



THE VALUE OF VACCINATION.

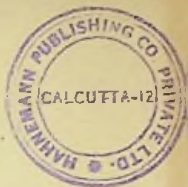
PUBLISHER'S NOTICE.

BEFORE deciding to publish this little work, the publisher usual placed the manuscript in the hands of two persons in whose judgment he felt that he could rely,—this time in the hands of two physicians directly opposed on the question of vaccination. The first, who was in agreement with the position taken by the author, pronounced it a most interesting and exhaustive treatise; the second, while he did not assent to the conclusions drawn, unhesitatingly declared it to be a scholarly effort and one that would be read with interest by many in the profession—"not a dull page in it," he said.

Such comment from two physicians of opposite principles on this question, decided the publisher that the work could not fail to be of value to those interested in the subject, and under this belief it is now placed before the medical profession.

F. E. BOERICKE,

Publisher



THE VALUE

OF

VACCINATION

A NON-PARTISAN REVIEW OF ITS
HISTORY AND RESULTS.

BY

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"Gladly wolde he lerne and gladly teche."—CHAUCER.



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TO MY
COLLEAGUE AND FRIEND,
PROF. STEPHEN POWELL BURDICK, M.D.,
THIS MONOGRAPH IS,
BY PERMISSION,
DEDICATED.

PREFACE.

THE following pages were primarily intended to form a chapter in an encyclopædic work on the Practice of Medicine. Had it been my desire to write a popular treatise on Vaccination, I should probably have arranged my material in a somewhat different manner, and have given less space to technical detail. Whether the result would have been more serviceable to the cause of truth, can only be determined by the reception which may be accorded to these pages.

This subject is one in which all intelligent persons are rightly interested, and it seems wise to give the facts here collated a wider circulation than they would reach if printed, merely, as originally proposed. As I have elsewhere said, there is nothing essentially medical in the art of Vaccination, no phase of it beyond the comprehension of any ordinarily educated person, and any attempt to hedge it about as a something with which the people have

nothing to do, but pay liberally and unquestioningly for, should be resisted.

Vaccination became a question of public policy, when laws for its enforcement were enacted, and as long as people are taxed to support it, they have the common right of investigation. As a medical tenet, they might readily leave it to medical authorities to dispose of; but when the ingenuity of the law is invoked to make it obligatory, then the public have a right to know what they get for their money.

In this little book, which I now submit to the indulgence of the public and the tender mercies of the critics, is expressed the growth in knowledge of the subject, on which it treats, extending over many years, and in sending it forth, it is with the hope that it may prove both instructive and entertaining.

G. W. W.

No. 29 West Twenty-Sixth St., New York.

December 10, 1885.

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“He who only knows his own side of the case, knows little of that.”—JOHN STUART MILL.

“I consider that the affirmation of facts is more powerful than the assertions of men.”—PASCAL.

“Persistent misrepresentation of familiar facts must be set right. If people are allowed to hear what is untrue repeated often enough and confidently enough, they come, at last, to believe it, and that is a process, which one is bound to disturb.”—*Pall Mall Gazette*, August 16, 1883.



Introduction.

THE subject of Vaccination has engaged the attention of a multitude of minds, both great and small, and its literature is as varied, in quality and complexion, as one need wish to find. It is one of those unfortunate topics, which seem to exasperate the most equably-tempered men, and to produce ebullitions of unreasonableness whenever and wherever broached. Conceived in ignorance of the real nature of disease, and born of fanaticism which brooked no questioning, fostered in the beginning by feminine conceit and courtly prerogative, and later by governmental patronage and the conservatism of habit, it seems to have been so imbued with the spirit of intolerance and arrogance, that, even now in these modern days, when we pride ourselves on the impartiality with which we discuss scientific topics, every one who believes in vaccination looks with a sort of pitying scorn upon any one who does not. To doubt or discuss is, to their minds, convincing, nay irrefutable evidence of an impairment of that mental balance which we all pride ourselves in possessing.

It is not singular, therefore, to find the densest ignorance on this subject among those who ought to know its origin and history; ignorance and prejudice being the twin handmaids of tyranny. It has been my lot to stand in personal relations with numbers of medical men during the past score years, and being somewhat curious upon this subject, I have, as opportunity presented, put the inquiry to some two hundred of them: Have you ever read Dr. Jenner's works. With two exceptions, the answer has been a negative. To be sure, one might know a great deal about a subject without having read a particular author, but those who do not know what Jenner claimed, and upon what basis he is canonized as the Immortal, can hardly be in a convenient attitude to defend him, and his theories, upon logical grounds.

This question, although affecting the welfare of untold millions, is calmly asserted to have passed beyond the domain of argument. Perhaps it has: but no truth was ever hurt by exposure to the rays of publicity, no matter how pitilessly they might beat upon it; nor, on the other hand, does truth ever gain by slinking behind vested interests and conventional phraseology. The object of this monograph is, therefore, to investigate fairly and dispassionately the claims of the Jennerian method, and the tentative basis upon which its theories were founded. It is hoped that sequestering ourselves from the atmosphere of partisan strife, we may be able to perceive the just value of theories, and quietly study the history of their growth.

It seems ludicrous that a question of so much import, and of so purely a scientific nature, should be a matter of partisan clamor, but it ceases to be comic, and becomes painfully embarrassing, when men cannot discuss a question of vital importance to themselves and the race without being accused of sinister motives or of mental unsoundness. And yet this is just what has happened ever since the earliest years of Vaccination. Jenner began it in his efforts to suppress every fact which told against his theory, and his mantle has passed with the passing years to men of like aptitude for the suppression of disagreeable truths. This is not philosophic, it is not scientific, but it is very human. Nevertheless, there has always been a widespread disapproval of the philosophy and practice of Vaccination; and acumen, probity, and learning have not been confined to the disputants on either side. The anti-vaccinists are neither more ignorant nor more fanatical than the pro-vaccinists, and neither side has been free from prevarication and unworthy methods.

My own interest in the subject is by no means recent. During the war for the Union, many cases of smallpox were brought up from the front to Cincinnati, where I lived during my boyhood. Circumstances brought me into contact with these cases to a considerable extent, and I became interested in the subject. Just previous to the war, I met an old lady, who had been vaccinated and re-vaccinated, and had had smallpox three times. This, as I then

thought, anomalous experience, and my subsequent familiarity with the disease, awakened a natural curiosity as to the value of vaccination that did not protect. My interest in the matter was not lessened by finding, upon questioning them, that nearly all the smallpoxed-marked persons, whom I casually met, averred that they had been vaccinated prior to taking the smallpox. When one's mind is awakened to a subject he naturally hears much about it, and what would otherwise slip by unnoted is read with attention, I might say with avidity. In this way, I have waded through much of the literature of Vaccination, both pro and con, and it has been my endeavor in the following pages to present such a *résumé* of my reading as would commend itself to all lovers of truth for its impartiality and directness.

Involving, as it does, the welfare of the race, either for good or for ill, Vaccination deserves the calm consideration of every thinking man or woman. The policy of presenting medical questions to the general public is vehemently condemned in certain quarters, and attempts to create a priestly craft in medicine are as persistently encouraged. The Legislatures of our various States are besieged annually by men whose aim is to establish by enactment a medical priesthood, under the plea that the people are too ignorant to judge for themselves. I am not one of those who sympathize with mysticism in medicine. I believe that the more rational the public may be on these topics the better for themselves,

for medical progress, and for the profession. Medical men are no better, and never have been any better, than the public demand; and the surest, the most reasonable, nay the only way to raise the standard of professional character and achievement is through the demands made by an intelligent and exacting public. I am, therefore, always glad to serve as a medium of instruction. It is with that purpose I send out this book, and it is for that reason that I have avoided a popular style of writing, and presented the matter from a purely scientific, but I hope not uninteresting, basis. If this be medical heresy, I am pleased to be a heretic.



The Value of Vaccination.

THE RISE OF VACCINATION AS A MEDICAL DOGMA.

VACCINATION consists in the introduction of a specific virus into the system; and is performed as a prophylactic against the contagion of smallpox. It was invented by Jenner, in 1798, as a substitute for inoculation.¹ Previous to this time, and indeed for many years subsequently, inoculation had been in vogue.

Inoculation was brought from the Orient by Lady Mary Wortley Montagu, in 1721; and consisted of the introduction subcutaneously of smallpox virus.² Writing from Constantinople she said: "The smallpox so general and so fatal amongst us, is here entirely harmless by the invention of engrafting, which is the term they give it. There is a set of old women who make it their business to perform the operation. Every year thousands undergo it, and the French

¹ *Inquiry into the Causes and Effects of the Variolæ Vaccinæ*, London, 1798.

² Vol. II, Letter XXXI, dated April 1, 1717.

Ambassador observes pleasantly that they take the smallpox here by way of diversion, as they take the waters in other countries. 'There is no example of any one that has died of it, and you may believe I am well satisfied of the safety of the experiment since, I intend to try it on my dear little son. I am patriotic enough to take pains to bring this careful invention into fashion in England.' And she did. Rumors of this method had been common enough in England for a score of years, but no one had been found brave enough to hazard the experiment, until Lady Mary had it tried on her own daughter; the operation was successful, and awakened great public interest. In the same year (1721) Dr. Boylston, in Boston, Massachusetts, inoculated 244 persons, of whom six died. Other deaths followed inoculation in England, and it would probably have fallen into permanent discredit, had it not been for two circumstances. Robert and Daniel Sutton, two brothers, practitioners, one in Essex and the other in Suffolk, perceiving the advantages in the method of treating smallpox as outlined by Sydenham, applied it to inoculation, and won great celebrity by so doing. This consisted in giving most minute attention to the personal hygiene of the patient, and keeping the bowels open with purgatives. Immense sums were paid to them by the nobility for attendance, and it became the fashion to employ them. The other circumstance which tended to give permanence to inoculation was the establishment, in 1746, of the Smallpox and Inocu-

lation Hospital, London; where inoculation continued to be performed, on all applicants, until as late as 1822.

