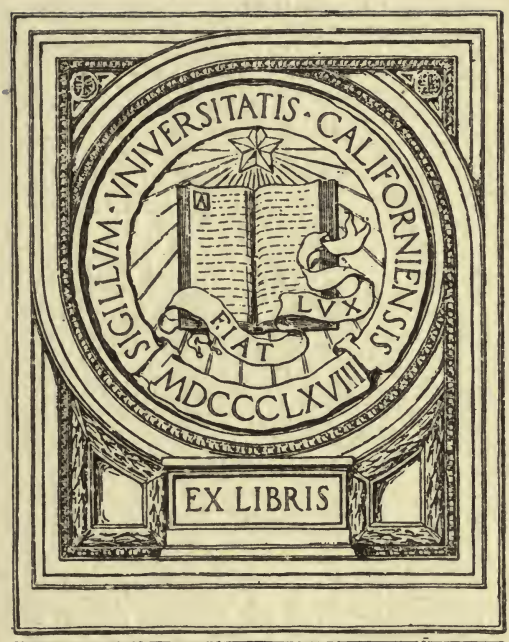
THE ADMINISTRATIVE CONTROL OF SMALLPOX

WANKLYN



"The writer is well qualified for his task, as his experience extends over twenty years and includes the London epidemic of 1901–2, in which he had to revise the diagnosis of some 10,000 cases . . . we can heartily recommend the book. Dr. Wanklyn possess the gift of exposition, and writes with the authority . . . that his long experience justifies."

—*British Journal of Children's Diseases.*

"Dr. Wanklyn's book has been published at a very opportune moment. The author has had a very large experience in the diagnosis of this disease, and is well able to lay down golden rules for the guidance of the general medical practitioner and the post-graduate student. . . . Dr. Wanklyn, by his original and chatty style, brings out every point of importance with great clearness . . . the book, from its eminently practical character, should certainly be read by all those who have to deal with smallpox and allied diseases."—*Universal Medical Record.*

"The Author sets out to prove the contention that smallpox is, perhaps, of all diseases that in which a certain diagnosis can be arrived at in almost every case, and is sufficiently lucid and emphatic to succeed in giving the reader greater confidence in his own competency to deal with possible cases. The book, which is the outcome of twenty years' experience of smallpox, is well arranged and illustrated."—*Guy's Hospital Gazette.*

"Readers will find the style clear and easy, and the subject is dealt with in a practical manner. The traps and difficulties which are likely to be encountered in the diagnosis of the disease are pointed out, and directions for avoiding them are set forth. . . . The original manner in which the subject has been approached has been much appreciated by a reviewer inured to the more conventional method of writing."—*Middlesex Hospital Journal.*

"An important practical contribution to the clinical study of smallpox. . . . After carefully reading the volume we can say without hesitation that the author has been singularly successful in carrying out his aim. . . . Though the volume is primarily intended for general practitioners and post-graduate students, it ought to appeal to a wide circle of readers. It is very well written, and a valuable feature is the inclusion of numerous illustrative clinical histories. . . . We have pleasure in bringing the volume before the notice of our readers, and we advise each one to secure a copy and carefully study its pages."—*The Prescriber.*

THE ADMINISTRATIVE CONTROL OF SMALLPOX

BY THE SAME AUTHOR

HOW TO DIAGNOSE SMALLPOX. With 11 Illustrations. 8vo, 3*s.* 6*d.* net.

SMITH, ELDER & CO.

LONDON PUBLIC HEALTH ADMINISTRATION. A Summary showing the principal authorities, with their origin, services and powers. With 24 pages of writing paper for Notes. Fcp. 8vo, 2*s.* 6*d.* net.

LONGMANS, GREEN, & CO.

THE ADMINISTRATIVE CONTROL OF SMALLPOX

HOW TO PREVENT OR STOP AN OUTBREAK

BY

W. McC. WANKLYN, B.A. CANTAB.

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

FELLOW OF THE ROYAL SOCIETY OF MEDICINE, FELLOW OF THE SOCIETY OF MEDICAL OFFICERS OF HEALTH, AND FORMERLY REFEREE IN THE DIAGNOSIS OF SMALLPOX AND MEDICAL SUPERINTENDENT OF THE RIVER AMBULANCE SERVICE (SMALLPOX) OF THE METROPOLITAN ASYLUMS BOARD

LONGMANS, GREEN, AND CO.

39 PATERNOSTER ROW, LONDON

NEW YORK, BOMBAY, AND CALCUTTA

1913

PREFACE

This is a companion volume to "How to Diagnose Smallpox," and has the same object, namely, to contribute to the prevention of that disease. It was drafted primarily for post-graduate students reading for the Diploma of Public Health; but it will be found useful by all who have to deal with outbreaks of smallpox. My cordial thanks are given to those who have helped me in its preparation.

Its subject-matter is practical, is presented in a conversational manner, and comprises the principal administrative details which require to be borne in mind and put into practice in order to cut short an outbreak. There are various methods of controlling smallpox which have come more into use during the last thirty years or so. They include, for instance, exact diagnosis of the disease,

removal of cases to hospital, regular disinfection, and close observation of contacts; and the importance of these methods increases in proportion as vaccination falls into disuse.

If, as I think, the equipment of every medical graduate should include a practical knowledge of the diagnosis of individual cases, it is equally important for every one who intends to engage in Public Health work to have a thorough knowledge of how to handle and stop an outbreak. Those who aspire to be Medical Officers of Health should realise the responsibility which an outbreak may bring upon them. Such a crisis means hurry, rush, and even panic; and it is to them that every one will appeal to secure their health and business. They will do well to be prepared.

When smallpox is not prevalent, nothing seems so remote; to all outward appearance a serious outbreak is most unlikely. In reality, the very reverse may be the case. Communities which are collected into close town populations, unprotected by vaccination, and exposed to a dropping fire of infection from all parts of the world, are certain, sooner or later, to suffer from a serious

invasion and spread of smallpox. Medical Officers of Health cannot stave it off indefinitely; they can only avert it as long as possible; and, when it comes, do their best to cut it short by means of effective administration.

LONDON,
September, 1913.

CONTENTS

THE ADMINISTRATIVE CONTROL OF SMALLPOX

CHAPTER I

GENERAL REVIEW

Epidemics of infectious disease are compared to conflagrations. The comparison is just. Especially striking are epidemics among island populations. There are, for instance, the well-known outbreaks of measles in the South Seas. Prior to the year 1875 the Fiji Islands had been free from that disease. But the population was highly susceptible. In December, 1874, the native chief Thacombau had measles while on a visit to Sydney. On the voyage home in January, 1875, one of his sons and a native attendant fell ill of the same disease. They landed. Another of the chief's sons sickened. Visitors

thronged the houses where the sick people lay. Infection was spread broadcast. There was a furious outbreak. Whole villages were attacked, their inhabitants being nearly all smitten at once. Food could hardly be obtained, or, if obtained, could not be cooked, because no one was well enough to cook it. In the midst of plenty, people died of exhaustion and starvation. An end was put to the epidemic only when the infectible material was exhausted, that is when nearly every person had been attacked. By the end of May, 1875, there had died about one-fifth of the population, that was about 20,000 persons.

Recently there has been a similar tragedy. Rotumé, another South Sea Island, was similarly swept in 1911. The transactions of the Epidemiological Section of the Royal Society of Medicine for 1913 inform us that the Resident Commissioner, a medical practitioner, was obliged to go on leave. In his absence a case of measles was landed. Again infection spread with great rapidity among the population, which here numbered about 2000 persons. Of this number about 350 persons died.

Epidemics such as these are paralleled in our

own islands by the Black Death of 1349, which is believed to have destroyed one person in every three. In each of these cases and in many others, the conditions were, that into an island population of a high degree of susceptibility there was imported a highly infectious disease; and the result was like that of a spark falling in long dry grass. A furious conflagration raged, till all that was combustible was burnt up.

What is the state of the case, in regard to smallpox, in our own islands and in many other communities? It is important to get a just view of the position; for upon it is based the whole rationale of keeping smallpox out as long as possible, and of stopping its spread when it has obtained an entry.

The position is something like this. We may imagine a huge stack of fuel composed of small bundles of brushwood or firewood. Some of these bundles are as dry as tinder and are very inflammable. Others are very damp and in no danger from fire; others again are in a condition between these two extremes. We may further suppose that the various bundles are not regularly arranged as regards their degree of dryness; in one part

dry bundles are packed together, in another wet bundles are packed together, in other places they are about evenly intermixed. There is a third point to be noted about this imaginary heap. In some places the bundles are packed very close; in other parts they lie wide apart, with ample clear space between them.

We must further imagine that on to this stack of fuel there are continually falling, at irregular intervals, but constantly falling and certain to fall, lighted brands or torches. In such a condition of things it is clear that fires are inevitable. All that is doubtful is the extent to which they will occur. This will depend on a number of factors; for instance, on the number and fierceness of the burning brands; whether they fall in places where the fuel is thick, or where it is scanty; and whether they fall on wet or on dry material. Much also will depend on whether the brands are noticed at once and picked out, or whether they are overlooked till a patch is well alight. But it is clear that, sooner or later, there is every probability, if not the certainty, of a very fierce blaze.

