

Is vaccination injurious? : a popular essay on the principles and practice of vaccination / by Henry Alleyne Nicholson, M.D.

Contributors

Nicholson, Henry Alleyne, 1844-1899.
University of Glasgow. Library

Publication/Creation

London : Churchill & Sons ; Manchester : A. Ireland & Co., 1869.

Persistent URL

<https://wellcomecollection.org/works/bc37bkjb>

Provider

University of Glasgow

License and attribution

This material has been provided by This material has been provided by The University of Glasgow Library. The original may be consulted at The University of Glasgow Library. where the originals may be consulted. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>

with the author's reply
(10)

IS VACCINATION INJURIOUS?

A POPULAR ESSAY

ON

THE PRINCIPLES AND PRACTICE OF VACCINATION.

BY

HENRY ALLEYNE NICHOLSON, M.D., D.Sc., M.A., &c.,

LECTURER ON NATURAL HISTORY IN THE EXTRA-ACADEMICAL SCHOOL OF EDINBURGH;
ETTLER MEDICAL SCHOLAR IN THE UNIVERSITY OF EDINBURGH; ETC.

Cuique in sua arte credendum.

LONDON :
CHURCHILL & SONS, NEW BURLINGTON STREET.

MANCHESTER : A. IRELAND & CO., PALL MALL.

—
1869.



Digitized by the Internet Archive
in 2015

P R E F A C E.

THE agitation which is at present going on in many circles for the repeal of the Compulsory Vaccination Act has induced the author of the following pages to lay before the public a portion, at any rate, of the evidence upon which the beneficial effects of vaccination are asserted. He has endeavoured to do this in a manner as little technical as possible, and he trusts that the result is capable of being readily and fully understood by all educated men. At the same time, he feels bound to express his opinion that the full comprehension of many of the factors which go to the solution of a question so complicated as this, is not as yet possible except to such as have received a special scientific or medical training. It is earnestly to be hoped that the number of those who can judge fairly and impartially of these important subjects will be larger year by year ; but in the meanwhile there can be no doubt that our ordinary education leaves the great majority, even of the well-educated, ignorant of the commonest physiological laws. It is hardly to be wondered at, therefore, if when such a subject comes for the first time prominently before the public, it is treated with that spirit of reckless assertion and disregard of the laws of evidence which too often distinguish the reasoning of the prejudiced and imperfectly educated.

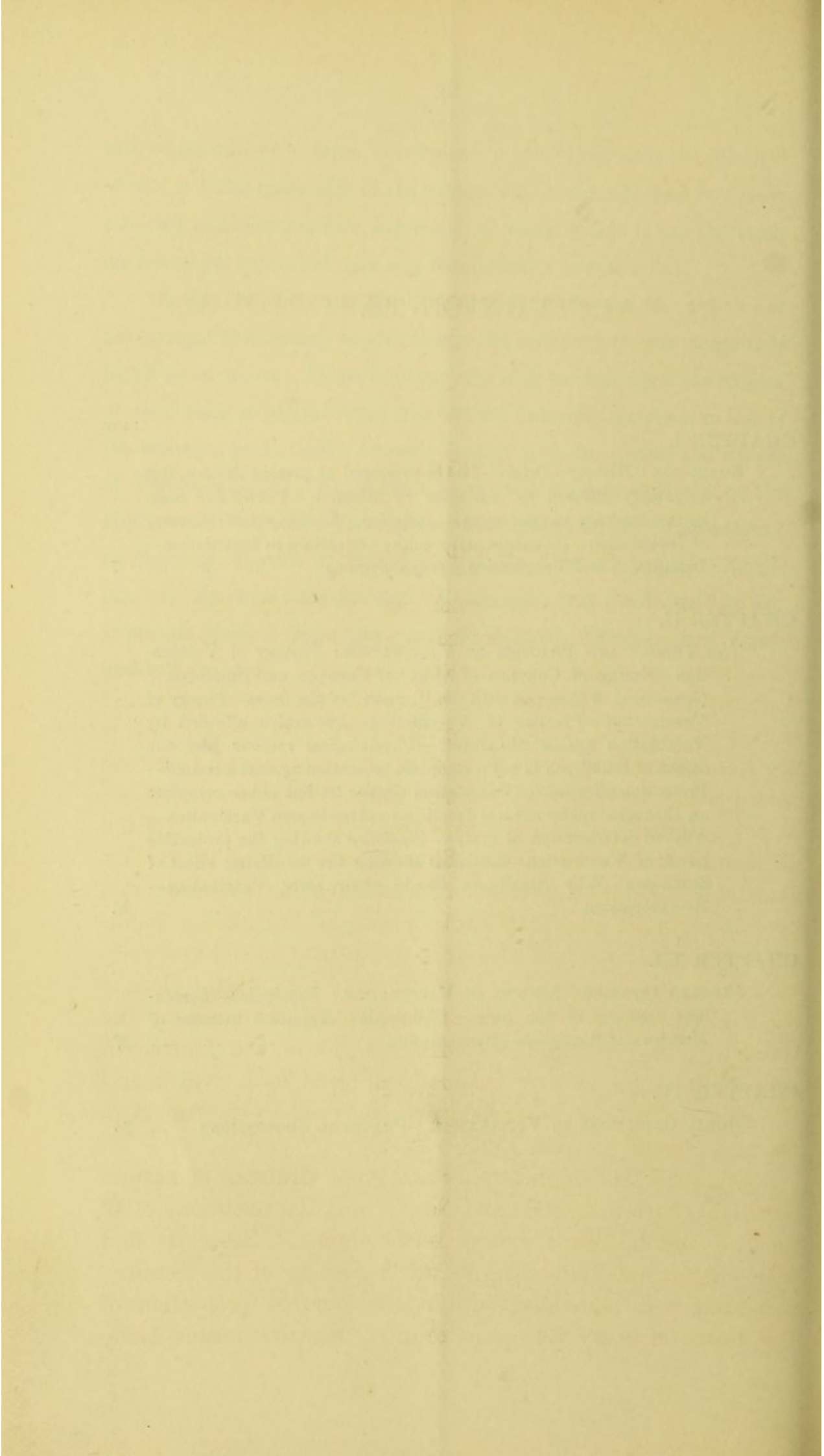
The writer is far from deprecating inquiry, having, on the contrary, fully satisfied himself that the closest investigation will only strengthen the position at present occupied by vaccination. Premature legislation, however, in obedience to a hasty and unreasoning impulse, cannot be deprecated too strongly. The question is one with which every educated

man ought to be acquainted, as it touches more or less nearly the interests of all. A fuller knowledge of the subject will, at any rate, lead to a more collected and dispassionate expression of views, which, to say the least, are not as yet supported upon any foundation of scientific fact.

Writing for the public, and not for the profession, the author has not thought it necessary to give always the authority for the statements which he advances. Those, however, who wish to investigate the subject of vaccination in greater detail will find the necessary materials in any of the following works :—Dr. Jenner's *Inquiry into the Causes and Effects of Variolæ Vaccinæ* ; Mr. Simon's *Report to the Board of Health on the History and Practice of Vaccination* ; Dr. Seaton's article "Vaccination" in *Reynolds' System of Medicine*, and Mr. Marson's article "Small-pox" in the same ; the articles "Vaccination and Small-pox" in *Dr. Copland's Medical Dictionary* ; and Dr. Seaton's "*Handbook of Vaccination*."

CONTENTS.