In the *Revue des Deux Mondes*, Aug. 1, 1882, M. Daremberg says in an article on M. Littré:—"Inoculation of smallpox was practised in the second century. This is proved by the following lines from the Schola Salermtana:"—

Pour éloigner d'un fils ce poison délétère
Inocule en sa veine un virus salulaire."

The phenomena of inoculation is thus described by Doctor Gregory, who had charge of the London Smallpox Hospital for many years: "On the second day after the operation, if the part be viewed with a lens, there appears an orange-colored stain about the incision, and the surrounding skin seems contracted. On the following day a minute papular elevation of the skin is perceptible, which on the fourth day is transformed into a vesicle with a depressed centre. The patient feels an itching in the part. On the sixth day, some pain and stiffness are felt in the axilla, proving the absorption of the virus into the general mass of blood. Occasionally on the seventh, but oftener on the eighth day, rigors occur, accompanied sometimes with slight faintness, sometimes with pain in the back, headache, or vomiting. The patient complains of a disagreeable taste in the mouth, and the breath is offensive, soon after which the eruption shows itself."³ The disease then usually

³ *Cyclopædia of Practical Medicine*, Vol. III, page 750.

runs the natural course, in a mild form. Inoculated smallpox was as infectious as spontaneous smallpox; and therefore Dimsdale and other enterprising inoculators recommended and superintended the inoculation of entire parishes, so that all having smallpox together, none might catch it. During the process, intercourse was, as far as possible, suspended with the outer world.

Up to the time of inoculation variola had not been looked upon with particular disfavor, and was not considered any more dangerous than measles. Indeed, in the Health Reports these two diseases were classed together up to 1738, and until after that year it is impossible to determine just how much smallpox there may have been. From the most trustworthy sources, however, it is evident that just as now we have epidemics of measles, and other of the zymoses, varying greatly in intensity and fatality, so in the pre-inoculation period there were epidemics of smallpox of great fatality and others of very moderate intensity. But after the introduction of inoculation, the ravages of smallpox increased, not only directly as the result of inoculation, but each new case became, as it were, a centre of disease, from it spreading in every direction, often with great virulence. It spread smallpox just as the natural disease did. It could be propagated anywhere by sending in a letter a bit of cotton thread dipped in the variolous lymph. In this way, not only the number of cases, but, also, the general mortality was very

greatly increased.' But so hard is it to alter the ideas of a people after they have crystallized into habit, that although it was evident that epidemics of smallpox often started from an inoculated case; and although the most strenuous efforts were made to supersede it by vaccination, inoculation continued to flourish for nearly a century and a half. It was found necessary in 1840 to make inoculation in England, a penal offense, in order to put an end to its use. Even that has not prevented its secret practice by the lower orders, where ideas die hardest, and the rite is even now probably more than occasionally performed.

I have thus dwelt, with possibly undue prolixity, on this exploded medical dogma, because it throws a broad side-light on the rise and history of vaccination. Viewed from our present knowledge of zymoses, inoculation is seen to be a gigantic mistake. Instead of being the entirely harmless invention that it was claimed to be in 1721, it was found to be so pernicious a custom, and so destructive of public welfare, as to be branded as a crime in 1840. At the time of its introduction it was hailed as the greatest of medical discoveries, and the encomiums lavished upon it equalled those that have since been given to vaccination. Dr. Monteith relates:—"By the year 1777 the arguments, in favor of Variolation, had so far triumphed over the habits and prejudices

of the profession that there is no instance mentioned in our reports of any medical man in Newcastle opposing it. *It is always spoken of as one of the best established facts of medical science.* With the general public the case was different. Their prejudices were as strong as ever, and they exhibited a horror of Variolation which would satisfy the most ardent anti-vaccinator. To combat these prejudices, various means were tried—sermons from the pulpit, pathetic exhortations in the newspaper, etc. . . . In 1801, there had been in all 3268 operated upon.”—*Report of the Newcastle Dispensary, from its Foundation in 1777.* Newcastle-upon-Tyne, 1878.

And yet, alas for human prescience, what was proclaimed as the savior, proved to be the destroyer. Probably, more than all other things combined, it has contributed to keep smallpox alive, by constantly disseminating the infection. The immediate deaths from inoculation were one per-cent.

Owing to the spread of smallpox through inoculation, great fear of the disease had been produced, so that, when Jenner proclaimed vaccination as the certain and unfailing prophylactic against this disorder, there were multitudes, especially of the educated and wealthy class, who were ready to give credence to the discovery.

Vaccinia (from *vacca*, a cow) or the Cow-pox, singular to say, never originates spontaneously in the cow, and is not one of its natural disorders. When found on that animal at all, it will be seen

that it is the milch cow that is almost invariable affected. The cause of this will presently appear, and it was well understood by Jenner. In fact, he frequently declared, that, if a disease of similar appearance ever did occur spontaneously on the cow, that such was a spurious form of pox, and utterly worthless for vaccinal purpose. It is well that this should be understood clearly, as of late years great stress has been laid upon the supposed virtues of a particular virus-stock, as having been obtained from a spontaneous case of cow-pox.⁵

When Jenner established vaccination he was very particular to point out the importance of using only a certain kind of virus. The cow-pox, to which he ascribes these virtues, is a filth-disease, communicated to the udders of the animal by dirty stable-boys, who had gotten their hands soiled with the matter from the greasy heels of ill-kept horses. Although it is not in every case possible to trace the infection thus, there is the best authority⁶ for saying that it is always communicated in some such way. That it is not a disorder to which the bovine race is subject, is amply shown by the fact that bulls never have it; and a zymotic disease confined exclusively to one sex would be an anomaly in nature. But who ever heard of bull-pox?

This disease, which is called cow-pox in cows, is known as grease in the horse. Grease is a disorder

⁵ A case of alleged spontaneous cow-pox at Beaugency, in France.

⁶ Prof. Simonds, Royal Veterinary College, 1879.

resulting from inflammation of the sebaceous glands of the skin, about the heels of a horse, and is properly called *eczema pustulosum*. The disease originates from a scrofulous condition, supervenes from exposure to wet, and from subsequent lack of cleanliness, and is always the result of carelessness on the part of the groom.⁷ The discharge from these vesicular pustules is often profuse, very irritating to the surface over which it flows, and fœtid. Prof. Hering has found in it large numbers of acari, called *sarcop-tes hippopodus*. The presence, however, of this parasite seems to be purely accidental, and is said to have nothing to do with the progress of the disease.

This purulent matter, carried on the dirty hands of farm-laborers to the teats or other sensitive parts of the cow, produced the disorder which has been misnamed cow-pox.

It was noticed that milk-maids or others, that became affected with this disorder, from absorbing the virus through cracks on the hands, were not, as a rule, subject to variola during epidemics of that disorder, and, consequently, it became a matter of country-side gossip, that cow-pox was a preventive against taking small-pox. This coming to the ears of Jenner, led him to cogitate upon the best manner of securing such prophylactic protection at will, and to finally adopt vaccination. This was no hurried step on his part. For it was when, as a mere sur-

⁷ Kirby on *Veterinary Medicine and Surgery*, page 168.

geon's apprentice at Sodbury, near Bristol, in 1768, that his attention was called to the matter by a chance remark made by a country girl,⁸ and it was not until nearly twenty years later that he made his first vaccination. This was upon a lad named James Phipps, who subsequently died of pulmonary consumption.

Two years later, in 1789, he vaccinated his own son, then a year and a half old, with swine-pox; and between that year and 1792, he repeatedly inoculated him with small-pox. This son was always delicate in health, and died in his twenty-first year, of pulmonary consumption, which many have claimed was induced by the repeated inoculations.

It was natural that, having thus spent many years of his life in developing this idea, that he should claim perfection of security for those who submitted to this rite. It was, perhaps, just as natural that the medical profession should have been slow to accept a new medical dogma thus thrust upon them by an obscure, and not over-successful practitioner. Dr. John Hunter, the celebrated physiologist, and a former preceptor of Jenner, thus voiced the medical opinion of the time: "The introduction by inoculation of mineral or vegetable poisons into the blood is hazardous, and in certain quantities may be destructive; but the introduction of animal products from another living body, be it a man, a cow, or even an

⁸ Baron's *Life of Jenner*, Vol. II, page 122.

ass, is infinitely more pernicious, because allied to it in being vitalized."