The foregoing comparison, with one important reservation, fairly represents the state of things in

our own and other countries during inter-epidemic periods. At such times we are free from the disease. But cases of smallpox are often imported from abroad where it is endemic; they come to this country from Europe, Egypt, Africa, India, and many other parts, even from China. They arrive, for instance, at Hull, Bristol, Liverpool, London. Port Sanitary Authorities are constantly stopping them; but they cannot keep them all out; for cases may come in at ports where there is no regular medical inspection.

There is also a class of case which is alluded to in the reservation just mentioned. Infection may be imported in a latent form. No mere medical inspection can keep out a patient who is in the incubation period of his disease. He is then, to all intents and purposes, perfectly well. He settles himself comfortably at home, and then breaks out with smallpox. It is the persons who arrive during their twelve days of incubation and settle down unobserved, who are apt to do the most mischief. Infection may also be imported in clothes, or in rags and other raw material for manufacture. In these ways smallpox can always succeed in obtaining an entrance.

The following is a striking example of how on one occasion smallpox was introduced into this country. It was related on July 13th, 1900, to members of the Epidemiological Society by Mr. T. W. Russell, M.P., then Parliamentary Secretary of the Local Government Board. He said: "I had a most extraordinary case before me yesterday, in which I am sure every one here will be interested. A deputation came to see me from Lancashire, representing several large towns, in connection with the spread of smallpox of a special character. There had been something like 100 cases in these Lancashire towns within the last few months; and the story as detailed to me yesterday, I confess, interested me, and will probably interest the members of this Society. It appears that a man left Moscow, in Russia, intending to travel to Staleybridge, in Lancashire. He was ill when he left; he arrived at Flushing; and when the vessel was boarded by the medical officer, the captain reported that there was no sickness. The man came on to Queenborough, landed there, and it was noticed that he had to be carried through the baggage-room on a chair; but he accounted for that by declaring that he

was suffering from rheumatism, and could not walk. He was put into the train, and travelled to Manchester, and from Manchester to Staleybridge, where he died the day after his arrival from virulent smallpox. The interesting point is, that almost every one who travelled with him in the compartment from Queenborough to Manchester took smallpox; the ticket collector at Manchester took smallpox; those who travelled with him from Manchester to Staleybridge in another train took smallpox; and something like 100 people, I think, had smallpox spread by means of this simple case. The real question is: could that have been prevented? Well, that is exactly the *crux* of the situation."

So much for a general consideration of the manner in which smallpox may be introduced. Next comes the question of the general policy of meeting it. That need not detain us long, for the decision does not rest with us. Pursuing the same line of thought as before, it may be said that there are three possible policies for protecting a wooden village from fire. The first is to secure that all the houses are built of wood which is non-inflammable. The second is to allow perfect liberty of

building material, and to maintain a fire-prevention organisation warranted to limit and extinguish any outbreak that may occur. The third is a combination and modification of the first two. In regard to smallpox, Germany furnishes an example of the first policy; our own country of the third. Parliament sanctioned the relaxation of routine vaccination in 1898, and loosened it still more in 1907. At the present time very large numbers of the population are susceptible to smallpox, and these numbers are increasing. As the susceptible material increases, so does the risk, and so does the responsibility of those who are engaged in keeping smallpox out.

Some outbreaks seem to have required a combination of circumstances to bring them about. For instance, the 1871 and 1902 epidemics in this country were preceded by an unusual prevalence of smallpox among our neighbours in France; it is obvious that must increase the chances of its being brought to us. If smallpox in that country is not now as prevalent as it was in the years named, we have to remember on the other hand that the facilities of modern travel have brought various countries, where smallpox is endemic,

much nearer to our doors than was formerly the case. It is a novelty in sanitary history for a patient, whose attack of smallpox showed itself on his arrival in London, to have received his infection in Manchuria. Yet that has happened. Smallpox has many more resources to draw upon than formerly; and when the disease breaks out among us improved internal locomotion offers greater opportunities for its spread.

A review of the past prevalence of smallpox in this country shows that it has come in cycles. It was very prevalent in 1871, in 1877, in 1881, in 1884, in 1893, and in 1902. Nine years of comparative quiescence elapsed between the maxima of 1884 and of 1893, and nine years between the maxima of 1893 and of 1902. A further nine years on brings us to 1911, which has happily passed without an epidemic. It is now eleven years since the last maximum and, in the autumn of 1913, we are still free from smallpox. How long this freedom will continue cannot be said. It is impossible to prophesy. Only two things are certain. Susceptible material is increasing, and infection is continuing to come in. Though the infection of case after case be extinguished, sooner

or later a spark will come in contact with a collection of highly combustible material; in that event the blaze will be sudden, and it will be fierce.

Whatever the future has in store, our part is plain, namely, to be forearmed. It is to assist in that object that these pages have been written.

CHAPTER II

SOME POINTS IN THE NATURAL HISTORY OF SMALLPOX

In making our plans against smallpox, we shall do well to begin by dwelling on one or two points in its natural history which bear especially on its prevention. First as to the incubation period. This is singularly constant. Twelve days is the rule. Variations occur; but in the majority of cases signs of illness show themselves with remarkable conformity to the expected time; smallpox has a more regular incubation period than any other infectious disease. It is convenient to keep a type of the chronology of the disease in mind for reference.

For example :—

Sunday, January 1st.	Exposure to infection.
Friday, January 13th.	Onset of fever, headache, other pains, malaise, vomiting.
Sunday, January 15th.	First appearance of papular rash.
Tuesday, January 17th.	Rash begins to be vesicular.
Thursday, January 19th.	Rash begins to be pustular.
Monday, January 23rd.	Scabbing stage may begin.
Monday, February 6th.	Scabbing stage may end.

These dates are of special importance in administration, and the earlier ones form a sequence which may be counted upon with some confidence. If a susceptible person be thoroughly exposed to infection on a Sunday, for instance, the following Friday week will not pass without signs of the beginning of his attack.

Next, as to the infective capacity of smallpox. We all know how highly infectious it may be. But the striking power of different cases and of different groups of cases varies in a remarkable manner. At a time when London was completely free from smallpox—it was in the year 1897 or 1898—I recall, for instance, a case of a woman

having an attack of smallpox which later became almost confluent; she was stated to have sat for a long time in an out-patient department of a hospital awaiting examination. The rash was then well out, and the patient thoroughly infectious; there must have been many people in contact with her before her illness was recognised. As a consequence, a small outbreak might have been apprehended, and it would seem that in any case secondary cases were inevitable; but no secondary cases occurred, or at any rate came to knowledge, except that of the patient's husband.

On the other hand, there are recorded cases whose progress, from shop to shop or from street to street, has been marked and traced by a perfect trail of secondary cases to which they have given rise. This high degree of infectivity is apt to proceed from severe or hæmorrhagic cases. Similar instances of this kind of contrast will come to the minds of those who have had experience of smallpox.

The same kind of phenomenon seems to hold true of smallpox in the bulk. At the beginning of an outbreak, cases in general are apt to be more severe and to have a higher average of infectivity than those which occur during the decline of

an epidemic; then they are apt to be both benign and only slightly infectious. It seems sometimes as if the onset and rise of an epidemic were dependent on some factor other than the mere presence of combustible material and the manner in which it is distributed; smallpox seems sometimes to become epidemic, as if its spread were almost irresistible; and also to disappear of itself, although considerable numbers of susceptible persons still remain. The probability is, that, at the beginning of some outbreaks, the virus is exalted in infectivity and is of a robust type; and that later it grows less rankly and luxuriantly, so to speak; then cases are apt to be benign and of low striking power, and an outbreak tends to die out of itself.

A word now on the time when an individual case begins to be infectious. My own experience is that smallpox is not infectious before a rash comes out. But this should be added. Hæmorrhagic cases are often the most highly infectious of all, and they can certainly infect before the true rash appears. But I do not recall any case of smallpox from which infection spread while the skin was still unblemished in any way. Nevertheless in practice, it is often difficult to fix the time

precisely when signs of the disease show themselves on the skin; and, if there is doubt, it may be wise to regard cases as infectious, for administrative purposes, from the time when signs of illness first appear.

By way of contrast to the constancy of the incubation period which has been mentioned, is the extraordinary variability in the clinical manifestations of the disease. This is always a most important matter for the administrator to bear in mind. He must be always suspicious of stories of "influenza with spots," mysterious "blood poisonings," "suppressed measles," and so on, and also, of course, of chickenpox in adults. The elusive habits of smallpox cannot be exaggerated. I have been seeing smallpox since the year 1892, and at times in large numbers; but I still find it surprising when I see in what varied and extraordinary disguises smallpox may conceal itself. Hardly anything is more remarkable about the disease than that. Sequences of overlooked cases such as those quoted in Chapters I and II of "How to Diagnose Smallpox," or those given in many public health reports, are worth careful study.

CHAPTER III

ACTUAL DETAILS OF ADMINISTRATION

We come now to deal with an actual outbreak. A certificate of a case of smallpox lies in front of you on your table. The question is, in point of fact and detail, what are you going to do? If you are the responsible Medical Officer of Health, that is the question that you must answer. If you are going to succeed, you have to be ready with the answer, to act instantly and to overlook nothing.