	PAGE.
CHAPTER I.	
SMALL-POX : History—Origin—Never produced at present <i>de novo</i> , but invariably diffused by contagion or infection—Preventive measures—Sanitary improvements—Isolation. INOCULATION : History of Inoculation—Its nature and results—Objections to Inoculation—Inoculation and Vaccination not synonymous	7
CHAPTER II.	
THE THEORY AND PRACTICE OF VACCINATION : History of Vaccination—Nature of Cow-pox—Identity of Cow-pox and Small-pox—Connection of Cow-pox with the “grease” of the horse—Theory of Vaccination—Practice of Vaccination—Protection afforded by Vaccination against Small-pox—Physiological reasons why one attack of Small-pox is not a complete protection against a second—Protection afforded by Vaccination similar to, but not so complete as, that afforded by natural Small-pox—Arm-to-arm Vaccination—Alleged deterioration of lymph—Statistics showing the protective power of Vaccination—Statistics showing the modifying effect of Small-pox—Why Small-pox should occur after Vaccination—Re-vaccination	13
CHAPTER III.	
ALLEGED INJURIOUS EFFECTS OF VACCINATION : Erysipelas—Scrofulous Diseases of the Skin—Diphtheria—Apparent increase of Measles and Scarlatina—Consumption	27
CHAPTER IV.	
MORAL OBJECTIONS TO VACCINATION. PRACTICAL SUGGESTIONS	36



IS VACCINATION INJURIOUS?

CHAPTER I.

SMALL-POX AND INOCULATION.

History of Small-pox.—Small-pox or Variola, like all the other eruptive fevers, is of ancient origin, though its exact commencement is veiled in complete obscurity. It is extremely doubtful if it was known at all before the sixth century, and it cannot be declared with any certainty whether the Greeks or the Romans had any knowledge of the disease, though there are some grounds for believing that they had. We possess, however, an accurate and graphic account of small-pox from the pen of the celebrated Arabian physician, Rhazes; and it is quite certain that the disease must have been in existence for a considerable period before his time (910 A.D.). From the East, where small-pox appears to have had its origin, the disease spread gradually westwards, reaching the shores of England towards the close of the ninth century. Its ravages were greatly favoured by the Crusades; and before the commencement of the fourteenth century it seems to have gradually diffused itself over nearly the whole of Europe, whence it was conveyed to the American continent about the year 1527.

As regards the high fatality and great virulence of natural small-pox, both in the Old and New World, the testimony of all medical and historical writers is unanimous. Since its first introduction into Europe up to the beginning of this century, small-pox was accredited with a considerable proportion of the deaths of every European country, curative means being

almost unknown, and the preventive measures which were employed doing as much harm as good. Not only did the mortality, as shown by repeated epidemics, bear an extremely high ratio to the number of people attacked, but various other evils followed in the wake of this terrible visitation. Of these, one of the commonest, as certainly the most grievous, was the partial or complete loss of sight, produced by the ulceration of the cornea, which so frequently accompanies severe small-pox. Less distressing was the permanent pitting of the skin, without which very few patients escaped. Of the extreme prevalence of these *sequelæ* of small-pox no question can be entertained, and it is quite sufficient to refer to the testimony of the last generation and to the records of our asylums for the blind.

Origin of Small-pox.—As regards the origin of small-pox nothing is certainly known. A tradition is current in the East that it was transmitted to man in the first place from the camel, but there are absolutely no grounds for this belief. Whatever may have been its origin—and it must be borne in mind that we are equally ignorant of the origin of the other eruptive fevers, such as scarlatina or measles—this much is universally admitted, that it has never, as far as our observation has gone, been produced *de novo*. It is important that this should be fully understood, as there is much misconception on this point, and a great deal of the value of vaccination depends on its due apprehension. As far, then, as human observation has gone, no single case of small-pox has been shown to have been produced by any combination of external circumstances whatsoever. In other words, every known case of small-pox is due to the reception—either by contagion or infection—of the variolous poison from some other individual who had previously contracted the disease. Of course, small-pox must have had an origin to begin with. That is to say, there must have been at some time or other—and may at any time again be—a combination of circumstances capable of producing small-pox. Since its primitive origination, however, no instance has been recorded scientifically in which the disease has been again generated *de novo*, and it appears to have spread solely by infection or contagion.

Two conclusions follow from this, and they hold equally good of the allied diseases, measles and scarlatina. In the first place, it is a mistake to suppose that small-pox can be generated by bad diet, ill-ventilated dwellings, bad drainage, or bad hygienic arrangements of any kind. These things may predispose to the reception of the poison, and doubtless in all cases aggravate the disease; but they do not produce it. The case is different with typhus, and probably with typhoid fever, both of which we have reason to suppose, may be generated by defective sanitary arrangements, as well as propagated by contagion when once produced. It follows that though we might almost certainly annihilate typhus fever by sanitary improvements, we must not hope to eliminate small-pox from our list of diseases in the same way. We might limit its diffusion, and would, doubtless, in many cases, diminish its severity, but we should not destroy it. In the second place, it is clear that in the case of any disease which, like small-pox, is solely propagated by transmission from individual to individual, we possess theoretically a certain and effectual means of annihilation, if it could only be put into practice. It is clear, namely, that if we could once break the chain of infection all over the world for any given term, the disease would be destroyed for good. At any rate, it would be destroyed until such a combination of circumstances should take place as originally produced the disease; and we have seen, as far as small-pox is concerned, that this combination of circumstances has not been shown to have occurred more than once in the observation of nearly a thousand years. Practically, therefore, the disease would be destroyed, if we were only able to destroy its infecting power for a given length of time.

Let us look at the case of a village in which scarlatina has broken out. In this case the disease commences in the person of some one individual, who has received the poison from some other individual previously affected with the malady, the infection being usually acquired either indirectly, or in some locality at a distance. When once imported into the village, the disease will spread by infection to all who may come in contact with the fever-poison, unless, from some cause or other, they should be temporarily or permanently insusceptible. The cessation of

the disease, and its final retirement from the place, will be due either to the fact that alarm has led to the establishment of something like an efficient quarantine, or to the fact that all who are susceptible to the malady have been attacked; its ultimate recession, in either case, being helped by the well-known, though unexplained, fact that all epidemics tend to get milder after continuing for a certain length of time, and tend therefore to their own extinction. This is the natural course of an epidemic of scarlatina, and such used to be the course of an epidemic of small-pox. It is clear, however, that the course of either epidemic *might* be very materially modified by one of two things—either by maintaining a complete quarantine, or by rendering those who are subjected to contagion insusceptible, or less susceptible than they would naturally be. In practice it has been found impossible, especially amongst the poor, to maintain anything like a serviceable isolation of the patient; and we may, therefore, leave this out of account, though there is no doubt but that the spread of any infectious disease may be wonderfully limited by a strict system of quarantine. There remains, then, to see if there are any means of annulling or reducing the susceptibility to infection. In the case of scarlatina and measles no such means, beyond special sanitary precautions, are as yet known to us; though it has been alleged that belladonna exerts a prophylactic effect in the former disease. In the case of small-pox it has been believed for more than seventy years that we have in vaccination such a means of reducing the susceptibility to infection; and the practice of inoculation dates from more than a hundred years earlier. We have now to examine the grounds upon which this belief rests, and we will commence with the consideration of inoculation.

Inoculation.—The practice of inoculation for small-pox is one of great antiquity, and was no doubt founded upon the general observation that the disease was not liable a second time to affect, except in rare instances, those who had once suffered from it. The practice had been apparently in general use in various parts of the East from time immemorial, and was certainly largely followed in Constantinople in the year 1700.

It was first introduced into England in the year 1721 by Lady Mary Wortley Montague, and towards the latter end of the eighteenth century it had become general throughout the whole country. In 1840, however, inoculation was declared illegal by Act of Parliament, the penalty for breaking the law being a month's imprisonment.

Inoculation consists in the artificial production of small-pox in a healthy person, by the direct introduction into the body of variolous matter derived from an individual already suffering from the disease. It would *a priori* have been expected that the direct introduction into the blood of the matter of small-pox would produce a much more virulent and dangerous type of the disease than the form produced by ordinary contagion. This, however, is not the case, and it remains a certain, though inexplicable, fact that small-pox when produced by direct inoculation is very much milder than when taken in the ordinary way through the medium of the skin, lungs, or stomach. At the same time the disease, as produced by inoculation, was as efficient a protection against a second attack, as the natural form of the complaint, instances of recurrence being rare. Inoculation, however, laboured under the unsurmountable objection that it was quite as infectious as natural small-pox, and that it was capable of giving quite as severe a form of disease; so that a person who had undergone inoculation in too many cases acted simply as a centre of infection to all those who had not submitted themselves to the process. This disqualification is of so grave a nature that the wisdom of Parliament can hardly be questioned, in having rendered the process illegal as soon as they possessed a means of attaining the same end with greater ease and safety.