Jenner had, in 1797, made an ineffectual effort to gain admission for his treatise into the Transactions of the Royal Society; but he was given to understand that "he ought not to risk his reputation by presenting to that learned body anything which appeared so much at variance with established knowledge, and withal so incredible."⁹

Happily for Jenner, he succeeded in persuading a number of aristocratic ladies to become amateur vaccinators among their tenantry and dependents. The method was novel and highly sensational, and thus furnished a pleasing diversion for the fashionable world. Under the protection of the Earl and Countess of Berkeley, he was able to defy the medical profession; and the art being alleged to be within the ability of any one to apply, many were found ready to spread the glad tidings. Lady Charlotte Wrottesley was one of the earliest devotees to the new rite and vaccinated thousands in Staffordshire. The clergy were pressed into the service, one of whom vaccinated three thousand persons in about three years. An enthusiastic friend of Jenner recommended that "the christening and vaccination be always performed on the same day." The Duke of Clarence caused his household and farm-servants to be vaccinated. The Duke of York ordered the vac-

⁹ *Life of Jenner*, Vol. II, page 168.

ination of a regiment. And in 1802 the King commanded the prime minister to convey to Parliament his majesty's desire that a benefaction should be awarded to Jenner out of the public purse. When the bill came up the princes of the blood attended in its support. To the subservient Parliament of that day, an intimation of the royal wish in a matter of this kind was decisive. Jenner promised the credulous monarch and his faithful Parliament that vaccination would put an end to smallpox forever. Not only were the people to be perfectly secure from death from smallpox, but they were to be equally secure from attack. There were absolutely to be no cases. In the anxiety of the Court to believe, and the readiness of Jenner to promise, the fact that vaccination had been on trial for only six years, and that it was utterly impossible for Jenner or anybody to know whether it would protect for a lifetime, was lost sight of. Jenner's positive declaration was received as if proven.

The Commons granted the £30,000. The Court breathed easily, they were to be made perfectly secure for life. To Jenner's high gratification, the medical profession, overawed by the attitude of the Court and the nobility, found it convenient to withdraw their opposition to the now triumphant method, and to publicly indorse what they had previously rejected.

This, in brief, is the history of the establishment of vaccination as an accepted medical dogma. It

will be seen with how little of scientific research it was adopted, and how much the whim of a few fashionable folk shaped its destiny. Had it remained purely a medical question, it may well be doubted whether it would ever have attracted more than passing attention, and if remembered at all, it would possibly be as only one of the curiosities of medicine.

In endeavoring to present as briefly as possible the present state of our knowledge of this very important subject, I shall describe cow-pox as modified in the human subject, the nature and origin of vaccine virus, the methods of vaccinating, the extent of protection afforded by vaccination, and the dangers, if any, of vaccination. In doing this it is my honest desire to present the arguments advanced by those who thoroughly and unquestioningly indorse the method, as well as of those who decry and despise it, in such a manner as to elucidate the truth in this vexed question, so that each reader may come to a proper understanding of it.

COW-POX AS MODIFIED IN THE HUMAN SUBJECT.

IF a small particle of the virus from a fully formed vesicle of cow-pox be taken upon the point of a lancet, and inserted by puncture beneath the cuticle of a person who has never had smallpox nor been previously vaccinated, certain phenomena will appear in a definite order. If the person be in otherwise good health, no particular effects will be noticeable during the first forty-eight hours, except a temporary elevation of temperature, followed by a fall to a point below normal. Within a few hours a peculiar malaise, like that precluding the whole class of exanthems, overcomes the patient. He is dull and sleepy; pulse and respiration are both slowed for a time; the pulse soon quickens, but the respiration continues slow or shallow, with bronchial râles, or slight laryngismus. At the end of the second day, or surely during the third, there will be perceptible a papulous spot over the point of puncture, which, very slight at first, becomes by the fifth day a distinct vesicle, bluish-white in color, the edge raised and clearly defined, and the centre lowered, thus forming a peculiar and characteristic cup-like depression. This vesicle gradually fills with a clear and limpid fluid, which is misnamed lymph, and

by the eighth day, that is the day week from the insertion of the virus, it has become fully ripe, and while retaining the peculiar shape already noted, it is now pearl-like in color, round and plump. Preceding this, however, by one or two days, there has begun to form about the base a thin ring of inflammation, called the areola, which rapidly spreads and takes on the character of erysipelas. This Jenner declared to be the chief sign of the true character of the virus, being even more important than the shape and appearance of the vesicle. He repeatedly said that without the accompanying erysipelas no vaccination could be counted upon as protective.¹⁰ The amount of erysipelas varies greatly. Sometimes it is a clearly circumscribed round spot of less than three inches diameter. At others, it extends irregularly, involving perhaps the entire limb. Even where it involves but a small cutaneous surface, there is much hardness and swelling of the subjacent connective tissue, while in extreme cases the arm may become enormously swollen, and so rigid as to be practicably immovable. In either case, the development of the areola is accompanied by the usual systemic symptoms of erysipelas. The temperature continues low until the fourth day, when it rises to 102° to 104° F., or even higher. On the eighth day there is usually a sharp rise of temperature, respiration and pulse. The pulse may even go as high as

¹⁰ Or, as he poetically expressed it, "The pearl upon the rose."

200, and the respiration to 80; but these are exceptional figures. Restlessness, heat and dryness of the skin, headache, nausea, diarrhœa, swelling of the axillary and other glands, are present in varying intensity, and are never altogether absent, even in the mildest cases. In fact, these secondary symptoms are looked upon, by all experienced vaccinators, as marking the effectiveness of the protection afforded by the vaccination.

The duration of these symptoms vary with their intensity, but usually after the tenth or eleventh day, that is about five days after the setting in of the erysipelas, the period of recovery begins. The temperature returns to nearly normal, and then sinks slightly below it, the bowels become regular, the headache disappears, the swollen glands are less sensitive, the skin is more natural, the areola fades gradually, the vesicle, which during this process has changed to an opaque and pustular appearance, now begins to dry in the centre, and a process of desiccation and incrustation follows, occupying four or five days, at the end of which time a hard, brown scab has formed. This process lasts about five or six days. The scab continues to dry, harden, and darken, and at the end of the fourth week spontaneously separates, leaving behind a permanent, slightly-depressed cicatrix. This cicatrix, upon examination with a magnifying glass, is seen to be indented with a number of minute pits, from which radiate fine lines.

In children, after vaccination, when the spots have nearly healed, an erysipelatous redness occasionally appears, spreading over the arm and a great part of the trunk. The redness is often intense, the tissues being very hard, painful and shiny; and this inflammation may continue for weeks.¹¹

Some persons are found, who, while never having contracted smallpox nor been inoculated, yet are peculiarly insusceptible to vaccination. In these, even the most careful performance of the operation only results in a transitory illness, not incapacitating them from their ordinary vocations, and leaving behind slight evidence in the way of a "mark." Such persons seem to have the power to throw off the poison through inherent vitality, and would probably not take smallpox in the natural way, if exposed to it. Occasionally, on the other hand, persons will develop extreme susceptibility, which shows itself by an eruption on a portion of, or upon the entire body. This eruption may be papular, vesicular, or pustular. Sometimes the sores are very similar to the one at the place of puncture. These eruptions are not generally long-lasting, ordinarily not extending beyond the falling of the scab. In other cases, however, persisting for weeks or months, or perhaps causing death.

Vaccination directly from the cow is now very rarely performed. The usual plan is a modified

¹¹ Sidney Ringer, M.D., *Handbook of Therapeutics*, 8th edition, page 445.

form, by which the dried virus either from a vesicle on the cow, or from another person who has recently been vaccinated, is used. In either case the virulence is very much lessened, and in consequence, the protective power greatly impaired.

From this use of virus of varying degrees of virulence, decided variations in the phenomena of vaccination occur. Papulation is sometimes deferred until the eighth, ninth, or even eleventh day. The areola may not appear until after the second week. The vesicle is often wanting in that sharp definition of edge, plumpness of appearance, and glistening color which has been described. The areola may be only a faint pink, or deepening in shade, it may pass through a dusky brick-red to deep purple. In some cases it fades and brightens in color, while the swelling and hardness remain unchanged. The scab sometimes does not fall until the sixth week. None of these things necessarily impair the value of the vaccination, though a too wide variation from the normal phenomena will always subject the case to suspicion.

There are three forms of variation which are recognized, and which demand our attention: (1) accelerated; (2) retarded; (3) irregular, or spurious.

Those cases are denominated as accelerated where the symptoms all appear in quicker succession than heretofore described. If the symptoms are twenty or thirty hours in advance of their due course, and the vesicle is irregular in appearance, the areola but

slight, and the general constitutional symptoms wanting, but little faith can be put in the protective power of the operation. If, however, the vesicle be normal in appearance, and the constitutional symptoms present and only briefer in duration, the value of the vaccination is not impaired.

Where the ordinary course of the vaccinal phenomena are modified by retardation, the circumstances that cause it should, if possible, be determined. In the winter season, especially if the patient be exposed to the vicissitudes of weather, a delay of a couple of days is of no special moment. Retardation rarely occurs in those vaccinated directly from the cow, and though more common, is still infrequent in immediate vaccination from arm to arm; but when dry virus is used it often seems to need several days of incubation before its specific character is aroused. Again, the state of the person's health at the time has much to do with the progress of the vaccine disorder. If they are so unfortunate as to take cold at that time, or if they are incubating some other disease, a marked delay in the development of the vesicle may result. Jenner noticed that the vesicles are often arrested in their course, if unwittingly a child was vaccinated just as it was falling ill of measles or scarlet fever, and that the areola did not appear until the morbillous or scarlatinal symptoms subsided.¹² If, however, the patient be

¹² *Continuation of Inquiry*, page 31.

incubating smallpox, the two diseases, vaccinia and variola, go on side by side, apparently unaffected by each other; unless previous to the formation of the vaccine vesicle the smallpox pustules appear, in which event the vaccination fails to take.

There are still other cases where the natural march of the vaccinal-disorder is delayed, at one point or another. If, however, the major symptoms do occur, even though the whole progress of the disorder may occupy six or seven weeks, no suspicion need be thrown upon the character of the protection afforded.