The main indications are three. You have to ascertain exactly what is the extent of the existing mischief, and how it originated; you have to eradicate what does exist; and you have to prevent fresh cases, or render them harmless as they occur. Those are the three main principles; they overlap and depend on each other; they cannot be separated in practice; but it is useful to consider them

separately at the beginning, and also afterwards when you are reviewing the position.

Coming to details, the first is that such a matter must take priority over every other which you may have in hand. It requires instant attention. Promptitude is the essence of success. It also requires close personal attention. It is of little use to give general directions, or to leave their supervision to others. You require to have full reports and knowledge of all the details, and, according to the circumstances of the case, personally to settle or be aware of all the steps that are being taken.

In the absence of any other communication from the practitioner who has certified the case, you must act instantly on the certificate, and set your preventive machinery in motion at once. The patient must be "telephoned away," that is, arrangements must at once be made for an ambulance to call at the house and remove the patient to hospital. At the same time you should send an inspector to the patient's house, to represent you on the spot, with instructions to prevent any person or article entering or leaving the infected premises, and also to inquire into

and report upon the origin and extent of the mischief.

You must get into communication with the certifier as soon as possible, and learn all about the case from him. The probability is that he has valuable additional information about which you should know. One important point that must occupy your attention early is the verification of the diagnosis. Until you can satisfy yourself that the case is not smallpox, your preventive measures ought to go ahead without delay, on the strength of the original certificate. But it is well to bear in mind that in epidemic times, when the proportion of correct diagnoses is at its maximum, the cases certified in error in London have been found to be 10 or 12 per cent., and in non-epidemic times to be as high as 80 per cent. So that it is advisable to take the first opportunity of verifying the diagnosis.

Let us assume that the case is genuine smallpox, and that the result of your inquiries is to disclose some such tale as the following. All the details of the story will not be obtainable at first, but for our present

purpose it is well to have a complete account to work upon, and therefore the following instance is given. For the details I am indebted to Dr. Sidney Davies, the Medical Officer of Health of Woolwich, in whose annual report for 1912 an account of the case is given. It is an instance of a district, hitherto free from smallpox, being invaded by a single case, and is, therefore, a simple case to consider. Subsequently, on p. 71, we shall consider an outbreak which was much more complicated. The facts in this first case turned out to be as follow :—

A man was shipwrecked on the coast of Africa. He spent Christmas Day in Tangier and slept in quarters which were very dirty. He took ship to England, and arrived at his home to all appearance well. That was on a Saturday. On the Monday following he was taken with vomiting, pains, and other accompaniments of the onset of an acute fever. He attributed his attack to a return of a fever from which he had previously suffered in the East. He took to his bed on the Monday. On the Tuesday an erythematous rash came out on his arms. This was an initial rash of smallpox. It

appears to have passed off rapidly. Medical advice was not sought at this stage. The papular rash was out on the following Thursday. The next day, Friday, the patient felt better, but was disturbed about the rash, which he could not ignore. Accordingly he went to a surgery, and took advice. The nature of the disease was not recognised. He returned home that same Friday morning and went to bed. He did not get up again, and died on the Monday, the octave of the day on which he fell ill, from confluent smallpox. The case was recognised to be smallpox on the previous day, the Sunday.

It is worth while for a student to take a case like this, and, for the sake of the instruction to be gained from the exercise, to set down in writing what he actually would do.

Supposing that some such story is what you have received over the telephone. One of your first steps, if you have not already attended to it, is at once to get facilities on to the spot for the vaccination of contacts, to send an urgent message to the Vaccination Officer, if that be necessary, and to ask that the Public Vaccinator should meet you. In some places the machinery

of vaccination may be outside your control, and one of your most important colleagues may be responsible to an authority entirely different from that which you serve. It may be necessary for you to communicate with the lay officer of the corresponding Board of Guardians, namely the Vaccination Officer, who in turn may have to communicate with the medical officer concerned, namely the Public Vaccinator, and this may give rise to delay. It is well, by previous arrangement and consultation, to accelerate this process as much as possible.

The time when vaccination is most likely to be accepted, and the time when it is most likely to be beneficial to contacts with the case, is the time of the removal of the patient. Delay in this matter is apt to be disastrous. It is true that vaccination, if efficiently done at any time within the first three days of exposure to infection, will secure the vaccinated from attack. But procrastination is easy, and is apt to be fatal. Contacts may change their minds, evade notice, and escape altogether. In consequence it may happen that a little focus of infection, which, by appropriate measures, could easily have been

localised and rounded in, may spread without the possibility of being watched, and a little outbreak may grow into a serious conflagration. To be able at once to render immune all the contacts with any given case is often to stop the whole outbreak. Therefore get vaccination facilities on to the ground instantly, if possible.

The matter has its personal aspect, too, from the point of view of the individual contact. So often people will be "done to-morrow"; and too late they find delay has been costly. It may be, of course, that contacts may not take the disease at all, or may take it only in a mild form; no one can prophesy. But no one, who has seen valuable lives trifled with and thrown away, can deal with a subject of this kind lightly. The delay which is pleaded for may seem to be a small thing at the time, but will not seem so when a life has been sacrificed because of a delay of a few hours. I have a vivid recollection of seeing a young fellow with smallpox, who had been vaccinated during his incubation period. The vaccination had taken well, but it had been done too late. He had hæmorrhagic smallpox. A few hours' delay had

cost his life. Smallpox had got the necessary start; had vaccination been performed a day or so earlier, it would have saved him. It is therefore a valuable practical detail to have a standing arrangement beforehand with the vaccination staff, so that when you call on them, they will be able to respond instantly.

In your conversation with the certifying practitioner, whether by telephone or personally, you will have obtained as full details as possible about the history of the cases. These will be most useful in assisting you to trace out the way in which infection has spread. It is very desirable personally to proceed to the patient's house or other centre of mischief as soon as possible. If you can get there before the patient is removed, you will be able to take your inspector's report, and to ask supplementary questions. It is specially necessary to have adequate staff on the spot when the ambulance arrives at the house and while the patient is being moved. Then is the time when leakage of infection is apt to take place. Children are apt to collect in crowds, and so are the neighbours generally. They will press close to see the patient, peer into the ambulance and

climb about it. Then is the time when clothes and other infected articles are lent to neighbours for safe keeping till the patient returns, and when similar leakage of infection occurs. Secondary cases frequently originate at such a time.

CHAPTER IV

ACTUAL DETAILS OF ADMINISTRATION—*continued.*

ONE of the principal points to which your inquiries will be directed is the date when the rash proper first appeared. It is material to get this fixed as accurately as possible. It is easy then to calculate that infection must have taken place almost exactly a fortnight before, and, with the date of the appearance of the rash as a guide, it is often possible to get patients to recall how they spent the day when infection must have taken place. Valuable information may be thus elicited.

But often it is difficult to get out the facts; for they are apt to be wilfully concealed. Sometimes patients themselves are hidden; I knew this to have happened for certain in one case. A child had had a mild attack, and had got over it comfortably. Nothing was said about it. But smallpox is

obstinate in asserting itself; another case occurred, and a vigorous search was made for the cause; but for a long time, unsuccessfully. At first a smallpox hospital was credited with spreading infection, but as it turned out, mistakenly. By a piece of masterly investigation which occupied several days, it was ascertained that a child was unaccounted for, and was in fact concealed. Eventually the child was disclosed, and by the distribution of some recent scars, and by the actual presence of seeds on the soles of the feet, was diagnosed to have had a recent attack of smallpox.

Sometimes it happens that perfectly *bonâ fide* answers are given to inquiries, but that a previous case has been unsuspected by the friends themselves. So-and-so has had a "cold." Some one else, some friend perhaps, was away from school or from work for two days. Such people should always be examined. No harm is done, if it was only a "cold" that was the matter; but in many a case it has turned out that a few recent scars on face and neck and forearms, and the dried-up seeds still present and visible beneath the hard skins of the palms and soles, have shown that the "cold" was really mild smallpox.

An exhaustive list of all contacts is required; and here it is convenient to say that a "contact" is, as the name implies, an individual who has been in contact with an undoubted case of smallpox. A "suspect" is a person who may have had nothing to do with smallpox, but from vague symptoms is suspected of having the disease, and the diagnosis is not yet settled; in an epidemic such suspects are often sent in large numbers to receiving stations and observation shelters. All the close contacts should be seen and cross-questioned, and as many as possible of those others who have been in less close contact. We shall see that the key to suppressing an outbreak is the successful handling of the contacts.

In making inquiries much depends on the circumstances of the individual case. In our example on page 19 the history was simple. The patient could be proved to have just come from abroad. On the day of infection, he was in Tangier, where smallpox is common. In all probability he had contracted it on the floor of a filthy house, where he was obliged to lodge. But sometimes it turns out that a smallpox patient has been home three weeks or more, or, instead of being an isolated

individual, has been one of a crew, or of some other party. Or perhaps it comes out that the patient has not been away at all for some time and the infection lies somewhere near home. A more thorough cross-examination and a closer examination of the contacts, is then necessary. It may then turn out that the patient whose notification you have just received, is the second, third, fourth, or even fifth generation of unrecognised smallpox in your district. In such an event you will probably have a serious outbreak to cope with.