Bearing in mind, for subsequent application, the undoubted fact that inoculated small-pox is, for some unknown reason, a much less severe disease than natural small-pox, we may make here a single observation on the confusion which appears to exist in the minds of some people as to the identity of inoculation and vaccination. The opponents of vaccination not uncommonly use these terms as if they were synonymous; or as if they meant mere varieties of the same process. Inoculation, however, as we have explained, is entirely restricted to the direct introduction

into the healthy human body of the matter of small-pox, derived from another human subject; and its performance, under any pretext, is now strictly forbidden by law. Vaccination, on the other hand, is the introduction into the healthy human body of the matter of cow-pox, derived directly or indirectly from the cow, and its results, as we shall have to point out, are singularly different from those of inoculation.

CHAPTER II.

THE THEORY AND PRACTICE OF VACCINATION.

History of Vaccination.—The history of vaccination is so generally known as to require but the briefest mention here. Though apparently known and practised in India from very remote times, its discovery in Europe was due entirely to the genius of Edward Jenner, a general practitioner near Berkeley, who was originally led to his great discovery by the popular belief that persons who had suffered from cow-pox (vaccinia) were afterwards insusceptible of the poison of small-pox (variola).

Nature of Cow-pox.—Cow-pox or Vaccinia, as its name implies, is a disease natural to the cow, chiefly affecting milch cows, and running a definite course. It consists mainly in a vesicular eruption on the udder and teats, and it can be transmitted to human beings by direct contact, the milkers being especially liable to take it, in consequence of their rupturing the vesicles during milking. Jenner himself believed that the cow-pox of the cow was simply the small-pox of man, modified by the peculiarities of the cow's constitution; and he further believed that both were truly derived from the disease of the horse known as the "grease." As regards the identity of cow-pox (vaccinia) with genuine small-pox (variola), the correctness of Jenner's view has been demonstrated beyond the shadow of a doubt by the experiments* of Mr. Ceely, of Aylesbury, and others. As regards the connection of cow-pox with the "grease"

* These experiments consisted essentially in the inoculation of cows with the matter of small-pox derived from the human subject. The resulting disease was not small-pox, but genuine cow-pox or vaccinia; and the lymph taken from cows thus operated on was found to produce in children all the ordinary and regular symptoms produced by vaccination with ordinary vaccine lymph.

of the horse, it is equally certain that Jenner was in error, and that the diseases in question have in reality nothing to do with one another. The horse, however, is subject to a form of genuine small-pox, which is capable by inoculation of producing genuine cow-pox in the cow.

Theory of Vaccination.—Having established that cow-pox is simply small-pox modified by the constitution of the cow, it follows that an attack of the cow-pox—as contracted, say, by a milker—is equivalent to an attack of small-pox, and ought equally to act as a protective against another attack. Jenner found a wide-spread belief that this was really the case, and he succeeded, by many years of patient observation, in satisfying himself that the popular belief was founded upon facts. We shall hereafter have occasion to recount the facts upon which the protective power of artificially induced cow-pox is asserted, but we shall take it for granted that no one will dispute the protective power of a previous attack of natural small-pox itself, or of cow-pox accidentally communicated to the human subject. The *theory*, then, of vaccination may be stated as follows :—

1. It is known by long experience that an attack of natural small-pox either completely protects against a second attack, or renders it, should it occur, much less severe.
2. It has been found, as the result of many thousands of actual experiments upon human beings, that small-pox, when produced by direct inoculation, is very much less severe than when taken in the natural way, and is, nevertheless, equally protective against a second attack.
3. It was established by Jenner that the cow-pox of cows, if accidentally communicated to human beings, rendered them insusceptible of the infection of small-pox—to the same extent, that is, that a previous attack of small-pox would do.
4. It was believed by Jenner, and has since then been conclusively proved, that cow-pox is identical with small-pox, and is, in fact, merely small-pox modified by the constitution of the cow.

5. It was asserted by Jenner that the cow-pox could be artificially communicated at will to man, and that when so communicated it was as effective in protecting the individual against an attack of small-pox as was cow-pox when accidentally contracted.
6. It was further asserted by Jenner that, when once communicated to the human subject, cow-pox could be transmitted, as cow-pox, from one individual to another, conferring upon each as full immunity from small-pox as though the disease had been contracted from the cow itself.

Upon these two last assertions rests the *practice* of vaccination, the value of which we shall now proceed to consider, always remembering that Jenner himself never claimed for vaccination that it afforded *complete* immunity from small-pox, or, in fact, that its protective power was any higher than an attack of small-pox itself would be.

Protection afforded by Vaccination against Small-pox.—

The practice of vaccination consists in the introduction into the human body of the matter derived from the eruption-vesicle of a cow which is suffering from cow-pox. This, at least, was the original operation, but it was subsequently so far modified by Jenner himself, that the matter was no longer taken directly from the cow, but was derived from the vesicles produced in a child by primary vaccination. This process is known as "arm-to-arm vaccination," and as its propriety has been frequently attacked, it may be as well to consider for a moment the physiological principles upon which it is founded.

The blood, as is well known to physiologists, possesses an inherent power of renovation and reparation, whereby it constantly retains its peculiar constitution and character, in spite of the ceaseless additions which are made to it, and the perpetual subtraction of material to which it is subjected. Or rather, to speak more correctly, those organs of the body which are concerned in the elaboration of the blood—a process constantly and continuously going on—possess a selective power over the materials offered to them, which is adjusted to the

utmost conceivable nicety. The characters of healthy blood, therefore, may for practical purposes be looked upon as constant for the same individual so long as the selective organs remain healthy. The same power, however, of perpetuating the constitution of the blood at any given moment remains in force in disease, though there is at the same time a constant endeavour to re-assume the healthy standard. Hence, when the blood has had some new character imparted to it, or has lost some pre-existent character, in consequence of some such disease as small-pox, the change, however slight, or of whatever nature, tends to be perpetuated more or less perfectly throughout the life of the individual. Sometimes the change is so great, and is so accurately kept up, that the blood never assumes again the character which it had before the disease. At other times the change has been sufficiently slight, or the reparative powers of the blood sufficiently strong, to allow, after a sufficient lapse of time, the re-establishment of the normal characters.

Applying this to small-pox, we can readily understand how it comes to pass that an attack of small-pox protects the individual more or less perfectly against a second attack. The blood in consequence of the small-pox has either gained some fresh character or lost one that it possessed before, and the change, whatever it is, is kept up more or less completely for a longer or shorter length of time. If, as is not unfrequently the case, the blood should ultimately succeed in restoring itself to its pristine characters, then the individual will become liable to a second attack, if placed under infection; hence the notorious fact that small-pox may be contracted more than once by the same individual. It is also easy to understand that the more severe the attack has been the more thoroughly will the blood have been changed, and the less liable is the individual to a second seizure; the protection afforded being in direct proportion to the severity of the disease. It follows from what we have just stated that the protection afforded even by an attack of natural, unmodified small-pox is not complete, and we shall proceed to consider how this bears upon the question of vaccination.

In applying this reasoning to vaccination, we have first to prove that, in successfully performing the operation of vaccina-

tion, we really do produce vaccinia (or cow-pox), and not some other disease. It would be open, of course, for an opponent to assert that, in vaccinating a child, the disease produced is not cow-pox, but something else. It may be denied, in fact, that a disease of an animal *can* be transmitted to a human being, and yet retain its same form and typical characters. Not to mention, however, the many cases, such as glanders, malignant pustule, &c., in which animal diseases are so transmitted to man, it is sufficient simply to remark that the technical characters of the vaccine vesicle, as produced in man, are identical in all respects with those produced in the cow by genuine cow-pox. There need, therefore, be no doubt but that vaccination really transmits cow-pox, and when we remember that cow-pox is nothing more than modified small-pox, and that man is already liable to this latter disease, we can have no difficulty in accepting this conclusion.