Spurious vaccination runs an entirely irregular course, the varieties being practicably unclassifiable. The vesicle instead of being cup-shaped, may be acuminated or conoidal; the contained secretion may be straw-colored or bloody, instead of limpid and clear; the vesicle may have scabbed by the seventh day, or even sooner; or the scab may be a thin scale, which drops off at the lightest touch. In other cases the vesicle breaks spontaneously, and becomes an open and unhealthy ulcer. None of these forms can be relied upon as having the slightest protective power.

While these irregular appearances may be often due to inexperience or carelessness on the part of the operator, or to the inferior quality or impurity of the virus used, it is not always so. In the hands of the most skilful and experienced vaccinator it will happen, that in a group of children operated upon at the same time and with the same virus, some will

present perfectly formed vesicles, in due time, while perhaps on one it will not take at all, and on another a hideous ulcer will result.

It is well known that in the vast majority of cases an attack of measles, scarlatina, pertussis, or variola renders the person insusceptible to the disease forever afterwards. There are, however, plenty of instances of individuals who have had one of these diseases two or more times. The same rule, to some extent, holds true of vaccination. The phenomena which I have described, can, as a rule, be produced but once in an individual. A second vaccination, providing the first has been thorough and severe, either fails to produce any local effect whatever, or else in a very modified form. There are persons, however, who are so susceptible to the influence of this virus that they will be severely affected by it whenever it may be re-introduced. It not infrequently happens that persons who can show excellent vaccination-marks, upon being re-vaccinated develop most severe constitutional disturbances, accompanied with extensive phlegmonous erysipelas. Cases have occurred terminating fatally from pyæmia. It is impossible to foretell what will be the result of a re-vaccination, as the severity bears no relation to the character of the primary disorder. It is simply and always a matter of good luck when, upon re-vaccination, the patient escapes serious constitutional effects.

Dr. Ballard observes¹³ in his work on vaccination that, "Vaccination is not a thing to be trifled with, or to be made light of; it is not to be undertaken thoughtlessly, or without due consideration of the condition of the patient, his mode of life, and the circumstances of season and of place. Surgeon and patient should both carry in their minds the regulating thought that the one is engaged in communicating, the other in receiving into his system a *real* disease—as truly a disease, as smallpox or measles; a disease which, mild and gentle as its progress may be, yet nevertheless now and then, like every other exanthematous malady, asserts its character by an unusual exhibition of virulence."

¹³ *Vaccination, its Value and Alleged Dangers*, page 93.

THE NATURE AND ORIGIN OF VACCINAL VIRUS.

THE history of vaccination is peculiar in several very important particulars. We are now to consider one of these. If it be asked, with what shall we vaccinate? the answer would seem to be simple enough—why, with vaccinal virus, of course. But if we ask, What is vaccinal virus? the answer is not readily found; nor is there, even now, after nearly a century of vaccination, any concord in the profession as to the proper material to be used.

When Jenner first performed the rite, he used cow-pox virus. We have already seen what was the origin of this disorder in the cow, viz., that it was a contagious disease transferred, by careless manipulation, from the heels of the horse to the udder of the cow. Jenner believed that smallpox, swine-pox, cow-pox and grease were merely varieties of the same disease, as he implied by the name *variola vaccinae*. He vaccinated his own son with swine-pox. He employed the grease-virus (horse-pox) in a large number of cases, and furnished it to other vaccinators. Acting on his suggestion, the King of Spain, in 1804, ordered all the children in the Foundling Hospital at Madrid to be vaccinated with goat-pox. Jenner claimed that the virus of these and

various other animals were all equally efficacious with cow-pox in warding off smallpox. He also used arm-to-arm vaccination, derived both from the cow and from the horse. He therefore practiced five distinct things under the one name of vaccination: (1) Cow-pox vaccination; (2) cow-pox-child vaccination; (3) horse-pox (grease) vaccination, which he denominated as the equination of the human subject; (4) horse-pox-child vaccination; and (5) swine-pox vaccination.

Although he asserted that grease, cow-pox and smallpox were all one disease, he made no attempt to prove it by inoculating the cow with variola. But, as early as 1801, Gassner, of Günsburg, inoculated with variolous virus eleven cows, producing on one of them vesicles having all the characteristics of vaccinal vesicles, and from which "a stock of genuine vaccine lymph was obtained."¹⁴ With this smallpox-cow vaccine four children were inoculated, and from them seventeen other children were in turn vaccinated. In the following year (1802) a number of cows were successfully variolated at the Veterinary College at Berlin.¹⁵

In 1830, Dr Sonderland, of Barmen, by enveloping cattle in blankets taken from the bed of a patient who had died of smallpox, and by also hanging the blankets up around their heads, and thus

¹⁴Seaton's *Handbook of Vaccination*, Chapter IV.

¹⁵M. Viborg.

forcing them to breathe the effluvia from them, succeeded in variolating several poor animals. The cows, he says, "in a few days manifested the symptoms of cow-pox, and lymph taken from them produced genuine vaccine vesicles in the human subject."¹⁶ These wantonly cruel experiments were repeated in various places in Europe and also in India. In 1836, by inoculation of variolous virus, Dr. Thiele, of Kasan, produced "the genuine vaccine disease." With this he vaccinated, through seventy-five transmissions, more than three thousand human beings. In 1839, Ceely, of England, induced "vaccine vesicles in two young heifers (out of three operated on), by inoculation of variolous lymph," and thus established vaccine-stock, which formed the basis of thousands of vaccinations. In 1840, Mr. Badcock, of Brighton, England, succeeded in smallpoxing a cow, and derived therefrom a stock of "genuine vaccine lymph." He has since repeated the experiment about six hundred times, succeeding in thirty-seven cases. The vaccine virus thus obtained has been supplied to many hundreds of practitioners, and tens of thousands of vaccinations have been performed with it. In 1849, the experiments were repeated in this country, at Waltham, Massachusetts, by Dr. Adams, and at Boston, by Dr. Putnam, and in 1852, by Dr. Wm. C. Van Bibber and Dr. Saml. Knight, of Baltimore, and the vaccine

¹⁶ Dr. Edward C. Seaton.

matter thus obtained is still handed down from arm to arm.

Beside this variola-vaccine lymph, as it is called, another, and as it is asserted, a new variety of lymph or virus has been imported. This is the celebrated Beaugency stock, which is claimed to be a spontaneous case of cow-pox, untainted with variolation on one hand, or horse-grease on the other.

Thus there are a number of strains of vaccine material:

- a. The original cow-pox of Jenner;
- b. Equine-pox stock;
- c. Swine-pox stock;
- d. Goat-pox stock;
- e. Variola cow-pox of Ceely, and others;
- f. Spontaneous cow-pox of Beaugency.

Each of these have passed through many transmissions, and to a certain extent have become crossed or intermixed, and with the exception of what is now called "calf-lymph," it is impossible for anybody to tell what he is using. This so-called "calf-lymph" is offered in two varieties. One of these is claimed to be inoculation from the Beaugency stock, which it is confessed, is of unknown origin, and which from the mildness of the vaccine-disorder which it sets up, is of dubious value. If this Beaugency stock is what it pretends to be, then it is confronted with a direct denial of its efficacy by Jenner himself, who says: "Pustulous sores frequently appear *spontaneously* on the nipples of the

cows, and instances have occurred, though very rarely, of the hands of the servants employed in milking being affected with sores in consequence. These pustules are of a much milder nature than those which arise from true cow-pox. *No erysipelas attends them.* This disease is not to be considered as similar in any respect to that of which I am treating, as it is *incapable of producing any specific effects* on the human system. It is of the greatest consequence to point it out here, lest the want of discrimination should occasion an idea of security from the infection of small-pox, which might prove delusive." That would seem to settle the question as to the Beaugency stock.

The other variety of "calf-lymph" is derived from smallpoxing a heifer, and from the vesicles thus produced calves are inoculated; these in their turn furnishing the "lymph" or virus for the human subject.

This furnishes two more varieties of vaccine material:

g. Calf-Beaugency stock;

h. Calf-smallpox-cow-pox.

Now, if as Jenner declared, these various poxes are really all one thing, and simply derivations of horse-grease, it can make little difference through what animal it comes, provided such animals are themselves free from disease. But just here authorities fail to agree. Drs. Drysdale, Seaton, Badcock, Ceely, Thiele, and Sonderland assert that smallpox

inoculation of cows produces "genuine vaccine lymph." But other experimenters, equally entitled to respectful attention, have shown that it is a delusion to suppose that the inoculation of cows with smallpox has ever produced cow-pox; it produces smallpox and nothing else. The smallpox may be induced on the horse or cow by variolation, but the variolous inoculation is never transmuted into grease in the horse, or cow-pox in the cow.¹⁷ Experiments made in the United States, and also at the Veterinary School at Berlin, have verified these observations, originally conducted at Lyons, France. Dr. Seaton says: "It is quite out of the question that cow-pox on the human subject should have been transformed into smallpox." If, therefore, cow-pox cannot become smallpox, it would seem incredible that smallpox could become cow-pox.

Dr. Geo. Wyld, of London, who is certainly competent authority on any matter pertaining to vaccination, and a man of unimpeachable integrity, indorses the conclusions of the French Academy. He says: "I find that many medical men are under the false impression that all that we require to do is to inoculate the heifer with smallpox matter, and thus get a supply of vaccine lymph. This might become productive of disastrous consequences. Smallpox inoculation of the heifer produces not vaccinia, but a modified smallpox capable of spreading smallpox amongst human beings by infection."¹⁸

¹⁷ M. Chauveau. *Report of Committee of the Académie des Sciences.*

¹⁸ *London Daily News*, February 17, 1877.