Schools and laundries should be included in the inquiry. Special attention should be paid to the patient's occupation and workplace. Here is one case in point from the 1904 report of Dr. (now Sir George) Newman, when he was Medical Officer of Health of Finsbury. He writes: "On visiting one of these printing works in Goswell Road, we learned that S.N.P. had worked there about a fortnight before, but that all the employees were well and that there had been no illnesses. On pursuing the matter further, however, and pressing the point, six men out of some twenty employed were brought to me. After examination I found that the first was suffering from toothache and neuralgia, the second and

third from smallpox in an acute stage, the fourth was recovering from smallpox, the fifth was affected with a minor skin disease on his face, and the sixth was suffering from what might be the premonitory symptoms of smallpox." Here was a serious focus of infection which might easily have been overlooked by a less searching inquiry.

In such and other ways, an effort should be made to track out every possible ramification of any previous and of any existing mischief. Appropriate measures can then be taken to check its spread, and to keep a watchful eye on those who have been exposed to infection. It may be that you will find reason to think that the case immediately under notice is by no means the first of a series of cases; if this be so, and if there be any evidence pointing to the infection not having been closely localised, a house-to-house call may very usefully be made in the suspected neighbourhood, or throughout the tenements on the staircase or block of buildings, if such be the site of the outbreak. In this way there may be found other cases with the rash still out or showing traces of having had it. In any case the neighbours will be put on the alert and should be

asked to communicate news of any suspicious cases.

It is a most useful plan to have a card register in your office on which a form is printed showing the name, age, sex, address of the patient, nature of home premises, of work, and of work premises; by whom certified, with date; the date when the rash appeared; condition as to vaccination and re-vaccination; also blank spaces left opposite such headings as laundry, school, source of infection, recent movements of patient; names and addresses of contacts; and other desirable points. When making inquiries, you and your assistants can take blanks of this card with you, and use them as memorisers, so that as many as possible of the necessary questions may be answered and the information gathered. It is annoying to return from an investigation and find that some important item has been overlooked.

It is also very useful to keep in close touch with the staff of the hospital where the patients are being treated. Most valuable information may be obtained by the medical and the nursing staff. The hospital should be in direct telephonic

communication with the administrative head who is controlling the outbreak.

It goes without saying that the inquiries in each case must vary according to the individual circumstances and be guided by them. The main indication is clear, namely to expose and thoroughly to understand every ramification of the infection.

CHAPTER V

THE INTELLIGENCE DEPARTMENT

WE assume now that the first of the main indications mentioned on p. 16 has been fulfilled; namely, that the extent of the mischief has been ascertained.

It will be convenient in this place to devote a few words to the discussion of a very important matter, namely the intelligence department. There is no need to labour its importance, especially if it has happened that some cases have been overlooked, and you are called on to repair the mischief that has resulted.

Nothing is more vital to successful control than full and early information of the mischief that threatens; or, as it may be put conversely, an outbreak, like a fire, which has once got a good hold is vastly more difficult to suppress.

However obvious such truisms may be, they are often neglected in practice. A variety of causes may contribute to the responsible officer being left in ignorance of the occurrence of a case of smallpox. It may not be suspected; it may not be recognised; it may be forgotten that it is a matter for his notice; it may be wilfully concealed. These are vital matters which, for the most part, must be met in advance and adjusted.

A careful watch must be kept upon the state of health of neighbouring districts and countries. Endeavour should be made to keep in touch with neighbouring authorities, so as to get warning of the occurrence of any cases. Generally speaking, no source of information should be neglected, whether it is from the Press, or from anonymous information, or gossip, or elsewhere. It is not very uncommon to hear rumours of cases, such as "hæmorrhagic chickenpox," "influenza with spots," "German measles and blood-poisoning," or "blood-poisoning with spots." Such rumours should be followed up and verified.

An instructive commentary on this subject occurs in the Annual Report, for the year 1880, p. 38, of the late Dr. T. Orme Dudfield, when

Medical Officer of Health of the Parish of St. Mary Abbot, Kensington. That was, of course, before the notification of infectious diseases became compulsory (1889).

"A difficulty with which we have to contend is the want of information of the occurrence of illness—information that would be of the greatest value, particularly at the commencement of an epidemic, when the first cases are often mild, and, therefore, not fatal."

Dr. Orme Dudfield enumerates the following as his sources of information :—

1. Notice of every death from graver infectious diseases within a few hours after registration. This by virtue of an arrangement with the sub-district registrars.

2. Relieving Officers were directed by the Guardians to report all cases of infectious diseases.

3. The Resident Medical Officer of the Infirmary and of two general hospitals gave similar information.

4. General medical practitioners similarly.

5. School officers similarly.

6. Clergymen and district visitors.

Facilities for obtaining information have been much improved since the year 1880, principally by the statutory obligation for every medical practitioner or head of a family to report cases of infectious disease. Nevertheless, the above list is useful as suggesting persons who may be encouraged to be on the look out and mention any suspicious cases. Especially in the case of schools, the medical administration of which has developed so much in recent years, medical officers, nurses, teachers, attendance officers, and others can render valuable assistance. So also can heads of large institutions and of business premises.

If smallpox has already broken out, or if contacts of cases have recently come into the district, an intimation may very usefully be made to professional colleagues in private practice in the district. "Missed" cases, which often play such a conspicuous part in the spread of smallpox, are likely to occur from the possibility of smallpox not having been present to the mind of the medical attendant. It may be the saving of the whole situation if he has been recently thinking of smallpox, or had it suggested

to him. There is no need to raise a scare or alarm. A warning can be conveyed without doing that.

As to what other people should also be warned, the circumstances of each place and time are the best guide. What you want to secure is the intelligent co-operation of every one, both of those within your administrative influence, and of others as well. In a quiet time, while no smallpox is about, inspectoral and other staff can do valuable service by being constantly on the look out for smallpox in the area of their work, in the press, or elsewhere. Every sanitary inspector should always have the question in mind, Might that be smallpox? Not so much in reference to any individual that he may see, but rather about some story or incident of which he may hear. He should take care to report any suspicious circumstances to his chief. Similarly, newspaper accounts of smallpox occurring within fourteen days' journey should always be reported to you; indeed, it is useful to have a note of smallpox occurring in no matter what part of the world. It is well to keep in communication with any centre that may be better informed

than you are, and arrange, if possible, to have regular reports forwarded at, say, weekly intervals. In whatever way obtained, it is of vital importance to have immediate, accurate, and full information of everything concerning smallpox in or affecting your district.

Then comes the matter of specially dealing with chickenpox. Chickenpox may be added to the list of diseases which are compulsorily notifiable. The local authority may look to you for guidance in the matter.

It is dealt with in the following passage from the Report, for the year 1902, p. 29, of Sir Shirley Murphy, the late Medical Officer of Health of the Administrative County of London :—

"Medical Officers of Health express different opinions as to the value of notification of chickenpox in bringing to their knowledge cases of smallpox which would otherwise have remained unknown to them. Some are of opinion that it was not of practical value; on the other hand, Dr. Bate, the Medical Officer of Health of Bethnal Green, states that sixteen persons, who were reported to have chickenpox, were found on examination to be suffering from smallpox, and he adds that 'undoubtedly

these persons would have remained at home distributing infection had chickenpox not been reportable.' In Hackney, twenty-two cases of smallpox were mistaken for chickenpox, and Dr. Warry, the Medical Officer of Health, states that notification of chickenpox was a measure of great value. A smaller number of such cases is also reported by some other Medical Officers of Health as occurring in their districts. Thus, there were two cases in Paddington, three cases in Woolwich, three cases in Finsbury, as well as two cases in Wandsworth, which would not otherwise have become known. From returns furnished by medical officers of health, relating to some 4000 cases, it is recorded in more than 100 instances that infection was traceable to a previous case, erroneously regarded as chickenpox. The use of the notification of chickenpox cannot, however, be fully estimated by such occurrences, for not the least of its value must undoubtedly have been the direction of public attention to the possibility that cases of smallpox might be mistaken for chickenpox, and to the need for more critical examination of all persons suffering from eruptions presenting the appearance of chickenpox."

Whether this particular step be taken or not, and whatever be its merits, there is great advantage in having special inquiry made about every case of chickenpox in an adult.

The sum of the matter is this, if you are to succeed in averting an outbreak, to have early and full information is imperative. As it is well put in a passage which stands at the head of the Public Health Reports of the United States Public Health Service: "No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring."

CHAPTER VI

OTHER PRACTICAL DETAILS OF SMALLPOX CONTROL

WE will now turn to some other matters. Having discovered what the actual extent of the infection is, it is your business instantly to clear it out or to destroy it. We have said that one of the first points to be attended to, as soon as the news of a case comes in, "is to telephone the case away," that is, to have an ambulance summoned by telephone in order to remove the patient to hospital. I do not propose on the present occasion to discuss the details of hospitals and the methods of isolation, except to say this, that, in preventing the spread of infection from hospitals, much the most effective policy is to get and keep a trustworthy and intelligent staff. The wise plan is to keep such staff together during inter-epidemic periods, for they cannot be brought into existence at a moment's notice. It is much more effective to explain your views to such staff, and, while laying down

comprehensive rules, to rely upon their intelligence in giving effect to them in circumstances that must necessarily vary, than to attempt to prevent the leakage of infection merely by the institution of a series of cast-iron rules, with the instruction that they must be rigidly adhered to. Success in the prevention of leakage of infection from hospital depends on the intelligent and loyal interpretation of well-understood principles.