Admitting this premise, it is absolutely clear in theory that when vaccination has been efficiently performed, so that vaccinia is induced, the individual so operated on has in truth undergone an attack of small-pox; and we are now in a position to understand how it is that arm-to-arm vaccination is a feasible and effectual process. We know by an enormous experience in the now illegal practice of inoculation that small-pox in a modified form can be directly transmitted from individual to individual, to an extent, as far as we know, quite unlimited, without in any way altering its character in the process of transmission. Vaccination, in producing vaccinia, produces a modified form of small-pox, and consequently, in vaccinating from arm to arm, we are essentially doing nothing more than used to be done in the abandoned process of inoculation. We are simply transmitting a modified form of small-pox directly from one individual to another. From the analogy, therefore, of inoculation we would be justified in believing that the disease produced by vaccination ought to bear transmission from individual to individual without in any way altering its characters, and, as a matter of fact, no alteration is observable, the best authorities concurring in the belief that the vaccine vesicle of to-day is in all essential respects identical with that seen in the time of Jenner.

It is not possible to discuss here at any length the question whether the vaccine lymph (as asserted by some) has deteriorated in activity and protective power by continued transmission through the human body. It may be as well, however, in this connection, to mention the following considerations. *Firstly* : The experience gained by the practice of inoculation would not in any way favour the view that repeated transmission of small-pox leads to any deterioration in the transmitting matter. *Secondly* : It would be perfectly easy at any time to acquire fresh lymph from the cow itself, if this could be shown to be desirable. This is denied by the opponents of vaccination, but their denial arises simply from a want of proper knowledge of the facts of the case. Fresh vaccine matter—to mention two cases only—was derived directly from the cow by Mr. Ceely, of Aylesbury (1839), and by Mr. Badcock, of Brighton (1840), and was employed in successfully vaccinating a number of children ; and the same process could be at any time repeated, if necessary.* *Thirdly* : Even admitting, as many believe, that some deterioration of the lymph as to its protective power has really taken place, this is capable of being explained otherwise than by the supposition that an inherent defect in the lymph has been established by repeated transmission. It is not only possible, namely, but is indeed highly probable, that a certain amount of protective power is transmitted hereditarily from the parents to the children, and that in consequence of this it is not so easy, now-a-days, to obtain the full results of vaccination as it was in the time of Jenner. This is, of course, to a great extent an hypothesis, but it is in accordance with the laws of physiology, and explains the facts quite as well as the assertion that the lymph has become humanised, this being equally an hypothesis, equally incapable of direct demonstration, and rendered upon *a priori* grounds highly improbable.

* Recent experiments have so amply demonstrated the feasibility of obtaining fresh vaccine matter from the cow, that the return to the original practice of vaccination might fairly be recommended, if only on the ground that the objections entertained by many people to the present system of arm-to-arm vaccination would thereby be removed. Vaccination, however, as things now stand, is so unremunerative to medical men, that we should fear a strong resistance to any change involving an increase in the cost, with a considerable augmentation of the labour, of the operation.

We have now to consider the grounds for the belief that vaccination protects against small-pox, and also the amount and kind of protection. We have seen that vaccination, when successful, is essentially an attack of small-pox; consequently a vaccinated individual ought theoretically to be as much protected against a second attack of small-pox as he would be by having previously undergone the natural disease itself. Now, notoriously, this is not a complete protection, a second attack of natural small-pox being by no means extremely rare. We have, therefore, no right to expect from vaccination, even in theory, any more complete protection than we get from natural small-pox in its unmodified form. Jenner himself expressly states this as his belief, as to vaccination, in the following words:—“Duly and *efficiently* performed it will protect the constitution from subsequent attacks of small-pox, as much as that disease itself will. I never expected it would do more; and it will not, I believe, do less.” (The italics here are our own). We see, then, how unreasonable it is to blame vaccination for not performing more than even its discoverer claimed for it, and to expect that its protective power shall be infallible.*

In practice, however, the protection afforded by vaccination has been found to be less complete than that given by an attack of natural small-pox, and for the following reasons. In the first place, it was only for *efficient* vaccination that Jenner claimed even the above mentioned limited protective power; and vaccination is too often performed inefficiently and without sufficient care. In the second place, though it is true that vaccination is an attack of small-pox, it is but a very mild attack; and, conse-

*As regards the comparative value of the protection afforded by a previous attack of small-pox or by vaccination, it is difficult to get accurate statistics, but the following may be taken as a good example. It was shown from the records of the Royal Military Asylum at Chelsea that 5,774 boys were admitted during the forty-eight years ending December, 1851, of whom 1,950—or about a third—exhibited marks of previous small-pox when admitted, and 3,824—or about two-thirds—exhibited marks of vaccination, or were vaccinated when admitted. Of the former class 6.15 per thousand, and of the latter class 7.06 contracted small-pox subsequently during their residence in this institution. When we consider that these statistics do not take into account the kind or efficiency of the vaccination, we are justified in concluding that the protective value of vaccination is very nearly, if not quite, equal to that afforded by a previous attack of small-pox.

quently, its protective power against a second seizure is not so great as that of the natural disease. The blood is not so completely altered by vaccination but that it can in many cases resume its original character in the lapse of time; hence the individual may become ultimately again unprotected against the infection of the small-pox. This return to the unprotected condition is shown by the capability of being re-vaccinated—a capability which is found to exist in about half the number of cases operated upon. In many cases, however, the blood remains permanently altered, the individual remains permanently protected, and re-vaccination cannot be performed. It has been asserted that Jenner himself in his later years was in the habit of vaccinating his patients every year, under the belief that the protective power died out in this period. This assertion, however, involves an impossibility, and is a *reductio ad absurdum* to itself. It is absolutely impossible that vaccination can be successfully performed (that is to say, that vaccinia can be induced) more than once, unless a term of, at least, several years be allowed to elapse between the times of vaccinating. This is not a matter of opinion, but one of strict scientific fact. The operation of inserting vaccine lymph beneath the skin can, of course, be performed as often and with as short intervals as is pleased; but this is not performing vaccination. No result will follow, unless sufficient time be allowed for the blood to have resumed its normal characters; and this—assuming the first vaccination to have been successful—cannot take place in a space less than that of some years. It would be quite as reasonable to assert that it is possible to take scarlatina, or measles, or small-pox in its natural form, time after time at intervals of a year between the attacks.

We have arrived, then, at the theoretical conclusion that efficient vaccination ought to afford a somewhat less degree of protection against small-pox than is afforded by an attack of the disease itself in its natural form. Let us now examine the records of the medical profession and the experience of the public, and let us see if this expectation has been borne out by facts. First as to the general experience of mankind, it is enough to point to the extraordinary decrease in the number of those

pitted by small-pox, or rendered partially or completely blind by this cause, since the introduction of vaccination. The *Quarterly Review* (July, 1855) says :—" Unless the reader has scanned the long list of villainous portraits exhibited by the *Hue and Cry* in the old papers of the last portion of the seventeenth and first portion of the eighteenth centuries, he can form but a faint conception of the ravages committed by the small-pox upon the population. Every man seemed to have been more or less speckled with 'pock-holes;' and the race must have presented one moving mass of pits and scars." This fact, however, is so notorious that we shall not adduce any further evidence on this head, simply referring to the reminiscences of anyone who is old enough to remember the closing years of the last and the commencing years of this century. We can only express our astonishment that those who think they can so readily see the bad results of vaccination find it so difficult to perceive such a glaring fact as the above. We know, however, that it is sometimes difficult "to see wood for trees," and it is merely a good example of the extent to which preconceived bias may blind the most acute observer.

As to the experience of the profession as regards the protective effect of vaccination, we shall content ourselves with giving the following statistics,* which speak for themselves :—

During a series of many years subsequent to the introduction of vaccination in the British army, the average number of cases of small-pox per 10,000 men was not more than 6·6,—enormously less, that is to say, than 1 per cent.