It would thus appear that a large proportion of the vaccination now performed is in reality but a modified form of inoculation, having smallpox as its basis, and containing nothing of the Jennerian method but the name. It is not cow-pox, neither spontaneous nor inoculated from horse-grease, but it is smallpox propagated from human beings, through calves, to human beings again.

Much has been claimed for the Beaugency stock, and it has been given wide currency. There had been growing up for many years such a wide-spread dissatisfaction with the prevailing vaccine material, that when, in 1866, it was announced that a case of natural cow-pox had been discovered at Beaugency, in France, there were hundreds of practitioners who were willing to give the new brand a trial. It has thus been in use nearly twenty years, and it is alleged can be had humanized or vitulated. That is a child was vaccinated directly from the cow, eighteen years ago, and the virus has passed through some four or five hundred transmissions, with the chance of having been corrupted at any one of them. The vitulated stock has, in like manner, been handed down from calf to calf in a long succession of animals, and the evidences of its present genuineness would be deemed inconclusive in any court in Christendom.

It will thus be seen on what slight foundation the whole question of vaccinal virus rests. Millions of vaccinations are made every year, and nobody knows

what they are made with.¹⁹ The whole process is a haphazard game with chance. Vaccination was accepted on the simple dictum of Jenner that it would stamp out smallpox. The medical profession of to-day buys its vaccinal virus of those who make merchandise of it on their simple dictum that it is the right thing to use.

¹⁹ Dr. Charles Cameron, M.P.

THE METHODS OF VACCINATING.

In matters of experimental science, the predictions of the greatest geniuses only show the imprudence of those who express them.—
Warlomont.

WHEN Jenner introduced vaccination he believed that if the cow-pox virus was directly brought in contact with the cutis, so as to be acted upon by the absorbents, that it would necessarily find its way into the system, and produce its specific results. An operation so simple apparently required no particular training, and could be performed by a layman just as well as by a legally qualified practitioner. In this way a large proportion of the earlier vaccinations were performed by laymen and ladies. When, however, smallpox began to appear among the vaccinated, it was at first indignantly denied, then ignored, and at last when the failures of vaccination became too numerous to be hidden from public attention, it was claimed that those cases which smallpox subsequently attacked had been but imperfectly vaccinated, and that the manner of the vaccination was at fault, and not the thing itself. This was not only plausible, but in the main true. Vaccination was seen to be a rite which required to be performed with due observance to detail in order to

be effective. Thenceforth amateur vaccination was discountenanced, and the matter was relegated to professional supervision. Up to this time "one mark" was considered protective for life; but when it was found that persons who showed a "good" mark, which had been made by a competent surgeon, nevertheless took smallpox, it was admitted that the effect gradually wore off, and that those who had been vaccinated in infancy, should again submit to the operation at the dawn of puberty. The possible fallibility of the rite having been admitted, and smallpox continuing to show itself even among the re-vaccinated, double vaccination was recommended; that is vaccinating in two places, either on the same arm or one on each, at the same operation. This has been successively increased to seven or more, while the frequency of the operation has doubled up with each decade, until now there are many pro-vaccinists who urge its annual performance. I am acquainted with persons who have been thus vaccinated fourteen or fifteen times, with several distinct marks for each time. In this way, one starting early enough might be pretty well tattooed in the course of a moderately long life.

Without attempting to decide how much of this is the eager partisanship of extremists, let us now consider what are the necessary conditions for the proper and successful conduct of a vaccination. There are three things which demand our attention, (1) the present state of health of the person to be

vaccinated; (2) the selection of the virus to be used; and (3) the thorough and effective manner of inserting it. The failure to thoroughly appreciate the importance of either of these three circumstances, and to carefully attend to them in performing the vaccination, may make the operation fruitless of good results, or fraught with danger and disaster to the vaccinated.

I. I think it may be laid down as an invariable rule of practice, that no one should be vaccinated except after the most rigid physical scrutiny. The carelessness of the Health authorities in this particular is amazing. Vaccination is performed, with the easy nonchalance of the impossibility of doing harm, upon multitudes without the slightest inquiry as to their physical condition or antecedents; and this among the very class, where the greatest danger always lurks—the tenement house population. Vaccination to be effective, pervades and alters the entire constitution. Says Sir James Paget, “The action of vaccine is to establish a permanent morbid condition of the blood.”²⁰ There are innumerable instances, in which vaccination has awakened a latent disease, whose fires were smoldering in the system. A lady, aged 33, who had had a small fibroid intramural uterine tumor for several years, was vaccinated during the smallpox epidemic of 1881–82. The vaccination took nicely, went through a normal

²⁰ *Lectures on Inflammation.*

course, and the scab fell on the twenty-sixth day, leaving a perfectly characteristic cicatrix. The genuineness of the vaccine was thus duly attested. Previous to this time, the tumor had grown very slowly, and had for some months seemed at a standstill. Within a few weeks after the vaccination, with no other perceptible reason for exacerbation, the tumor was noticed to be growing rapidly, and in six months it increased from three or four ounces in weight to seven or eight pounds.

During the same epidemic a man, aged 39, in apparently good health, was vaccinated. The vaccination ran an irregular course, leaving an open ulcer, which did not heal for several months. This could not be ascribed to faulty vaccine, as others were vaccinated with the same virus at the same time, and all these had the vaccine-disorder normally. In this case, before the ulcer healed, diarrhœa set in, which persisted, with transient ameliorations from treatment received, until his death. He was vaccinated in January. In May, mesenteric tubercles could be easily perceived upon physical examination. He lived until the following December, and died of tuberculosis intestinalis cum marasmus.

These cases are not given as in any way reflecting on vaccination; but only as illustrating how vaccine may act in liberating the latent germs of a diathesis, and to enforce the necessity of extreme carefulness in performing the operation.

It is self-evident, that where the person is suffer-

ing from an acute disease, as for instance, diarrhoea or bronchitis, vaccination must be delayed. Skin affections greatly modify and frequently nullify vaccination. A simple intertrigo may completely spoil the effects of an operation, and before proceeding to vaccinate, the operator should carefully examine the folds of the neck, behind the ears, and about the buttocks for chafed patches, and if abrasions be found, the lancet must be withheld. The same advice holds true in regard to all skin disorders, especially those of the eczematous or herpetic sorts, as vaccine is nearest allied to these, and is most frequently aborted by them on the one hand, or greatly adds to their virulence and chronicity on the other.

In the case of infants, themselves apparently healthy, there always arises the interesting inquiry, whether there be any taint of syphilis in either parent. Should there be even the slightest well-grounded reason for believing there may be, vaccination should be postponed until the infant is six months old. As hereditary syphilis nearly invariably manifests itself before the child is four months old, this precaution will prevent a disease which was pre-natal in its origin from being ascribed to the vaccination.

Nearly all writers on vaccination urge the performance of indiscriminate vaccination or re-vaccination during an epidemic of smallpox upon all classes and conditions of men (including the babies);

and it is the practice of the Health Board here in New York, on discovering a case of smallpox, to remove the patient to Riverside Hospital, Blackwell's Island, disinfect the house, and indiscriminately re-vaccinate everybody in the vicinage. As to the moral right of the Health Board to thus enforce vaccination, I have nothing to say in this place. Waiving that point, altogether, at this time, and viewing the question solely from the physical point, this seems a mistake. It is well known that persons, recovering from one of the zymotic disorders, are prone to take any other that may be prevalent at the time. A person weakened by scarlet fever is likely to take diphtheria, if it is about, or *vice versa*. It is then but fair to believe that if the vaccine-disease be made plentiful that it will turn the community into a convenient nidus for other zymoses, including smallpox. The error seems to be, in looking at vaccination, not as a disease-bearer, but as a purifier, while the vaccine-disorder is as truly a disease as measles or typhus.

As smallpox is so largely confined to infants and very young children, one-fourth of the deaths from that disease being of children under one year old,²¹ if the infant is to be vaccinated, health permitting, the earlier it is done, the better. The earliest period

²¹ Of 42,277 deaths from variola, in England, during the ten years, 1856-1865, 10,223 were of children under one year of age. (Seaton.)

In the variolous epidemic of 1837-8, when 9,762 perished in England, 9,008 of the victims were under fifteen years of age.

of life, that is during the first three months, is particularly suitable to vaccination, for at that time the infant is free from the disturbing influence of teething, and if the health is otherwise good and the vaccine is selected with care, the probabilities are that the child will pass through the vaccine-disorder in a normal manner. Children vaccinated during dentition often suffer severely from diarrhoeal complaints. Frequently the tooth-making process is interfered with, and the teeth are imperfectly developed, or are subject to early decay.

The chances of an adult taking smallpox are remote. Like measles, whooping-cough and scarlet fever, smallpox is mainly a disease of childhood. After the tenth year the probabilities of taking it rapidly lessen, and it is hardly worth while undergoing the risks of vaccination, to ward off a danger so problematical. I know I am not in accord with most vaccinists in this conclusion, but the facts upon which it is based are admitted by all.

II. The vaccine²² to be used should not only be free from all taint, but, like Cæsar's wife, above suspicion. The vaccinator should make assurance that the "lymph" that he introduces into the system of the helpless babe before him is from a perfectly healthy animal, or if it is humanized virus, that it is from a child of perfectly healthy stock. The vacci-

²² The origin of the word vaccine is thus described: "Dr. Odier, of Geneva, has baptized the new disease, *la vaccine*, or *vaccinia*; rejecting as absurd the name of the English, *variola vaccina*."—Dr. Pearson, in *Medical and Physical Journal*; Vol. III, page 100; 1800.

nator has no right to trust to chance in this matter of virusation. It involves consequences too pervasive and long-lasting for a happy-go-lucky style of selection. The difficulties of the problem offer no valid excuse for evading its solution. Vaccine is an article of commerce, and has therefore a mercenary element, in addition to the uncertainties to which I have referred in speaking of the origin and nature of vaccinal virus. Many accidents have arisen from the use of impure vaccine,²³ but vaccinists, as a rule, have been loath to admit the facts, fearing to prejudice the public mind against the whole matter. It is often unpleasant to face the truth, but it is always cowardly to evade it.