Sometimes difficulty is experienced in getting a patient isolated in hospital, owing to his refusal to leave his home. There should be no difficulty in dealing with this. It is seldom possible for adequate isolation of smallpox to be secured at home. Application for an order for removal should be made to a magistrate and representation made of the impossibility of home isolation and the risk to the public thereby involved. Smallpox is still held in such horror by public opinion, and justly so, that an order for removal is usually obtainable.

There is one proviso to this proceeding. It is that every possible precaution should be taken to verify the diagnosis before application is made for forcible removal of the patient. I recollect a case

which several circumstances combined to complicate. Removal of a case of certified smallpox from the home was refused, a magistrate's order was obtained, and carried out. So far so good. But the diagnosis was subsequently upset in favour of chickenpox, and the patient's friends were litigious. Actions for damages followed. In case you should ever be placed in a similar position of difficulty, the main point to remember is to take every possible care in the examination and verification of the case. If you examine the case thoroughly yourself, or obtain the best other advice that is available, you will be able to show that every possible care and skill had been brought to bear, and to repel criticism accordingly.

Having had the living part of the infection segregated and isolated where it can do no harm, your attention will be given to destroying the infection of the inanimate objects. Of course, if you have ample vans at command, and ample steam disinfectors, your task is greatly simplified. Otherwise there is nothing like a good bonfire, and the liberal use of soap and water. The first may be expensive. But it is in the nature of a smallpox epidemic to be expensive.

As to the second, to aim at absolute cleanliness is a great point in disinfection. Again in this matter, you will be most successful if you can bring an intelligent staff to bear. You may have never such a complete set of rules and regulations, but circumstances must continually arise to which they do not exactly apply; and also unintelligent persons will have many opportunities of carrying them out in the letter and not in the spirit. Speaking from a fairly wide experience of the niceties of disinfection, I can say that the same set of circumstances seldom recurs. Each case must be taken on its merits. General rules can be laid down, but their interpretation must depend on the staff; more important points being referred to and settled only by the medical officer in charge. So much for disinfection.

There is one other matter of much importance to the administrator, and that is the question of reporting. First of all, there are the reports which you will require from your assistants, if you are in charge. You will have to impress upon them that they must keep you informed, and promptly informed, of everything. They are to see and hear and act for you; they are your

agents, for the reason that you cannot yourself be everywhere at once; and, until they are sure that you are fully informed of their proceedings, their work is only half done. It is for you to settle how their reports can be made most conveniently to yourself, and for them to make a point of carrying out your wishes. It is with them that the responsibility rests for getting reports forward. Any delay in information reaching you reflects on the person or persons with whom it sticks. Efficient reporting is one of the main tests of capable staff.

Then there are the reports which you have to make to the Authority concerned, and also those for the records. Making these is often a great difficulty and a great strain, which may not be understood by those who have not been through an outbreak. I have a vivid recollection of the stress of a spell of work, when a heavy epidemic broke out with full force. It was winter, and for most of the twenty-four hours darkness and fog prevailed. From the first thing every morning we worked throughout the day, never sitting down except to a broken meal, and having no relaxation of any kind. Sundays

and other holidays made little difference. The work went on right through the day, till 10 p.m. or midnight or later. Every day was just the same; we worked while we were awake, and when we stopped we fell asleep. In these circumstances the heaviest burden of all was the reporting. The day's work done, say at midnight, reports had to be cleared up, and required several hours' more work.

Of course full reports will be required. The clerical work and clinical records are a matter of organisation which cannot be followed out here in detail. But it may be said that the greatest economy and the easiest plan in the end, is to keep them up-to-date, day by day. The same applies to reports of the general progress of an epidemic. If possible, a shorthand note should be given, every day, of the stage to which matters have advanced. At given intervals, every week or fortnight, what is irrelevant at that particular stage can be omitted, and the remainder of the report is ready and can be submitted. That is a great relief to overworked officers, and provides accurate information for record.

One further matter requires mention, in

connection with reporting. Your Authority will not only want information as to the origin and extent of the outbreak, but advice and recommendation as to how it is to be met. In recommending remedial measures, vaccination and so forth, it is imperative first of all to point out what is the existing mischief, the number of cases, of deaths, the damage to business, the probable spread, and so on. That must be very clearly demonstrated. The position then makes itself clear. That is, that smallpox is an actual fact, that there is so much risk of it spreading, of involving more lives, more loss of business, and creating a greater scare. The point is that an outbreak is here, and how can it be stopped? The answer is that what has to be done is to check it and stop it by every available and possible means. Any recommendation is then not a question of professional predilection or personal preference.

CHAPTER VII

THE OBSERVATION OF CONTACTS

WE pass now to the third of the general indications on p. 16; that includes the observation of contacts. This is often the most irksome and difficult part of controlling a smallpox outbreak; and it is one of the most important. It is a duty which the disuse of vaccination increases enormously in importance; and we will consider it in detail.

Let us consider first the comparatively simple example which has been given on p. 19. In such a case what contacts are there? The period to be considered is that between the time when the patient's skin first showed any sign of rash and the time of his removal from his house. Our object is to obtain a list of all the persons with whom he came in contact during this time. For this purpose, his movements must be

reconstructed in detail; patience and time are required to effect this. It is surprising, even when a patient's movements have been related in the most honest way possible, how some forgotten contact may make an appearance later, and perhaps be the cause of much mischief.

However, in the case in point, the contacts fall into three categories. There are

1. The other people residing in the house.
2. Those who came to visit the patient.
3. Those whom he met outside his own house.

All these people have to be listed, seen, warned, offered vaccination, and kept under medical observation, with the view of being instantly dealt with at the first sign of illness; if necessary, isolated for observation, or removed to hospital. In this manner fresh centres of infection are ascertained and eradicated, before they have had time to do any harm. Special observation is necessary during the time when the rash may be expected. This day can usually be predicted with some exactness, if the exposure is certain and single. But very often that cannot be known, and consequently careful supervision is necessary over the whole of the period of observation; that is, for

at least a fortnight subsequent to the last possible date of contact; it may be advisable to extend this period to 16 or 17 days. It is important for the patient to be under *medical* observation. The exact degree of medical observation required must be determined by the circumstances of each case, and should depend upon how the object in view may most effectually be achieved. As a rule, however, contacts should be inspected daily at least.

Objection may be made to the expense of extra medical assistance. Epidemics must necessarily be expensive. It is a more effective policy and cheaper in the end to put on sufficient medical assistance to keep contacts under daily medical observation. Otherwise cases may be missed, and, by forming fresh foci of infection, may enable an outbreak to keep smouldering on for weeks and months. In any case a contact should be seen by a doctor daily during the days when the onset of his illness may reasonably be expected. Unless this is done, a slight case may easily be missed. For it is likely enough that persons, who are left to report their own health or that of a family, may disregard—whether intentionally or

not—both the initial symptoms, as well as the rash of a slight attack.

The following description of how contacts were observed in London during the year 1902, when about 8,000 cases of smallpox occurred in London, is extracted from the report for that year of the Medical Officer of Health of the Administrative County of London.

"The system of keeping under observation persons who had been exposed to infection was largely adopted during the epidemic. This, indeed, was a course followed in every district, and early in 1902 the Council's Public Health Department was utilised for immediate daily distribution to every Medical Officer of Health in London of particulars as to cases of smallpox occurring, and also of the addresses of persons who had been exposed to infection, this information being transmitted by Medical Officers of Health for this purpose. In this way Medical Officers of Health obtained information of the addresses of persons residing in their districts who had been exposed to infection in other districts, and such 'contacts' were able to be visited, offered vaccination, and removed to hospital in an early stage of

the disease if they subsequently sickened with smallpox.

"It was a frequent practice, especially in the early part of the epidemic, to endeavour to limit the extension of disease by informing employers whenever any of their staff were found to have been living in a house in which a case of smallpox occurred. The result was, in many cases, that the employee was suspended from work, and where no allowance was made for his maintenance or that of his family by his employers, or by the sanitary authority, hardship was often suffered. Dr. Warry gives his experience in Hackney of this procedure. 'The result, in the majority of cases, was that many persons were reduced to the brink of starvation, for a large number, although in great want, would not apply for parish relief; and, as a matter of fact, the Guardians' officials did not like persons coming from infected houses and applying for relief, neither did they like visiting the unfortunate contacts in their houses.' Nor does the result of such action always appear to have been of sufficient value to compensate for the disturbance of wage earning. Dr. Harris, Medical Officer of Health of Islington, found that 'these employees were thrown

on their own resources to fill in their time, and, although they might stay at home for a few days, they would then generally go into the streets, loiter at the hall doors, or find their way to the nearest public-house.'