Out of 757 individuals in infected families during an epidemic of small-pox in Chelsea, Mr. Marshall found that 231 had been vaccinated, whilst the remaining 526 were either wholly unprotected or had previously suffered from small-pox. Of the former class 27, or about 13 per cent, contracted small-pox, whilst of the latter class 519, or all but seven of the entire number (about 98 per cent), were attacked.

In upwards of 50,000 children in national and parochial schools, workhouses, &c., examined by Drs. Seaton and Buchanan,

* Most of these are taken from the excellent article on vaccination by Dr. Seaton, in "Reynolds's System of Medicine."

360 out of every 1,000, or 36 per cent of the unvaccinated, whilst only 1.78 per cent of the vaccinated, exhibited the scars of small-pox. Carrying the examination still further, and enquiring into the effect exercised by the quality or amount of the vaccination, the same gentlemen arrived at the following statistics :—

Classification of Children Examined.	Proportion marked with small-pox, per 1,000 children, in each class respectively.
1. Having no vaccine marks (unvaccinated)	360
2. Vaccinated	17
(a) Having one vaccine cicatrix... ..	6.80
(b) Having two vaccine cicatrices	2.49
(c) Having three vaccine cicatrices	1.42
(d) Having four vaccine cicatrices	0.67
(e) Having cicatrix or cicatrices of bad quality	7.60
(f) Having cicatrix or cicatrices of tolerable } quality }	2.35
(g) Having cicatrix or cicatrices of excellent } quality }	1.22

Consequently out of 50,000 children belonging to the lower classes no more than 1.22 in the 1,000, or 0.12 per cent of those who had been efficiently vaccinated, had subsequently contracted small-pox.

According to Mr. Simon, to whom we owe the exhaustive report to the Board of Health on vaccination (1857), since the introduction of vaccination “the fatality of small-pox in Copenhagen is but an eleventh of what it was; in Sweden a little over a thirteenth; in Berlin and in large parts of Austria but a twentieth; in Westphalia but a twenty-fifth. In the last-named instance, there now die of small-pox but five persons, where formerly there died a hundred.” The following table shows the diminution in the mortality from small-pox, since the introduction of vaccination, in England and Wales, and shows a steady decrease in the death-rate from this cause, in proportion as vaccination has become more and more general :—

Periods Compared.	Annual Deaths by Small-pox in England and Wales.	Annual Rate per Million of the Population.
1. Average of 30 years previous to the introduction of vaccination, esti- mated by Dr. Lettsom and Sir Gilbert Blane.		3,000
2. Average of three years (1838-40) when vaccination had become generally diffused, but before there was any pro- vision for its gratuitous performance ..	11,944	770
3. Average of nine of the years (1841-53) when public vaccination was gratuitously provided, but vaccination was not obligatory	5,221	304
4. Average of ten years (1854-63) during which vaccination has been to a certain extent obligatory	3,351	171

It is not necessary to multiply statistics as to the protective power of vaccination against small-pox, but there is another point of view which it is most important not to lose sight of, and which we shall now proceed to consider. No fact, probably, in medicine is more universally acknowledged by the profession than the fact that vaccination, when it fails to protect completely against small-pox, nevertheless renders the disease in almost every case very much less severe—less severe, in fact, than even the mild forms of the natural malady. Upon this point, Dr. Seaton says :—

“The facts showing the power of vaccinia in modifying small-pox, if it should happen to be subsequently contracted, and of disarming it of its terrors, are so ample that it is difficult to know whence to select examples. No epidemic of small-pox has occurred in any climate since the introduction of vaccination without affording the most abundant evidence of it. While the mortality of natural small-pox is seldom below 20 per cent, and often amounts to 30 or 40 per cent of the attacks, the death-rate amongst the vaccinated (taken indiscriminately and without regard to the quality of the vaccination) is rarely known to exceed 7 per cent, and is more frequently 3, 4, and 5 per cent. In observations which, on account of the large scale on which they were made, are of great value, viz, those

made for twenty-one years in Bohemia on four millions of people, it was found that the death-rate among vaccinated persons who happened to contract small-pox was $5\frac{1}{8}$ per cent, while the death-rate among non-vaccinated persons when they contracted small-pox was $29\frac{4}{5}$ per cent. But the observations which outweigh all others in value, on account of the extreme accuracy and precision with which they have been made, are those which Mr. Marson has collected by thirty years' labour at the Small-pox Hospital. In this hospital above 15,000 cases of small-pox have during that time been under his personal care, and all particulars respecting them have been carefully recorded; and it has been found that while the unvaccinated have died at the rate of 37 per cent, the vaccinated have died at the rate of only $6\frac{1}{2}$ per cent."

Again, when the vaccination has been well performed—four or more vaccine cicatrices being the witnesses of this—only one half per cent of those who contracted small-pox died. When there was only a single scar, and that not a good one, the mortality was as high as 12 per cent; and when the persons simply believed that they had been vaccinated, but had no cicatrices to bear out their belief, the mortality reached $23\frac{1}{2}$ per cent. Upon this point Mr. Marson's observations are most conclusive, since he found that out of 268 persons reputedly vaccinated, who died of small-pox in the Small-pox Hospital, only 191 exhibited any marks of vaccination at all, and of these no more than three had been vaccinated in what would now be looked upon as an efficient manner.

The death-rate, however, is not the only, or, indeed, the fairest, test of the value of vaccination; but we must also take into consideration the condition of those who recover from small-pox contracted in the natural manner, as compared with the state of those who have small-pox after efficient vaccination. Thus, whilst by far the greater number of those who take natural small-pox receive some permanent disfigurement therefrom, almost all being marked by "pock-marks" for life, and many being rendered blind or deaf, either partially or completely, an exceedingly small proportion of those who contract small-pox after *efficient* vaccination suffer from any evil consequences

afterwards. The type of the disease is made very much milder, and even a moderate amount of pitting of the skin is quite exceptional in these modified cases.

In weighing, therefore, the often-repeated argument against vaccination, that many of the cases of small-pox now-a-days are in people who have been previously vaccinated, we have to attend to the following considerations. In the first place, seeing that a large proportion—yearly growing larger—of the population is vaccinated, when small-pox occurs at all as an epidemic it is certain that a seemingly large number of the vaccinated must be affected by it, since vaccination in its best form is not a complete protective. Secondly, when it is said that of the small-pox patients so many have been vaccinated, it is to be remembered that this simply means that they have undergone the operation of vaccination. As a matter of fact, provable by the most rigid calculations, an enormous proportion of these reputedly vaccinated cases are found to have been vaccinated imperfectly—in a manner either very slightly protective, or positively not protective at all. In Mr. Marson's cases, quoted above, out of 268 of these reputedly vaccinated cases of small-pox, only 3 were found—by the infallible evidence of cicatrices or scars—to have been vaccinated efficiently, or practically to have been vaccinated at all. With regard to this insignificant residue, it is only reasonable to suppose—what we know to be true of all infectious diseases—that these individuals were by some defect of natural constitution, more than ordinarily predisposed to succumb to the action of the small-pox poison. *

Re-vaccination.—Upon the question of the advisability of re-vaccination, at a more or less definite number of years after primary vaccination, we shall say little here, the question being one more for the medical profession than for the public. The arguments, also, against re-vaccination are in the main identical with those against primary vaccination, and do not, therefore, require separate notice.

