. A medical officer will be visiting the school shortly to give protective treatment to children under 8 years of age who have not previously been treated, and whose parents now wish for such protection to be given. It will be at least a year before the doctor visits the school again.

If you wish your school child to be thus treated, please fill in the attached form and return to the Head Teacher.

Protective treatment against diphtheria for children from eight months of age upwards may be obtained on application to the Public Health Department, Congreve Street.

Yours faithfully,

H. P. NEWSHOLME,

Medical Officer of Health.

FORM L.

If your child has previously been inoculated against diphtheria or if you do not wish treatment to be given, please do not return this form.

Has your child previously had diphtheria?

I desire that my child.....aged..... should receive treatment with a view to obtaining protection against diphtheria.

(Signed)..... (Parent or Guardian).

Address

Date.....

NEW COLOURED FILM

in connection with

DIPHTHERIA PREVENTION WORK.Information for Head Teachers.

In connection with the diphtheria prevention work, a short film has recently been taken at Little Bronwich Hospital and infant welfare centres in Birmingham.

Its purpose is to spread information about, to stimulate interest in the work, and to show that the actual inoculation is not a lengthy or painful procedure.

The Education Committee have given permission for it to be shown on school premises at meetings of approved societies.

The film is non-flammable, takes 15 minutes to show, and can be shown in any room with a length of 18 feet or more where there is electric light or power and which can be darkened. We have our own projector, screen and operator, and dark curtains for wall windows.

Arrangements can be made for it to be shown to parents either at the end of the afternoon session or at evening meetings - in the latter case a short address can be given, if desired. There is, of course, no charge.

Applications should be made to the Diphtheria Prevention Clinic, Public Health Department, Congreve Street, suggesting a time and date, giving about four weeks' notice. Formal application should be made to the Education Department after a date has been arranged.

Notices to parents giving details of shows can be provided by the Public Health Department