"Question, therefore, arose in a number of districts whether steps should be taken to prevent the extension of disease by inducing the inmates of infected houses to remain within doors, a course which involved the abandonment of work and wage earning, and the maintenance of the household at the cost of the rates. In February, 1902, the Local Government Board addressed a circular letter to London sanitary authorities on the question of the quarantining of persons living in dwellings invaded by smallpox. The letter stated that the Board 'are advised that under ordinary circumstances the quarantining at their homes of inmates of such dwellings is not necessary in such districts in which sanitary matters are properly administered and vaccination and re-vaccination are properly carried out. If, on a dwelling becoming invaded by smallpox the actual patients are at once removed to hospital, the dwelling and all articles in it that have been exposed to infection, including the clothes

worn by the other inmates are properly disinfected, and the other inmates of the house are immediately vaccinated or re-vaccinated (as the case may be), there is no material advantage to be gained by keeping these other inmates at home. They are not likely to infect other people unless they themselves develop smallpox ; and all that is required is to keep such persons under medical observation for a fortnight, and particularly to examine them carefully day by day towards the end of the second week from their exposure to infection, in order to ascertain whether any of them are developing smallpox. If none of them do so by the beginning of the third week from exposure, the re-vaccination (or vaccination) to which they were submitted on the occurrence of the first case in the invaded house should secure them from attack by the disease. The Board considers that in ordinary circumstances the course of action indicated above is the correct one. Occasions, however, may arise in which additional precautions may be necessary, as, for example, when laundries are in question, or where the business or habits of the members of the invaded house are such as to make it difficult for medical observation of them to be maintained. In exceptional

cases of this kind, in which the Council are advised by their medical officer of health that in the special circumstances it is essential that the inmates should remain in their own houses, the Board would be prepared to sanction a reasonable expenditure in securing such a result.'

"The impractibility of the wholesale quarantining of all persons exposed to infection when smallpox is widely distributed, is, of course, obvious. The actual number of such persons during the recent epidemic cannot be shown, but some idea of the magnitude of this number can be formed by reference to the annual reports of a few of the medical officers of health.

"Thus, in Westminster, where there were 301 cases of smallpox, there were 2,677 persons living in houses in which cases of smallpox occurred and there were 3,108 additional 'contacts' who had otherwise been exposed to smallpox by visiting persons suffering from the disease, or working with such persons, or in other ways . . . In four districts there were 1,093 cases of smallpox and 13,259 contacts."

These figures show that there were from twelve to thirteen contacts for every case of smallpox.

It is a rough but useful rule to bear in mind, that for every case of smallpox there may be, on an average, not less than ten contacts.

A special department of the supervision of contacts is that concerned with the observation of common lodging-houses; that is fully dealt with in the following passage on page 35 of the Report quoted above.

"The Council's administration aimed at the early detection of cases of smallpox in common lodging-houses with a view to their removal. For this purpose the houses were kept under close inspection, especial attention being given to houses in which a case of smallpox was known to have occurred. In such houses systematic inspection was made of the inmates, the houses being visited in the early morning, when the lodgers were most likely to be within doors, by officers who, for this purpose, were relieved of other inspectoral duties. Effort was made to induce lodgers, who had been living in houses in which smallpox had appeared, to continue to reside in such houses so as to prevent the infection of other houses which would result if they were to remove while incubating the disease.

"With a view to insuring, as far as possible, the continued residence of such lodgers where they could be kept under observation, the inducement of a free bed and, when necessary, of small sums of money for the purchase of food was offered to them, and this was done with much success. The money thus expended by the Council during the whole of the epidemic amounted to £35. The keepers of common lodging-houses, who co-operated largely with the Council in this matter, were able to learn when particular lodgers, who had been indicated to them by the Council's officers, were likely to leave their houses, and thus, without any general offer of bed and money to the lodgers as a whole, which would have involved a large expenditure, by dealing with particular persons the officers were able to secure the object in view at trifling cost.

"Lodgers who had been especially associated with any person attacked by smallpox were in their sleeping arrangements kept together in a particular room. Persons showing any ailment which raised suspicion of smallpox were, as far as practicable, kept from other lodgers and from the population outside, until it was

possible to determine the nature of their malady. It was, of course, impracticable when numerous houses were invaded, to proceed in the same way as in the beginning of the outbreak, when the Council rented the common lodging-house, 8 and 9, Parker Street, Drury Lane, and maintained the whole of the inmates, keeping them in quarantine; but much was done by the early detection of cases of smallpox to prevent the continued residence of infectious persons in these houses. Moreover, the Council obtained the sanction of numerous Boards of Guardians for the Poor Law medical officer to examine, without previous order of the relieving officer, the inmates of common lodging-houses whose condition created suspicion of smallpox, and in certain localities where the common lodging-house population was much involved the Council appointed medical men to examine the inmates at a time in the morning before they left the house so as to ensure the early detection and removal of infectious persons.

"It is difficult to estimate the extent to which this procedure limited the spread of smallpox in this class of the population, although

there cannot be doubt that it was of considerable value. The inmates of common lodging-houses do not appear to have been specially susceptible to smallpox; indeed, the results of inquiries made by the Council's officers showed that a considerable proportion had been re-vaccinated or had previously suffered from smallpox. Even, however, allowing for this, the attack rate, which was only about three per cent. of the population residing in these houses, must be regarded as low, when the frequency of invasions of common lodging-houses, and the condition of aggregation in which the inmates live, is considered.

"When a common lodging-house was involved to the extent of several lodgers being attacked, only the vaccination of the inmates on a large scale can be pointed to as at once bringing the outbreak to an end; but the speedy detection and removal of infectious cases must have limited the exposure of other inmates to infection, and reduced the number of cases which otherwise would have occurred among persons associating with the lodgers, whether within or outside the lodging-house. As a rule, comparatively little success attended efforts to induce the inmates of common

lodging-houses to submit to vaccination. The Council exhibited a notice in all common lodging-houses advising the inmates to seek this means of protection against smallpox, and the Council's officers exercised such influence as they had over the lodgers, but the only inducement which was successful on a large scale was the course adopted in a few instances by the sanitary authority, viz. the offer of a small sum of money which would enable the lodger to live for a few days without work if the effect of the vaccination was such as to prevent him from following his employment."

CHAPTER VIII

VACCINATION

THERE are various points regarding vaccination which require to be mentioned.

First, as to the efficacy of recent and successful vaccination, a matter upon which I have known doubt expressed even by medical practitioners themselves. Any one who is recently and successfully vaccinated cannot, by any loss of health, by any degree of exposure, or by any possibility of any kind at all, contract smallpox. There is not the slightest risk. If it were possible to conceive of a recently and successfully vaccinated millionaire, who wanted to have experience of the disease in his own body, all his millions could not possibly gratify his wish.

If a word of advice may be suggested to a young Medical Officer of Health, it would be this, to be drawn into no dispute or discussion

on the "vaccination question." An inquirer is entitled to his opinion, and you are entitled to yours. Let it rest at that. It may be different when your opinion and your reasons therefor are required by the Authority who retains your professional services. Then of course your advice should be fully given and stated with due firmness. Yours is the advice; the responsibility of the ultimate decision rests with the Authority who employs and consults you.

In the matter of giving reasons to those whose right or wish is to be informed, I have found two items from my own experience to carry weight; they may be worth mentioning here. They have the advantage, which is no slight one in discussing vaccination, of being observations in the actual field. The first is this.

It is the practice at the London Smallpox Hospitals, when a patient is dangerously ill, to inform the near relatives that their visiting would be allowed in the special circumstances. Such visitors are warned of the risk which they run of contracting the disease, are instructed to take suitable precautions, and are offered vaccination for their own protection. Not a few refuse

the offer, and proceed in charge of a nurse to visit their sick friends. It has not infrequently happened that such visitors have returned to the hospital about a fortnight later, themselves suffering from smallpox. But the nurses who have accompanied them, and were equally exposed, have escaped. There has thus been carried on, as it were, a series of experiments, in each case of which two persons have been exposed to infection. On some occasions both nurse and visitor have escaped. On other occasions the visitor has sickened and the nurse has escaped. It has never happened that the visitor has escaped and the nurse has sickened, or that both have sickened. An independent inquirer would be struck by such a series of phenomena and would cast about for an explanation. He would find that the only factor common to all the occurrences was that the nurses were recently and successfully vaccinated, and that the visitors were not so conditioned.

The second item is this. During the 1901–1902 epidemic, when about 10,000 patients passed through my hands at the London Receiving Station, I saw a considerable number of mothers who themselves had smallpox, and had infants at

the breast who were entirely free from the disease. The mother, when apart from the infant, had been exposed to infection and taken it, and had gone on nursing her infant until the rash of smallpox came out. Although these infants were then exposed to infection with extreme thoroughness, and it would seem inevitable for them to take smallpox, in point of fact a number of them never took it. Those who did not take it, differed from those who did, in having been successfully vaccinated within three days of exposure to infection.

Questions may often arise about the necessity of renewing and bringing vaccination up to date. The fact is that protection conferred by vaccination wears out after a lapse of time which is uncertain and varies with each individual. No one can say, for any given individual, what the length of that lapse of time may be. Re-vaccination may be effective for a period of 20 years. Primary vaccination does not confer immunity for so long a period as this.