There are, however, two points which we may touch upon. Firstly, as to the argument which is often employed against vaccination, that it must be useless if re-vaccination is necessary, we need only remark that this arises from a misconception of

what vaccination really is. Vaccination, when successful, is nothing more than a mild attack of small-pox, and as we have seen that a certain number of small-pox patients have small-pox a second time, we need not be surprised that the same is the case with the vaccinated. As we shall afterwards point out, it is certainly unreasonable to reject a remedy of proved efficiency simply because it is not infallible. Upon this ground we might decline to take any drug or medicine of any kind, since even if its curative effect were certain, it would not prevent a recurrence of the disease for which it might be taken. Secondly, we will simply quote the following passage from Dr. Seaton, premising that it expresses the general opinion of the profession as to the value of re-vaccination. He says:—"After effectual *re-vaccination*, small-pox, even in its most modified form, is found very rarely, or scarcely ever, to occur. Thus, Heim found that in five years there occurred amongst 14,384 re-vaccinated soldiers in Würtemberg only one instance of varioloid,* and among 30,000 re-vaccinated persons in civil practice only two cases of varioloid, though during these years small-pox had prevailed in 344 localities, producing 1,674 cases of modified or unmodified small-pox among the not re-vaccinated, and in part not vaccinated, population of 363,298 persons in those places in which it had prevailed. In the Prussian army, since the introduction of systematic re-vaccination of all, the annual deaths from small-pox (which at one time were 104) have not averaged more than 2; and, on analysis of 40 fatal cases that occurred in twenty years, it appeared that only 4 were in persons who were said to have been successfully re-vaccinated. Other national experience might be referred to, but it will be better to have recourse once more to Mr. Marson's very precise statements. He tells us that *in thirty years no nurse or servant at the Small-pox Hospital has taken small-pox, he having taken care always to re-vaccinate them on their coming to live in the hospital.*"

* Varioloid is simply the technical name for the mild or modified form of small-pox, which occurs when the disease is contracted after vaccination.

CHAPTER III.

ALLEGED INJURIOUS EFFECTS OF VACCINATION.

HAVING now established, as we conceive, satisfactorily the fact that vaccination is truly a protection against small-pox—though it is not possible to bring forward here a tithe of the evidence on this head—we have to consider whether vaccination is attended by any ill results sufficiently grave to detract from or counterbalance the benefit which it confers. Its opponents allege that such ill consequences do follow in the wake of vaccination, erysipelas, consumption, scrofula, diphtheria, syphilis, &c., figuring conspicuously in the indictment. We shall proceed to consider these seriatim, taking first those cases in which the ill results are said to be produced as the direct and immediate result of the act of vaccination ; secondly, we shall consider those diseases which are said to have become more prevalent since vaccination has been rendered compulsory ; and thirdly, we shall take those cases in which certain morbid constitutional conditions are said to be transmitted by vaccination.

Erysipelas.—As regards the allegation that vaccination is apt to be followed by erysipelas, it has been found extremely difficult to discover the facts upon which the statement has been brought forward ; and we may at once and unhesitatingly assert that such an occurrence must be exceedingly rare. Systematic writers on erysipelas do not allude to vaccination in enumerating the causes of this complaint, and the disease is not mentioned as occurring amongst children by Dr. West in his classical work on the diseases of infancy and childhood. At the same time, there is no question but that erysipelas does occasionally occur

amongst children, and that it might be caused by vaccination, since the smallest local injury may set up erysipelatous inflammation in persons previously much debilitated or of an unsound constitution. As regards the special question of vaccination, it appears that two cases of death from erysipelas caused by this operation are recorded in the returns of the Registrar-General for 1861.* It appears, then, that the irritation of the vaccine vesicle *may*, in certain isolated cases in children previously weakened or of an unhealthy constitution, give rise to erysipelatous inflammation. It is certain, also, that re-vaccination—the local symptoms of which are almost invariably more severe than those of primary vaccination—is not very uncommonly attended with slight erysipelas, though this never assumes a serious complexion, except in patients whose constitution is depraved, and predisposed to take this disease upon the most trifling superficial injury. Nevertheless, with these admissions, it is certain that erysipelas following vaccination is so infrequent proportionately, and so rarely dangerous, that unless supported by more serious disqualifications, it should of itself be no bar to the performance of vaccination.

Scrofulous Diseases of the Skin.—One of the commonest of the charges against vaccination, especially amongst the lower classes, is that it is frequently followed by cutaneous affections, such as eczema. On investigation, however, this appears to be merely a single instance of the *post hoc ergo propter hoc* argument, of which we shall find so many other examples with respect to vaccination. It is quite true that many children have affections of the skin *after* vaccination; but it by no means follows that these are caused *by* vaccination. As a matter of fact, vaccination is performed at a period of infant life at which these skin diseases are especially liable to break out, either in consequence of mal-nutrition or of some constitutional taint, such as scrofula or infantile syphilis, or in other cases as the result of the irrita-

* In two cases which have recently occurred, in which fatal erysipelas supervened upon vaccination, Dr. Ballard—well known as an eminent medical man—has satisfactorily shown that the blame was not fairly chargeable upon the vaccination, as such. The cases are too complex, and involve a knowledge of too many technical details, to be inserted here; but Dr. Ballard's able article should be consulted by all who are interested in this matter. (See *Medical Times and Gazette*, Aug. 14, 1869.)

tion of commencing teething. Scrofulous children especially—and the name of these is legion—seldom reach the close of their first year of life without suffering from some skin eruption; but it would be as reasonable to assert that this was the result of their having blue eyes as that it is caused by vaccination. It *may* be the result of vaccination, but there is not in the meanwhile a particle of evidence to support this view; and the *onus probandi* lies with those who make the assertion. The utmost which can be at present asserted with any foundation is that vaccination may act as the *exciting cause* of the skin disease; but any other irritation, such as that of teething, would produce exactly the same effect, in a child constitutionally predisposed to this class of disease.

Diphtheria, Bronchitis, Measles, and Scarlatina.—It is alleged that all these diseases have become commoner since vaccination has been rendered compulsory by law; and with regard to diphtheria, it is even asserted that this disease was not known prior to the era of vaccination, the legitimate inference from this being that vaccination has generated diphtheria. This is an excellent specimen of the reasoning and knowledge of those who now come forward to oppose vaccination. Admitting for the moment that diphtheria had arisen as a new disease, since vaccination has been generally performed, upon what grounds or upon what probabilities is it asserted that it has been produced by vaccination, or that any connection whatever exists between the two diseases? As every medical man, however, knows, and as everyone ought to know who presumes to speak upon the subject at all, diphtheria has been a recognised disease all over Europe since the year 1557, and was known even to the Greeks. The name alone is new, dating within this century, but the disease itself has doubtless “existed as long as the history of man extends.”—(*Squire.*) It is needless, therefore, to discuss the question whether diphtheria has been caused by vaccination or not; and the allegation with regard to bronchitis is equally without foundation.

With regard to the alleged increase of measles and scarlatina since the introduction of vaccination, there certainly are

grounds for believing that this is the case ; but the explanation is widely different from the view taken by the anti-vaccinators. It is not that vaccination has produced a more extensive dissemination or a greater liability to measles and scarlatina, but simply that it has preserved a greater number of children than before amongst which these diseases might spread. Both are essentially diseases of infancy and childhood, and both *ceteris paribus*, will find a greater number of victims in proportion to the number of our infant population at any moment. Vaccination has greatly increased our floating population of children by preserving them from the ravages of small-pox ; and as a necessary result, the material upon which measles and scarlatina act most effectually is increased in proportion. Hence an apparent increase in the number of cases of measles and scarlatina ; but this surely is to be placed to the credit of vaccination, and should only lead us to regret that we are not as yet acquainted with a good preventive against these diseases also.