Arm-to-arm vaccination has almost ceased in New

²³ The following communication from Dr. T. S. Hopkins, of Thomsville, Ga., concerning the results which have followed the use of "patent solid lymph," is published for general information:

"Our town authorities have employed a physician to vaccinate all persons who present themselves for the purpose. The virus was procured from the New England Vaccine Company, Chelsea, Mass., as 'bovine matter.' The result has been fearful. Nearly every one vaccinated has suffered severely from Erythema or Erysipelas, the arm swollen from shoulder to wrist, and the point of puncture presenting the appearance of a sloughing ulcer, discharging freely sanious pus. Many of the sufferers have been confined to bed, with high fever, from five to ten days, requiring the constant application of poultices to the arm, and a free use of morphia for the relief of pain. I deem it my duty to inform you of the result here from the matter used and from whence it came. It came in cones, each cone said to contain enough to vaccinate one hundred persons, at a cost of one dollar per cone. Those who have tried it tell me they would much prefer to have smallpox."—*From the National Board of Health Bulletin, Washington, D. C., March 4, 1882.*

York. Occasionally a doctor will ask to have a scab saved for him, but of immediate arm-to-arm operation from the vesicle, I have known of no instance for some years. I think this a misfortune, as when the doctor thus had a whole series of vaccinations under direct purview, he was enabled to judge of the quality of the vaccine he was using. It has now assumed a more purely commercial aspect, and the family doctor is simply a "middleman," between the vaccine dealer and the vaccinated; conveniently and dextrously shoving off upon the former any ill-effects which may appear in the latter.

In New York our main supply of vaccine has long been the Health Board, which, through the energy of Dr. Taylor, has not only been able to keep up the supply for its own large corps of vaccinators, but has it on sale for all comers. Dr. Taylor first obtained his material from the Essex Market Dispensary, where it was gathered from the unwholesome dwellers in that populous but filthy quarter. At that time, the mother was required to report at the Dispensary, with the child, on the twenty-first day after the vaccination. The scabs were then taken off and dropped into an open-mouthed, glass fruit-jar. A sufficient quantity of water was added from time to time to soften these scabs into a paste, and into this filthy mixture the quills were dipped, then dried, then sold with the official aroma of true Jennerian cow-pox. Fortunately the medical fashion changed, and "calf" lymph came into vogue. Dr. Taylor, as public vaccinator, not to be behind the times, estab-



lished a calf farm, and from this source, the city and surrounding towns have been supplied for eight or nine years. Just what is the genesis of this vaccine I have been unable to discover. It is said to be Beaugency, but I am inclined to think it is another instance of smallpoxing the cow.

III. Various methods are employed for inserting vaccine, and various places on the body are selected for the operation. A favorite place, especially for girls, is on the inner surface of the thigh several inches below the groin; this prevents the marks from showing, many mothers objecting to having a girl's arm scarred. The point at which the vaccine is introduced is of no moment, provided it is brought well in contact with an absorbing surface. The most common method here in New York is by scarification. Various instruments are manufactured by the surgical instrument makers for this purpose, but the best tool is a thin bladed and very sharp lancet. With this a number of scratches, about half an inch long and equidistant, are made through the cuticle. The abrasion must be deep enough to draw a little blood in order to ensure that the true skin has been reached. Sometimes the abrasion is criss-crossed, in this manner. As soon as the blood appears, it is quickly wiped away, and the vaccine smeared over the wound. If fluid lymph is used, all that is necessary is to dip the point of the lancet into it before making the incision; but if dry matter is used, it is better to soften it with



the smallest possible amount of water, and when it is of the consistency of cream, plaster it on with the flat of the blade.

Many operators err by making the cuts too shallow, fearing that if there is much oozing of blood, that the vaccine will be washed away, and the operation prove a failure. This is a mistake, failures to "take" being commonly caused by insufficient scarification. There is a great difference in the vaccinal successes, even of experienced vaccinators. A failure of more than one per cent. of primary vaccinations should be considered *prima facie* evidence either of the poorness of the vaccine, or of the inefficiency of the vaccinator. The best operators often make a couple of hundred successive vaccinations without a failure.

One good operation, such as I have described, is all-sufficient; but some vaccinators prefer  to make a line of small abrasions like this,  which, if close enough together, will, as the vesicles fill, run into one long compound vesicle, tied down at as many points as there were original punctures. There have been various ways proposed for accomplishing the same thing, but none of them possess any advantages over the method of scarification which I have described.

This question of insusceptibility to vaccination is a mooted point. Probably there are few cases of insusceptibility to real cow-pox, although they are undoubtedly occasionally met with.

THE EXTENT OF THE PROTECTION AFFORDED BY VACCINATION.

When one meets a fact in opposition to a dominant theory, we must accept the fact and abandon the theory, even though, being supported by great names, it may be generally accepted.—*Claude Bernard.*

IN considering the amount of protection afforded by vaccination, naturally the first query which presents itself for solution is, Does vaccination prevent smallpox in the vaccinated? If it does, without in any way endangering the system in other directions, or rendering it more liable to other diseases, then it is manifestly the duty of every one to submit to the operation, under the advice of their regular physician.

This question, simple as it may seem, is not to be answered off-hand. The testimonies as to its protective power are so conflicting, in fact, so absolutely contradictory, and this from men of equal probity and experience, that it can only be by the most careful and impartial sifting of the evidence that we may be able to reach an authoritative conclusion. Casting aside prejudice, therefore, let us first see what Jenner actually claimed; secondly, whether this claim has been substantiated by the eighty-five years of subsequent experience.

When Jenner began the practice of vaccination, in 1798, he assumed that it was a preventative of smallpox for life.²¹ This, it will be readily seen, was mere theory on his part, because in the nature of things it was not possible to determine, at that time, except theoretically, that the artificial production of one disease, would surely prevent, forever afterward, in that person, the occurrence of another analogous disease. That he had abundant reason for his theory, I am quite ready to admit; and, probably, any of us so situated, would have been equally sure of the far-reaching quality of the discovery. But assumption is not law, and Jenner lived to see his error. He found that the vaccinated were not only subject to smallpox, but that it attacked them sometimes twice.²⁵ He thereupon advised (nearly sixty years since) re-vaccination. It was evident that he did not ascribe these failures to lack of care, or to the use of improper material, for he finally *re-vaccinated his own patients once a year.*

“It was only, however, to *efficient vaccination,*” says Dr. Seaton, “that is to vaccination which had gone through all its stages with perfect regularity, and had given evidences of *infecting the constitution,* that

²¹ What renders the cow-pox virus so extremely singular, is, that the person who has been thus affected is FOREVER AFTER SECURE FROM THE INFECTION OF THE SMALLPOX.—*Jenner.*

²⁵ During the recent epidemic, a man 89 years of age was admitted to the Wynberg Smallpox Hospital, and it was the fifth occasion of his being attacked by variola.—*Port Elizabeth Telegraph,* Dec. 9, 1882.

he attributed protecting power. Observations made since Jenner's day, by Mr. Marson, of the London Smallpox Hospital, have conclusively established that, for *thoroughly* infecting the constitution, a certain *amount* of local affection (*i. e.*, erysipelas) is as necessary as a perfect character of vaccine vesicle. We must, therefore, so far extend the meaning of the words 'due and efficient' performance of vaccination, as to make it include amount as well as quality of vaccine influence; and with this extension, the experience of seventy years tends to show the correctness of Jenner's estimate."²⁶ But which estimate does this refer to, that of 1798, when vaccination protected for life, or of 1821, when he was re-vaccinating year by year? The context clearly infers the former, for nowhere is it suggested, in this long article from which the above is quoted, that Jenner advised re-vaccinations.

It is claimed that all who do not have variola are preserved from it by vaccination. In other words, that all persons do have smallpox unless they have been vaccinated, with rare exceptions. This is a broad statement, and can hardly be true. Even if every person one or two centuries ago had smallpox, that would be insufficient evidence upon which to base a statement that all would have it now. Surely modern improvement in living, increased knowledge of hygiene, and advances in sanitation must be al-

²⁶ Reynolds' *System of Medicine*. Vol. I, page 166.

lowed to count for something, unless, indeed, we are willing to accept the dictum of the Public Vaccinator of New York (Dr. Taylor), that it is the robust, the healthy, the clean, who are most likely to be stricken with this disease. This latter view, separating, as it does, variola from its kindred zymoses, is neither common sense, nor in accord with the experience of the wise. Proofs that smallpox and other zymotic diseases originate in filth are almost innumerable. Florence Nightingale is good authority here. She says: "I was brought up both by scientific men and ignorant women to believe the smallpox, for instance, was a *thing*, of which there was once a first specimen in the world, which went on propagating itself, just as much as there was a first dog, or pair of dogs; and that the smallpox would not begin itself any more than a new dog would begin without there having been a parent dog. Since then I have seen with my eyes smallpox growing up in first specimens, in close rooms or overcrowded wards, where it could not by any possibility have been caught, but must have begun. Nay more; I have seen diseases begin, grow up, and pass into one another; with overcrowding, continued fever; with a little more overcrowding, typhoid; with a little more, typhus, and all in the same ward or hut." I have myself seen diseases grow and develop in the same manner. About four years ago, I saw scarlet fever grow through four transmissions from an influenza. Squalor, sewer-gas, cold and neglect were the factors in the case.