To a person who is in doubt, or who is unwilling to be re-vaccinated, the risk may be clearly stated, and the matter, so far as the operation is concerned, may be fairly put in this way. If

vaccination takes well, it shows how much it was required and what a risk was run; the illness actually experienced is nothing to the attack which would have been experienced had the infection of smallpox been taken; on the other hand, if immunity already exists, the operation means a scratch and nothing more.

There is great need for medical terminology to provide a word which should signify "efficiently and recently protected by vaccination," and should have the meaning, as regards vaccination, of the word "salted" or "immunised." The necessity of some such word is often felt. "Vaccinated" is necessarily a word of vague meaning. All that it means is that the operation of vaccination has been done; it may be one year or fifty years ago.

The question may be asked: Up to what day in the incubation period may vaccination be performed so that security results to the vaccinated person? The experience gained from the infants alluded to on p. 62 is instructive on this point. What was noted at the bedside was this. If vaccination was successful and ran a normal course, and if on the eleventh day of successful vaccination the infant's skin was otherwise

unblemished, that is, if there was no trace of smallpox rash, and the infant was otherwise in normal health, smallpox never afterwards supervened. That meant that vaccination, if it was to protect the patient, must have been performed within the first three days of the incubation period. When performed on the fourth day, it did not avert the attack, though it modified it. It is therefore very desirable to get contacts vaccinated or re-vaccinated without the slightest delay.

Since the above passage was written, my attention was drawn to the following passage from the pen of Mr. Marson. Mr. Marson was resident Medical Officer of Highgate Smallpox Hospital for many years. He wrote in Reynolds' "System of Medicine": "Suppose an unvaccinated person to inhale the germ of variola on a Monday, if he be vaccinated as late as the following Wednesday the vaccination will be in time to prevent smallpox being developed; if it be put off until Thursday, the smallpox will appear, but will be modified; if the vaccination be delayed until Friday, it will be of no use, it will not have time to reach the stage of areola, the

index of safety, before the illness of smallpox begins; this we have seen over and over again, and know it to be the exact state of the question. Re-vaccination will have effect two days later than will vaccination that is performed for the first time, because re-vaccination cases reach the stage of areola two or three days sooner than in those persons vaccinated for the first time."

I was interested to find that my observations corresponded so nearly with those of Dr. Marson. I am not in a position, however, to corroborate his note about re-vaccination running a two days' shorter course to maturity than primary vaccination.

The possibility of vaccination running a course longer than the normal should also be borne in mind. I have seen this happen when vaccination is performed upon persons who are suffering from some pre-existing condition of ill-health, such as obtains in a marasmic infant, for instance, or in a debilitated old man; vaccination may then take a period considerably longer than usual to complete its course.

An important matter, in connection with

vaccination, is the protection of staff engaged in smallpox duty. At the beginning of epidemics smallpox may be contracted by staff who may have been vaccinated, but whose vaccination has not been brought up to date. The sound rule in this connection is that in force at the Smallpox Hospitals of the Metropolitan Asylums Board. The rule is to re-vaccinate every applicant for smallpox duty, unless he or she can show a pigmented foveated scar indicating recent and successful vaccination. If the first operation is not successful, it is twice repeated with a strain of lymph known to be potent.

On any threatening or alarm of smallpox, one of the things that a medical administrator has to see to is that the state of vaccination of his staff is up to date. This must be closely attended to. Many excuses and pleas may be put forward to avoid re-vaccination. They are not to be regarded if accidents are to be avoided. Staff should not be allowed to proceed on smallpox duty unless their condition as to vaccination is satisfactory to the responsible officer. Accidents are apt to occur from reliance being placed upon second-hand instead of first-hand

evidence of vaccination. That is to say, staff assert that they had bad arms on such and such a date, or quote some one else's opinion or bring a medical certificate. If they can show evidence of recent and successful vaccination, *i.e.* by means of a foveated and pigmented scar—both conditions must be present—they may be passed; or if they bring a certificate of successful vaccination, at a recent date, from a physician whose skill as a vaccinator is well known, they may be passed. Otherwise they should be re-vaccinated. To allow persons to be exposed to smallpox about whose protection there is any doubt is to incur grave responsibility.

The same remarks apply to visitors, workmen, tradesmen, contractors' men and others who may be occasionally near or about smallpox cases. Each case must be taken on its merits and submitted to the medical officer who is responsible for their safety. It is for him to decide if vaccination is necessary. He should take no risks in the matter, no matter what pressure is brought to bear. If accidents occur, the responsibility is his and his alone, a matter not always borne in mind by persons who may bring pressure. It is of no

avail for a visitor to say, "Oh, I am not afraid of infection." If he contracts smallpox and proper precautions have not been taken, it is on the medical officer that the blame will fall, and it is for him to take appropriate measures.

CHAPTER IX

AN EXAMPLE OF A COMPLICATED OUTBREAK AND HOW IT WAS HANDLED

WE pass now to consider the handling of an outbreak of a complicated nature. For the following account I am indebted to Dr. D. L. Thomas, the Medical Officer of Health of Stepney. See his Annual Report of the year 1911, p. 13. The problem with which he was confronted was that presented by the occurrence of three cases of smallpox in a ward of a Poor Law Infirmary. Inquiry showed very soon that the mischief was more extensive than had at first sight appeared, and that there was a most serious centre of infection. The events are quoted in some detail to show by what methods such an outbreak may be successfully handled. For the sake of convenience the story is here given, not

as it at first sight appeared, but as it was finally unravelled.

A. L., a girl of twelve, living at home, fell ill on January 28th, 1911, and sought advice at a Hospital Out-patient Department. She then had no rash. She went again to the Out-patient Department on February 4th and 5th, 1911, that is, eight days later. Chickenpox was diagnosed, and the patient was sent home. From home she was removed to the Poor Law Infirmary on the same day, being admitted to one of the women's wards containing sixty women and children. There she remained in the open ward till February 20th, that is, fifteen days later. By that time two of the infirmary patients developed the symptoms of an acute fever. They were examined and certified to have smallpox. Attention was thus called to the patient who had been believed to have chickenpox. She was now diagnosed to have smallpox. All three were removed to the Smallpox Hospital. That was on the night of February 20–21st.

At this point the Medical Officer of Health came on the scene, having had notified to him the certificates of these three patients. On the next day, viz. February 21st, two other patients

from the same ward were certified to be suffering from smallpox; also an Infirmary scrubber living outside in her own home; also S. L., aged eleven, a sister of A. L. the original case.

On the next day, that is February 22nd, L. L., another sister of A. L., aged fifteen, was certified, and R. L., aged eight, another sister; R. L., the last-named, was found to have the smallpox rash in a late stage. She had attended hospital as an out-patient and had been to school when the rash was out. The friends of the patient, A. L., had been visiting her daily during her fifteen days' stay in the Infirmary. On this same day, February 22nd, one more patient (fatal case) from the same Infirmary ward was certified; and also a nurse who had been on duty in the ward.

On February 23rd there were certified with smallpox ten more patients (one fatal case) and one nurse; and also L. L., a brother of the original patient, A. L.

On February 24th were certified two more patients (one fatal case) and one nurse (fatal case).

On February 25th were certified five patients from the Infirmary (one fatal case), and one Infirmary visitor who was a friend of a patient.

On February 26th was certified one patient who had been discharged from the Infirmary.

On February 27th and 28th two patients on each day were certified (two fatal cases).

Up to March 2nd there were thirty-seven cases with eight deaths. About seventy cases in all occurred in this outbreak.

This brief narrative shows what a serious hold this focus of infection had obtained. Incidentally also, it is a forcible illustration of the importance of the correct diagnosis of smallpox. Its special bearing in this place, however, is to illustrate the measures which need to be taken for the supervision of contacts. We will, therefore, consider what various groups of contacts there were and how they were dealt with.

It will have been noted that the period of time, during which infection was operating unsuspected, was from January 30th to February 20th.

The principal groups of contacts were :—

1. Other inmates of the patient's home.

2. Hospital out-patients, and staff (where the patient first attended).

3. Infirmary patients (where the patient was warded).

4. Infirmary visitors.

5. Infirmary resident staff.

6. Infirmary non-resident staff.

7. School-children and staff.

8. Friends, workmates, and schoolmates of the later cases.

These groups of people the Medical Officer of Health arranged to keep under observation in the following manner:—

1. The patient's family was removed in its entirety to a Contact Shelter; disinfection was then completely carried out at the home, and the remaining members of the family were kept under observation.

2. The occasions of possible infection at the hospital were ascertained, re-vaccination of staff was carried out, the hospital authority fully apprised and due warnings given; exposed staff were kept under observation.

3. (*a*) At the Infirmary appropriate measures were taken, including examination, re-vaccination, and constant observation of patients; disinfection was attended to, and the Infirmary was placed in quarantine.

(*b*) The homes of the sixty patients in the

affected ward were visited daily, and inquiries made of the health of the inmates.

(*c*) Sixty-five patients had been discharged from the Infirmary while the original unrecognised smallpox case was there. They were all visited daily and examined. One case of smallpox was thus discovered.

4. (*a*) There had been visitors to the infected ward from sixty-eight houses in the Borough during the time. All these houses were visited daily and inquiries made of the health of the inmates. One case of smallpox was discovered among them.

(*b*) There had been also visitors from forty-five houses outside the Borough. The addresses of these houses were communicated to the health authorities having appropriate jurisdiction, and the persons concerned were kept under observation.