Consumption.—It is likewise alleged by the opponents of vaccination that consumption (*phthisis pulmonalis*) has largely and notably increased since the introduction of vaccination : the increase of the former being said to stand in the relation of effect and cause as regards the latter. Here, again, we have an instance of the *post hoc ergo propter hoc* method of reasoning. Supposing consumption had increased largely within the last thirty years, there is not a shadow of evidence to lead us to believe that vaccination has anything to do with it. The mode of life, the habits, the food, and the sanitary condition of the masses of the people have undergone enormous changes within the same period, and to alterations of any of these the supposed increase in consumption might be due, quite as well as to vaccination. We have, however, good grounds for supposing that, on the whole, consumption has, if anything, slightly decreased in frequency within this century. The apparent increase which is shown by the tables of the Registrar-General is due, not to vaccination, but to that useful instrument, the stethoscope. Since the introduction of this invaluable instrument for the exploration of the chest, there has been an apparent increase in

the number of all cases of diseases of the respiratory organs. It would be hardly just, however, to blame the introduction of the stethoscope for this. Before the discovery of the stethoscope medical men, in investigating the diseases of the lungs, had to rely almost entirely upon the "rational symptoms;" that is to say upon such symptoms as were to be arrived at by questioning the patient. Hence a great number of cases of consumption were never recognised at all, and these figured in the returns of the Registrar under the head of whatever intercurrent disease might be the immediate cause of death. Now-a-days, with the help of the stethoscope, almost every case of consumption may be recognised by a moderately educated medical man, and whatever the immediate cause of death might be, all these cases are returned as primarily cases of phthisis. There need, therefore, be no surprise at the apparent increase in the number of cases of consumption, and there unquestionably is no need to go to vaccination in search of the cause.

Syphilis.—This most loathsome of all human diseases is often supposed to be transmissible, and transmitted, by vaccination; and the subject is one of such importance that it behoves us to examine it thoroughly, though we shall unfortunately be compelled to suppress a great part of the evidence as too technical for ordinary readers. Premising that in speaking of the transmission of syphilis by vaccination *constitutional syphilis** alone is meant—since it is to this alone that children are liable—the evidence may be considered under the following heads:—(1) The theoretical grounds for believing such a transmission possible; (2) the results of direct experiments; (3) the experience of the medical profession.

Firstly, as to the *possibility* of infantile syphilis being trans-

**Primary* syphilis is a local disease of adults, produced by a definite and specific cause, and leaving behind it a morbid condition of the system, which is known as *constitutional* syphilis, and which is transmissible by heredity from the parents to the children. Children, not being exposed to the specific cause of *primary* syphilis, suffer only—except under quite exceptional circumstances—from the transmitted constitutional form of the disease. In discussing the question, therefore, of the transmissibility of syphilis by vaccination, we may leave primary syphilis out of account.

mitted by vaccination, Professor Paget, perhaps our greatest living pathologist, decides in the negative upon these grounds:—(a) “Because infantile syphilis, though conveyable in some instances by its own peculiar morbid products, does not render the *blood* of the patient capable of directly conveying the disease; and (b) because, if the blood of a syphilitic child could so modify the vaccine disease within it as that the vaccine lymph should be capable of conveying any other disease, there is every reason to believe that the vaccine vesicle in the diseased child would be modified in correspondence with the modified lymph.” (*Vide* Article Vaccination, in Reynolds’s System of Medicine). To put this less technically, the theoretical grounds for believing in the impossibility of communicating infantile syphilis by vaccination are as follows:—(1) The *blood* of syphilitic children is not so much altered as to be capable of transmitting the disease even by *direct inoculation*; and it would be contrary to all analogy to suppose that vaccine lymph from such a child should transmit syphilis, when the blood fails to do so; (2) if infantile syphilis *were* to be transferred by the operation of vaccinating, all pathological laws go to show that no vaccine vesicle, or an imperfect one, would be produced. We may remark, *en passant*, that this last mentioned pathological principle, though it would not, of course, afford any consolation in any particular case in which syphilis might have been transmitted by vaccination, nevertheless affords an almost certain guarantee that there can never be any *repeated* transmission of syphilis by means of vaccine lymph.

Secondly: We have to see how far theory on this subject is borne out by actual facts, and we find that the results of direct experiment are in singular accordance with what we should have been led to expect by theoretical reasoning. The experiments* on this subject have been twofold, thus according with the two theoretical objections which we have just mentioned. In the first class of experiments, largely and repeatedly performed (by

*The author would wish here to exonerate himself from the charge which might be brought against him, that he would approve of these experiments. The question is not one to be discussed in this place, but it is admittedly hard, if not impossible, to justify experiments such as these, and nothing but the great value of their results could prevent them assuming a criminal complexion.

M. Cullerier, M. Taupin, Dr. Heim, &c.), vaccine matter has been purposely taken from known syphilitic children, and inoculated upon healthy children. *In no case has the experimenter succeeded in producing syphilis in the vaccinated children, or, indeed, anything except vaccinia itself.* In the second class of experiments (performed by Professor Sigmund, of Vienna), the matter of *primary* syphilis was taken from *adults*, mixed artificially with vaccine lymph, and inoculated on healthy children. In every one of these cases the syphilitic matter destroyed, so to speak, the vaccine matter; syphilis was always communicated, but no vaccine vesicle was ever produced. We may finally observe that the best syphilographers appear to agree that constitutional syphilis, *even in adults*, is not capable of being transmitted by direct inoculation of the diseased blood, the morbid changes in that fluid not being sufficiently great to allow of this transference. It is true, amongst numerous experiments, contradictory results are said to have been obtained in one or two isolated cases; but sources of fallacy are not wanting, and there need be no hesitation in accepting the above statement as being generally, if not universally, true.

Thirdly: Though the above-mentioned experiments appear to be absolutely conclusive as to the impossibility of transmitting syphilis by vaccination, it may be as well to appeal for a moment to the experience of the profession, and to see how far this bears out the results arrived at by theoretical reasoning and by direct experiment. Mr. Marson, of the London Small-pox Hospital, in the performance of over 50,000 vaccinations, has never seen a case in which syphilis, or "other disease," has been transmitted by vaccination. Dr. West, the eminent writer on the Diseases of Children, in 26,000 cases of vaccination, has never seen "the slightest pretext for supposing that syphilis had been communicated to infants through the medium of the vaccine lymph." It is unnecessary to multiply instances, but in the words of Dr. Seaton, "it may safely be said that there is scarcely a subject in medicine in which there has been a more general concurrence of opinion." And we are certainly safe in believing with Mr. Simon that "if syphilis could be diffused by the vaccine lymph of children with an hereditary taint of that disease, this possi-

bility must long ago have been made evident on a scale far too considerable for question."

It is impossible to discuss here the few and isolated cases in which it has been asserted that infantile syphilis has been transmitted by vaccination. Their proof, or disproof, is of a nature appreciable by the trained medical man only, and the introduction here of technical arguments would serve no good end. It is sufficient to state that the weight of authority is in favour of the belief that these rare cases can be explained otherwise than by the hypothesis that the syphilitic taint was conveyed by vaccine lymph; whilst the experiments recounted above would seem to render this hypothesis wholly untenable.*

Grounds for belief that Vaccination has a generally injurious effect.—Apart from the above-mentioned specific charges against vaccination, there unquestionably exists, especially amongst the less educated classes, a very general opinion that vaccination is hurtful in a general way, lowering the standard of vitality, and predisposing to various more or less trifling, or sometimes to serious, complaints. This charge is so extremely vague, and has so little definiteness and compactness, that it is almost impossible to meet it satisfactorily; but it may be tolerably thoroughly disposed of by the following considerations. It is instinctive in the uneducated of all classes to assume that because two things follow one another in point of time, therefore the latter is necessarily caused by the earlier. Every medical man meets in practice, hundreds of cases—not necessarily connected with vaccination—in which he has to lament and combat this popular tendency. Now, looking to this common form of reasoning, vaccination takes place at an extremely unfortunate age. It is performed, namely, just anterior to the commencement of the most unsettled period of a child's existence. The process of dentition—almost invariably attended with more or less constitutional disturbance—usually begins

* The cases alluded to are such as the outbreak of syphilis at Rivalta in Piedmont, where the production of the disease was stated to be due to vaccination. For an able and convincing refutation of the vaccinal origin of the syphilis in this remarkable case, the reader should refer to Dr. Seaton's Article on Vaccination in Reynolds' System of Medicine.