Mr. John Simon, F.R.S., the able and zealous Medical Officer of the Privy Council (England), said: "When smallpox attacks an unprotected population after a lapse of years, it seizes *all who come in the way* of the contagion, who have not previously had the disease. Supposing there is an island, and it has not had a smallpox epidemic for fifty years, the epidemic, when it comes, will take all up to the age of fifty."²⁷

The facts, as far as we know them, do not warrant this assertion. According to Dr. Lettsom and Dr. Gilbert Blane, both ardent pro-vaccinists, the average death-rate from smallpox, for the thirty years previous to the introduction of vaccination, was *estimated at* three thousand per million of population. This, it will be noticed, is a mere estimate, by those who were anxious to place the death-rate before vaccination as high as possible. A modern writer remarks that "Dr. Lettsom possessed the facile art of extracting suitable percentages from unknown numbers;" and Dr. Farr, the Registrar-General, when questioned whether there were any statistics that would warrant any such conclusion, said emphatically: "No, it is a mere estimate; no statistics of the last century or the previous one are to be relied upon."²⁸

What the average mortality from smallpox may have been during the last century, it is impossible

²⁷ Parliamentary Vaccination Committee of 1871.

²⁸ Parliamentary Vaccination Committee of 1871.

to determine, but the following table will give an approximate idea; and, as they are hospital cases, are likely to be above rather than below the mark, as it is well known that isolated patients do better than those collected into wards.

FATALITY OF HOSPITAL SMALLPOX BEFORE VACCINATION.

DATE.	AUTHORITY.	CASES.	DEATHS.	PER CENT. OF DEATHS.
1723	Jurin.	17,151	2,848	16.6
1700-63	Duvillard	24,594	4,635	18.85
1779	Rees' Cyclopaedia . . .	400	72	18.0
1700-79		42,145	7,555	17.64

Dr. Seaton, in his valuable work on vaccination, says: "Dr. Jurin, writing early in the last century, laid it down as the result of his investigations, that of persons of all ages taken ill of natural smallpox, there will die of that distemper, one in five or six. From returns made to the Epidemiological Society in 1852, by 156 medical practitioners in various parts of England who had kept numerical records of their smallpox experience, it appeared that the proportion of deaths to cases which they had met with in the natural form of the disease was 19.7 per cent., or as nearly as possible, one in five."

In Newcastle-upon-Tyne 2616 cases, from 1777-1877, caused 428 deaths, or 16.3 per cent.²⁹

Admitting the correctness of Dr. Lettsom's estimates, and calculating all deaths at the hospital rate, there would be only an average of 18 cases per year of smallpox to every one thousand of population. With even this liberal count it is evident that not half the inhabitants could have had the disease. The claim, therefore, that vaccination alone preserves from smallpox, falls to the ground.

One of the most reliable accounts of smallpox in the last century is that of a very severe epidemic in Boston, Massachusetts, in 1752, which may be found in the *Gentlemen's Magazine* of 1753. The population of Boston was then 15,684; its sanitary condition was, like most cities of that period, extremely bad; and variolous inoculation was freely practiced, as it had been for nearly thirty years. One-third of the inhabitants, 5545, were attacked with smallpox. The mortality among these was 539, or 9.7 per cent. This was previous to vaccination. As inoculation is now freely admitted to conduce to the intensity of the disease, it is probable that natural smallpox, uninfluenced by inoculation, would have shown a lower death-rate.

Smallpox during the fifty years prior to inoculation, that is during the latter portion of the seventeenth and the beginning of the eighteenth century,

²⁹ Dr. Monteith, *Handbook of Vaccination*, 1868, page 191 *et seq.*

formed a variable, but considerable cause of death. During this period, in London, out of every one thousand deaths, fifty-six were from this disorder. After the introduction of inoculation the proportion of deaths steadily rose until it reached one hundred and eight out of every one thousand, in 1770. From this date, which was nearly thirty years before vaccination, it began, in common with other diseases, to decline. As Dr. Farr, the Registrar General, observes: "Smallpox attained its maximum after inoculation was introduced; this disease began to grow less fatal before vaccination was discovered; indicating, together with the diminution in fever, the general improvement in health then taking place." Now, if smallpox declined while inoculation was disseminating the disease, it is reasonable to suppose, nothing else interfering, that the decline would be more marked at the partial discontinuance of inoculation about 1800, and again upon the practice being made penal in 1840. The annexed table shows what did happen:

Year.	Smallpox deaths per 1000 deaths.	Year.	Smallpox deaths per 1000 deaths.
1700-1720	56	1801-1810	64
1721-1740	65	1811-1820	42
1740-1750	80	1821-1830	32
1751-1760	100	1831-1840	23
1761-1770	108	1841-1850	18
1771-1780	98	1851-1860	21
1781-1790	87	1861-1870	27
1791-1800	88	1871-1880	19

Vaccination was introduced when smallpox was a diminishing factor, and by checking inoculation withdrew a fertile source of variolous propagation. Mr. Marson admits that the discontinuance of inoculation, rather than the practice of vaccination, was the cause of the lesser prevalence of smallpox during the first three decades of the present century.³⁰

Sir Lyon Playfair, the scholarly representative of the Universities of Edinburgh and St. Andrews, in a speech before Parliament, in June, 1883, thus tabulates the death-rate from smallpox in Great Britain during the past two centuries:

Year.	Deaths from smallpox per million inhabitants.
1701-1800	3000
1801-1840	600
1841-1854	305

Year.	Under Compulsory Vaccination.
1855-1871	223
1872-1882	156

Sir Lyon Playfair observes: "These great reductions in the rate of smallpox mortality I believe to be due wholly to vaccination. Sanitation is not the cause, for it would diminish all other diseases likewise; but these have only diminished six per cent., whereas smallpox has diminished eighty per cent. in children under five."

It is hardly fair to compare the mortality of smallpox with *all* other diseases, because a large propor-

³⁰ *Report of Parliamentary Committee, 1871.*

tion of the total mortality arises from causes with which sanitation has nothing to do. But if we compare smallpox to the group of cases so nearly allied to it from a sanitary point of view, viz., typhus, typhoid, etc., the Registrar General's figures are (with the exception of 1847-49, for which he does not give the figures for fever):

Year.	Deaths per Million Living	
	Smallpox.	Fever.
1850-53	310	986
1854-70	223	940
1871-80	156	473

Sir Lyon Playfair is willing to allow six per cent. for sanitation, but if sanitation had done for smallpox what it did for fever, the last decennial death-rate would have been 140 and not 156; and this without allowing anything for vaccination.

Dr. Farr states that fever has declined progressively since 1771, in nearly the same proportion as smallpox.³¹ These are his figures:

Year	Deaths per 10,000 Living.	
	Fever.	Smallpox.
1771-80	621	502
1801-10	264	204
1831-35	111	83

The deaths in England from smallpox, per million living, are thus stated by the Registrar General. Those for the years 1843-6 are not given by him, but the number was small:

³¹ McCulloch's *Statistics of the British Empire*.

Year.	Deaths.	Year.	Deaths.
1841	367	1863	293
1842	181	1864	373
1847	246	1865	309
1848	398	1866	144
1849	264	1867	118
1850	263	1868	96
1851	396	1869	72
1852	409	1870	118
1853	174	1871	1022
1854	153	1872	831
1855	136	1873	102
1856	121	1874	92
1857	206	1875	40
1858	335	1876	99
1859	197	1877	174
1860	140	1878	74
1861	66	1879	21
1862	81	1880	25

Precise data has never been collected to enable us to state what proportion of the successfully vaccinated are liable to take smallpox. The proportion will vary, of course, with the age of the person and the degree of exposure to the contagion. Some epidemics are much more virulent than others, and seize upon a much wider range of victims. American statistics are utterly unreliable, and in many instances purposely misleading.

There are few vital statistics in the United States worthy of credence, and none that are of any help in this inquiry. Only twenty-nine of the States have Boards of Health, and not more than a fourth of these have existed ten years. Some have never

issued a report. Even in Massachusetts and Michigan, the only two States, where the reports on zymotic disorders have even an appearance of accuracy, the opportunity for comparative study of smallpox in the vaccinated and unvaccinated is meagre and unsatisfactory. The National Board of Health has done nothing, and evinces no disposition to do anything. Here in New York things would be in better shape, if funds were forthcoming to pay for the work. The Registrar of Vital Statistics (Dr. Nagle) is an accomplished and efficient officer, but he can do little unaided. From the imperfect returns which are made to him it is impossible to tell in any week of any year how many cases of measles, diphtheria, or any other disease may have occurred. This is not the Registrar's fault; but must be laid to the baneful influence of the political jugglers, who hamper every department of civil administration. No reports on vital statistics have been published in this city in the past eleven years. And take the country through, we are totally ignorant of vital statistics, as they are understood in Great Britain and Germany. Having had abundant opportunity to compare the work done here, with that of such men as Farr, of England, or Kolb, of Bavaria, I am obliged to confess with shame the shortsightedness of our various State Governments. I recognize the great advantages in a settled population like England, over a growing and migratory population such as we have here, in the matter of statistic col-

lection; but on the other hand, the general diffusion of intelligence makes the gathering of data easier here than in countries less favored in this respect.