(*c*) Visitors to the Infirmary from the workhouse were kept under observation.

5. The Infirmary indoor staff were revaccinated.

6. There were sixty-five non-resident staff. Their homes were visited daily and inquiries made of the health of the inmates.

7. School-children. First it was necessary to ascertain what schools had been attended by the various patients; then to proceed to those schools and confer with the head teachers and learn what classes the sick children had attended; to learn on what days they had last attended and what was then their condition.

Any contacts residing in a house where there had been a case of smallpox were at once excluded from school, and were kept under medical observation at home like other contacts.

The schools were visited daily by medical staff, and teachers were asked to bring to notice all children who seemed in any way unwell, or presented any suspicious spots.

A note of school absentees was daily forwarded to the responsible medical officer of health, together with a note of their last attendance. Such absentees were daily visited at home until smallpox could be excluded.

The result of these various proceedings was that the Medical Officer of Health of the Borough was able to cut short a very ugly-looking outbreak, and to limit it to dimensions smaller than at first had seemed possible. Although there were 38 patients

within the first week, the whole outbreak totalled no more than 70.

As a matter of detail in the observation of contacts, it is useful for the responsible officer to furnish himself and his assistants with simple manuscript books ruled on the principle of a medical practitioner's visiting book. The dates of visits and conditions of contacts can then be entered at the time and on the spot by the visitor reports can be made accurately and expeditiously to the supervising officer; who is thus enabled to keep himself well posted in a most vital portion of his work, viz. the exact condition of the contacts.

The circumstances of each outbreak vary, and so, of course, must the details of the remedial measures. It is not uncommon, for instance, to find that infection has been distributed at some social function, such as a Christmas party, or a funeral. Another example was that at the beginning of the 1901–1902 outbreak in London, when smallpox got amongst a camp of hoppers in Sussex; of those who were ill some were detected on their return to London. From the description which these patients gave of some of their friends, it was certain that some of the latter also had smallpox.

It was ascertained by what train they were travelling. The train was met in London, and some of the passengers were picked out with the rash of smallpox on them.

The subject of common lodging-houses has already been mentioned. See page 55. They may be fruitful breeding grounds of smallpox, and require special measures. It is well known how likely the vagrant population is to spread smallpox, and how difficult it is to keep such contacts under observation. For instance, Sir Shirley Murphy relates, in his Report of the year 1901, p. 28, that in October of that year a woman, who frequented common lodging-houses in Holborn and Westminster, remained at large for four days, having, while suffering from smallpox, escaped from an Infirmary, where her disease had been recognised. As a direct result, a very large number of persons were infected in the two districts; "she visited nearly every public-house in the district, and from each one into which she had been, one or more of the inmates or customers took smallpox." See also the Report of the Medical Officer of Health of the City of Westminster for the year 1901.

CHAPTER X

RECAPITULATION

IT is convenient to recapitulate, by way of conclusion. There are certain general considerations to be borne in mind. Instant action must be taken; personal attention must be given; there must be a well-thought-out plan; success depends on the closest attention to details, and on no detail being allowed to escape notice.

A smallpox epidemic, in the nature of things, is a very expensive affair. But the expense of providing and working an effective apparatus for bringing it speedily to an end is much less than that of allowing it to drag on. It is necessary to mention this, because at the beginning, which is especially the time when an outbreak can be got under control, and perhaps the only time, there may be a tendency to work with the smallest

possible margin of men and money. There may be a small saving in such a plan at the moment. But it is apt to be a most costly economy, and to be followed by a dragging string of cases, or even by a big outburst, which, from the direct loss of life, the dislocation of business, and the great outlay for measures which ultimately become necessary, costs much more than ample measures would have cost at the beginning.

True economy is to throw the whole administrative weight upon the mischief at the earliest moment, and, where there is any doubt, to err on the side of excess. It may be that the outbreak is over-attacked, so to speak; sometimes that cannot well be avoided. Even so, it is far cheaper in the end. The cheapest policy is to throw in every ounce of weight instantly, and to crush the outbreak at the beginning.

By way of summary, it is useful to have a handy reference-list of steps which should be taken on the outbreak of smallpox in a district. When smallpox suddenly breaks out, there is little time for thinking; plans must all be ready, and put into instant operation.

The main indications are these :—

1. To ascertain the extent of the existing mischief, and its origin.

2. To eradicate the existing mischief.

3. To arrest its further spread by watching for fresh cases, and rendering them harmless as they occur.

Among the detailed steps which have to be taken are—

1. "Telephone the case away," *i.e.* summon an ambulance, and arrange for the patient's immediate removal. It is useful to give instructions that the time of removal of patient, or any delay in removal, be at once reported to you.

2. Communicate with the certifying practitioner, and obtain all particulars possible.

3. Despatch staff to the spot to make inquiries, to superintend the patient's removal, and to carry out disinfection.

4. Advise the vaccinating officer or public vaccinator.

5. Personally proceed to the spot, and ascertain extent of existing mischief.

6. Obtain the history of the source of infection. Obtain from patient or friends (1) a note of his movements at time of infection, and ascertain

who may have given it to him; and (2) a note of his movements after his illness began and ascertain to whom he may have given it.

7. Obtain list of contacts.

8. Push further inquiries as to workplaces, schools, laundries, and other similar collections of persons.

9. Offer re-vaccination to contacts, and, if necessary, by house-to-house calls.

10. Make house-to-house inquiries, if necessary.

11. Bring vaccination of smallpox staff up to date.

12. Consider notification of chickenpox.

13. Consider sending information of cases to practitioners in district.

14. Arrange for *medical* supervision of contacts.

15. Warn heads of common lodging-houses, casual wards, workhouses, infirmaries, hospitals.

16. Advise public health colleagues in neighbouring or other districts about contacts proceeding thither, and about other material facts.

17. Make reports to proper authorities.

Other measures may be necessary, and will be dictated by the special circumstances of the case. It may be necessary to open local

vaccination stations for school children or others, to distribute hand-bills to the public, or take other appropriate measures.

Success depends on two things. The first is a well-prepared plan. The second is tireless attention to details of action.

INDEX

THE END

PRINTED BY WILLIAM CLOWES AND SONS, LIMITED, LONDON AND BECCLES.

BY THE SAME AUTHOR

LONDON PUBLIC HEALTH ADMINISTRATION

A Summary showing the principal authorities, with their origin, services and powers.

With 24 pages of writing paper for Notes.

Fcp. 8vo, 2s. 6d. net.

"This handbook will be of great use to others besides the foreign visitors, interested in public health administration, for whom it is intended. It presents a conspectus of London public health administration in very handy and simple form. The first ten pages or so are occupied with a list of the authorities and a summary (but adequate) account of their origin. This is followed by a tabular arrangement of the various forms of service, and opposite to each is placed a short account of the principal legislation and the authorities concerned. The services are grouped into (1) Administration principally affecting the normal individual, from birth to death; (2) administration principally affecting the dwelling; (3) administration of the food supply; (4) administration of the very poor; (5) administration of the sick. This useful table is followed by a chronological list of the Acts of Parliament concerned and by an excellent index."—*Morning Post.*

"Even the Londoner himself, whether a member of any of the local bodies or not, will find it interesting and helpful. Chapter one, pleasantly and interestingly written, will show him from what small beginnings the great public administration has grown, and chapter two, which shows the works to be done, by whom they are done, and the powers under which they are carried out, will convey to him better than anything else the diversity of the problem of keeping him in health, and the methods adopted to attain that object. As a reference and guide book Dr. Wanklyn's is probably unique, and should admirably fulfil the purpose for which it is intended."—*Medical Officer.*

London Public Health Administration—cont.

". . . An admirable guide to the intricate working of Public Health Administration in London, and in addition to being of service to strangers who wish to investigate the subject—the object for which the book is primarily written—it also serves to bring before the notice of all who may see it the enormous number of agencies already at work and the frequent Acts of Parliament which seem necessary for their evolution.

"It is called a Summary, and such it is. The information is given in tabulated form, and in the most concise terms. The introductory chapter, brief though it is, is of peculiar interest, and all will be interested to read it."—*Middlesex Hospital Journal.*

"This is a useful little handbook. The authorities are such a chaos to the uninformed that the average person never attempts to make himself acquainted with the subject. With this book he will be able to get on the track of any question he desires. For instance, if he wish to know what authorities deal with the milk supply he need only turn to the index, and under 'milk' he will find a list of the Acts of Parliament containing regulations on the matter and a brief account of the powers vested in the various local authorities."—*The Clarion.*

". . . The book should be of the greatest use to more than foreign visitors; the mass of information it contains is arranged in tabulated form so that information concerning any matter is found easily and quickly. A most valuable book of reference for all whose work brings them in contact with Public Health Authorities and legislation."—*Nursing Notes.*

"The object of this admirable little work is to show in a convenient form the principal authorities who are charged with preservation of the health of London, with their origin, their services, and their powers. It is invaluable for any one who is engaged in municipal work or provisionaly concerned with any of the services with which it deals."—*The Globe.*

LONGMANS, GREEN & CO.
LONDON, NEW YORK, BOMBAY, AND CALCUTTA