within the first six months after birth. In many cases weaning has an equally disturbing effect about the same time ; in a still larger number of cases the diet has been from the first unsuitable ; and, lastly, infantile syphilis, when present, rarely exhibits itself earlier than some two or three months after birth. From these causes, singly or combined, it very generally results that the latter half of the first year of life is more trying to the constitution of the child than any succeeding period of equal length. The system of the infant, too, is so easily disturbed, that the irritations of this period are very commonly manifested in some form easily recognised by the parents. Too frequently vaccination gets the blame, but, as before pointed out in more serious cases, there is not really any ground for supposing that it is really in fault. It *may* perhaps, in some cases, especially in children constitutionally unhealthy, act as the *exciting cause* of some minor affection, such as some disease of the skin ; but even this is very far from being proved. If this really were the case, the skin-affection ought immediately to supervene upon the vaccination. As a matter of fact, however, the disease which is attributed to the vaccination, in ninety-nine cases out of a hundred, follows the vaccination at an interval too long to render this hypothesis a tenable one. At any rate, there is absolutely no *proof* that vaccination has a generally lowering effect upon the system, as its opponents assert. It may be so, but no rational man, who takes the trouble to inquire into the subject, will believe it without better proofs than any that have yet been brought forward. Certainly those whose opportunities of observation have been greatest, and whose authority in the profession is highest, are unanimous in their disbelief. And it is hardly reasonable to ask us to reject well-grounded scientific testimony upon the dictum of any number of men whose faculties have not been trained to observe, and whose reasoning powers have never enabled them to perceive, that sequence of time does not always or necessarily imply causation.

CHAPTER IV.

MORAL OBJECTIONS.—PRACTICAL SUGGESTIONS.

Moral Objections.—In reviewing the objections which have been urged against vaccination, we must finally notice the theoretical objections which are occasionally advanced by educated people. Thus, it is firmly held by some that we are not morally justified in producing any disease of any kind with the view of preventing even a greater disease. This argument is not one which can be met by reasoning, and it is enough to point out that its acceptance would be at once fatal to the use of almost any and every drug known to the medical man. A very small knowledge of physiology would convince those who hold this view that most of the remedial means employed in medicine are really based upon this very principle. If a patient is dying from want of sleep, or from the exhaustion produced by continued pain, few people, probably, would think it immoral to give a full dose of opium. Yet, in this case, as in the case of vaccination, nothing is more certain than that we produce one disease to cure or prevent another—since opium produces congestion of the brain. Exactly the same objection has been urged against the use of chloroform, and it would be easy to show that many of our more powerful and valuable drugs owe their remedial power to their producing distinct morbid conditions of the body.

A second objection which has been strongly insisted upon, is that we have no right to compel unless “the remedy and the evil are both equally certain.” This objection rests entirely upon the erroneous assumption that vaccination has been rendered compulsory simply with the view of preventing any or every particular child from contracting small-pox. Even if this were

the case, and even if no ultimate benefit had been looked for from the vaccination law, we nevertheless fail to see why a remedy, though confessedly imperfect, should be rejected upon that ground alone. Surely we take the best remedy we can get, hoping that at some future time we may find a better. All preventive legislation is based upon this principle, and we do not see how it can be based upon any other. Take the case of the liquor laws. No one, probably, will maintain that every man who may be in the habit of taking intoxicating liquors will necessarily become a drunkard; and certainly no one will assert that *any* repressive measure will entirely put an end to drunkenness. In this case neither "the evil nor the remedy are both equally certain," and yet few of those who are satisfied that alcohol is an evil, but would be glad to get the legislature to pass some compulsory law of prevention.

There is another point of view, however, in which this subject may be looked at. The legislature, in framing the compulsory vaccination act, has had in view not only the benefit to the present generation, but the ultimate extinction of small-pox itself. That vaccination does afford some decided protection against small-pox, and that small-pox has notably diminished both in frequency and in virulence since its introduction, we have shown upon evidence which no sane reasoner can reject. There is reasonable hope, therefore, that if vaccination and re-vaccination were strictly and rigidly enforced, small-pox would nearly or entirely disappear; and few will deny that this would be a great public boon. In the absence, therefore, of any unmistakable and acknowledged evidence of the injuriousness of vaccination, we maintain that it is a high and sacred public duty that a parent should have his children vaccinated, if not, as he may think, for their own good, nevertheless for the good of mankind in general. The question is one which strikes at the very roots of government and law, and simply amounts to this:—shall any individual, relying upon his own wisdom, refuse obedience to a law which has been passed for the general weal by the collective sense of the nation? In this case, the collective sense of the medical profession is the collective sense of the nation, since, without dreaming of asserting medical infallibility,

there is no doubt but that the great bulk, and all the leading members, of the medical faculty are in favour of vaccination, and the question is one of the merits of which they alone are at present qualified to judge. Let the question be examined into as freely, and discussed as minutely as is possible, and if a case can be made out against vaccination, by all means let the law be repealed, but do not let us, by unreasoning agitation, upon no grounds which have as yet been scientifically proved, pull down an edifice which it has taken many years to build.

Lastly, it is with pain and regret that we feel bound to notice in this place another allegation which has been brought forward, and we notice it merely with the view of correcting an erroneous statement of facts. The opponents of vaccination do not scruple to affirm that medical men wilfully distort the facts in favour of vaccination, being impelled by motives of personal interest to keep up the present law. We do not feel that it is necessary to refute this undeserved slander against what is perhaps upon the whole the best educated, and is certainly one of the most disinterested, hardest-worked, and worst paid bodies of men in the world. We simply wish to point out that the interest of medical men is entirely the other way. Not only would the revival of small-pox in all its original horrors be more advantageous to the medical man in a worldly sense, but vaccination happens to be more poorly paid than, perhaps, any other operation which the practitioner is called upon to perform. The efficient performance of vaccination requires considerable skill, care, and patience, and always entails a far from trifling amount of trouble and loss of time. As regards remuneration, the case stands as follows:—Government appoints in every district a public vaccinator, but does not insist upon every one in the district having their children vaccinated by him. The Government fee for vaccination is only eighteen-pence, and every one conversant with the subject will admit that this must be entirely unremunerative, except on a large scale. Now, as any one so disposed may pass over the public vaccinator, and may have his child vaccinated by any other medical man whom he may prefer, it always happens that the public vaccinator gets only a certain proportion—often only a small proportion—of the vaccinations

of his district, supposing there to be any opponent. As regards the other medical men, who are not public vaccinators, the operation is still more unremunerative. For many reasons, every medical practitioner prefers to vaccinate his own patients, and he is, therefore, compelled to charge less than the public vaccinator, or to charge nothing at all, since poor patients would always have recourse otherwise to the public operator. It should also be added—as the writer can attest from personal experience—that many people look upon the operation of vaccination as too trivial to be paid for at all. We need not pursue this subject further. It is certain, however, that vaccination, in a general way, is not remunerative to medical men, and it is equally certain, taking human nature as we find it, that the operation will never be universally performed with due care and trouble until it is adequately rewarded.

Practical Suggestions.—It remains only to make one or two practical suggestions as to the manner in which the operation of the vaccination laws may be rendered more efficient. All authorities concur in believing that many of the evils which have been charged against vaccination are truly the result—when they have any real existence—of *inefficient* or *careless* performance of the operation. Any alteration, therefore, of the law ought to be in the direction of making imperfect or unsuccessful vaccination less and less possible; and it appears that many of the evils of the present system might be obviated by the following changes:—

1. That the public vaccinator, as at present appointed by Government in every district, should be compelled, prior to his appointment, to give full and satisfactory evidence that he is thoroughly acquainted with the principles and practice of vaccination.

2. That the public vaccinator be compelled to vaccinate in the manner and to the extent recommended by the best authorities; and that he be compelled to state on his certificate the number and characters of the cicatrices produced in each case.

3. That all persons residing in the district be compelled to employ the public vaccinator to vaccinate their children, whether he be their medical man or not ; the Government refusing to accept a certificate from any other medical man.

4. That Government should pay a small additional fee on every certificate, in which the vaccination is shown to have belonged to the first class as regards the resulting protective power against small-pox.

5. That re-vaccination, between the ages of twelve and sixteen, shall be rendered compulsory upon all.