The Smallpox Hospital, London, is believed to be a fair representative of English experience.³² The number of cases of smallpox *after vaccination* has steadily risen from about 5 per cent. at the beginning of this century to 44 per cent. in 1845, 64 per cent. in 1855, 78 per cent. in 1865, 90 per cent. in 1875, and is now about 96 per cent. of the whole number of cases admitted. The residual 4 per cent. is mainly composed of infants under one year of age, who on account of tainted constitutions, or the nomadic character of their parents have escaped the official lancet. They are the waifs and strays of civilization; the children of vagabonds; the natural victims of disease. That the deaths among this residual per cent. of unvaccinated should be more than one to three, will excite no surprise. They would have died at the same rate from whatever disorder happened to strike them first, whether it was measles, whooping cough, or diarrhœa; if they at all correspond to the same class as we see them here in our tenement-house life. During the last smallpox epidemic in New York (1880-2) the number of vaccinated cases very largely exceeded the unvaccinated, and of these latter the vast majority were infants.

³² Marson.

In the first report of the Vaccine Pock Institution, in 1803, page 111, it is said: "It is not manifest that the vaccine inoculation has been of benefit to the public, however great a one it has been to individuals."

In the second report of the Royal Jennerian Society, 1806, is the following: "The Committee admit to having seen a few cases of smallpox by persons who had passed through the cow-pox in the usual way."

In the same year (1806) the Royal College of Surgeons issued a circular-letter to 1,100 of its members, asking their experience of vaccination. They received 426 answers, and the information of 56 cases of smallpox after vaccination, 66 cases of eruptions, and 24 bad arms. It may be interesting to compare the smallpox deaths, at this period, in New York and London.

Comparison of smallpox deaths.

YEAR.	NEW YORK. NO VACCINATION.	LONDON. VACCINATION THE FASHION.
	PER HUNDRED THOUSAND LIVING.	
	DEATHS.	DEATHS.
1801	169	61
1805	62	163
1806	48	110
1807	29	122
1808	62	108
1809	66	106
1810	4	106
AVERAGE	63	111

The London *Medical Observer*, Vol. VI, in 1810, published the particulars of 535 cases of persons having had smallpox after vaccination, the operation in some instances having been performed by Jenner himself, including their names, with an index, pointing to the authorities as witnesses; also similar details of 97 fatal cases of smallpox after vaccination; and of 150 cases of injury arising from vaccination, together with the addresses of ten medical men, including two Professors of Anatomy, who had suffered in their own families from vaccination.

Whereupon, Dr. Maclean, a well-known medical authority of that time, observes:—"Although numerous, they are few in comparison to what might be produced. It will be thought incumbent on the vaccinators to come forward and disprove the numerous facts decisive against vaccination here stated on unimpeachable authority, or make the *amende honorable* by a manly recantation. But experience forbids us to expect any such fair and magnanimous proceeding, and we may be assured that, under no circumstances, will they abandon so lucrative a practice, until the practice abandons them."

In 1820, that is before Jenner's death, it was said: "Cases of smallpox after vaccination have increased to such an extent, that no conscientious practitioner can recommend vaccination as affording certain security against the contagion of smallpox."³³

In 1828 there was a severe epidemic in Marseilles, when about 2000 were attacked with smallpox who had been vaccinated.³⁴ In the epidemic, 1831, *et seq.* in Wirtemberg, 955 persons were attacked with smallpox after vaccination.³⁵

The Registrar-General of Sweden in his official report, 1856, declared that to explain certain statistical data it is necessary to suppose, either that the effect of vaccination is little or none, or that the workings of the vaccination system are highly defec-

³³ *Gazette of Health*, Vol. V, page 656. London, 1820.

³⁴ Marson. ³⁵ Hein.

tive.³⁶ This is after forty years of compulsory vaccination.

Dr. Ducharme, speaking of an epidemic in 1868, which broke out in his regiment (Voltigeurs of the Guard) a few months after he had re-vaccinated it, says:—"To what should we attribute this epidemic in a regiment in which 437 re-vaccinations had been performed, and where the hygienic conditions, as to space, ventilation, and food, were excellent, when in the 2d Regiment of Voltigeurs—lodged in a precisely similar barrack situated in the same court, but on whom no vaccinations had yet been made—not a single case of smallpox existed?"

The London *Morning Advertiser*, November 24, 1870, reports that "the smallpox is making still greater havoc in the ranks of the Prussian army, which is said to have 30,000 smallpox patients in its hospitals." These were all vaccinated and re-vaccinated.

The following are a few samples cases out of many, in the United States Navy Department Reports:—

"In 1850, in the U. S. frigate *Independence*, with a ship's company of 560 persons, there were 116 cases of smallpox, seven fatal. Fleet-Surgeon Whelan writes:—"The crew of this ship almost universally presented what are regarded as genuine vaccine marks. The protection, however, proved to be quite imperfect."

³⁶ Rektor P. A. Siljestrom, April, 1877.

“Upon the U. S. steamship *Jamestown*, serving in Japanese waters, there occurred, in 1864, among a ship's company of 212 persons, 31 cases of smallpox, with four deaths. The entire crew had been vaccinated after leaving the United States.

“In 1870, sixty-one cases occurred on the U. S. steamship *Franklin*. The disease first appeared on a sailor with ‘an excellent vaccine scar.’ The officers and crew were immediately vaccinated with fresh vaccine matter obtained at Lisbon, this vaccination being the third one during the cruise. Nineteen days later, the second case occurred. ‘The disease has been epidemic in many places in Europe during the past season, but I hoped our vaccinations would prevent trouble with it on board ship.’

“In a cruise of the *North Carolina* up the Mediterranean, she shipped at Norfolk a crew of 900 men, most of whom had been vaccinated, or had the smallpox, but were nevertheless twice vaccinated prior to the ship sailing, a third time at Gibraltar, and a fourth time at Port Mahon. Dr. Henderson, who reports these facts, states that notwithstanding this ultra vaccination under such various circumstances of virus, climate, etc., 157 of the crew had varioloid.”

In the Kingdom of Bavaria, where no one for many years, except the newly born, escaped vaccination, there were in the epidemic of 1871 no less than 30,742 cases of smallpox, of whom 29,429 had

been vaccinated, as is shown by the documents of the State Department.³⁷

In the first Annual Report of the Health Department of the city of New York, 1870-71, it is stated: "This extraordinary prevalence of smallpox over various parts of the globe, especially in countries where vaccination has long been efficiently practiced; its occurrence in its most fatal form in persons who gave evidences of having been well vaccinated, and the remarkable susceptibility of people of all ages to re-vaccinations, are new facts in the history of this pestilence, which must lead to a re-investigation of the whole subject of vaccination and of its claims as a protecting agent." Smallpox continued epidemic during this period in New York, in spite of the most rigorous enforcement of vaccination.

In Baltimore, during 1882, there were 4,930 cases of smallpox, of which 3,506 were children. The deaths numbered 1184, of which 959 were children. Of the vaccinated 2853, 327 died. The victims were mainly Germans, colored persons, and sailors, huddled together in the worst quarter of the town. As many as twenty cases were taken from a single house. During one month (January) 162,414 were vaccinated by the city physicians, beside large numbers in the previous months.

The Report of the Health Department of the city of Chicago, for the years 1881-82, shows the total

³⁷ G. F. Kolb, of the Royal Statistical Commission of Bavaria.

mortality from smallpox for the last thirty years (the population having increased from 252,000 in 1868 to 560,000 in 1882) has been as follows:—

Years.	Smallpox deaths.
Decade—1851-60	109
“ 1861-70	778
“ 1871-80	1479
One Year—1881	1180
“ 1882	1292

Thus as vaccination was more rigidly enforced, smallpox increased.

In 1859-62 there were, in the British troops quartered in England, 430 cases of smallpox after vaccination. During the Franco-Prussian war (1870), there were 23,469 cases of smallpox, in the French army, all of them vaccinated, and the larger part re-vaccinated. Dr. Bayard, of Paris, says: “Every French soldier on entering a regiment is re-vaccinated; there are no exceptions.” In 1871 smallpox was epidemic in Milan; 17,109 cases were recorded, of which only 278 were classed as unvaccinated. In 1871-2 there were 11,174 cases of smallpox after vaccination in the London hospitals. Of this year, Dr. Seaton said: “An epidemic of smallpox so intense as that which recently prevailed, has afforded a very severe test of the value of our present vaccination laws.” If the Jennerian theory had been true, this virulent epidemic could not have occurred in a population where ninety-six per cent of the births are

registered as officially vaccinated.³⁸ As a portion of the remaining four per cent. must have succumbed to the hardships of living, the actual substratum of the unvaccinated must be very thin.

Men are prone to see things much as they imagine they ought to be. In a controversial question few can be magnanimous, and fewer still impartial. As showing the different manner of looking at this subject, I present side by side two statements, made by reputable men. Which shall we credit?

John Leacroft, M.R.C.S., writing from Fechenham, near Red-ditch, Feb. 16, 1883, says: "I have been a Public Vaccinator of several districts since the passing of the Compulsory Vaccination Acts, and have, during the past forty years, vaccinated many thousands of children, and am perfectly satisfied that vaccination,

Dr. Browning, the Medical Officer of Health, for Rotherhithe, writing *On Vaccination with Calf-Lymph*, 1882, says: "That children and adults comparatively recently vaccinated with humanized lymph, and some showing good marks, may subsequently, within a few days, months, or years, contract small-

³⁸ "The deaths from smallpox have assumed the proportions of a plague. Over 10,000 lives have been sacrificed during the past year in England and Wales. In London, 5641 deaths have occurred since Christmas. Of 9,392 patients in the London Smallpox Hospitals, no less than 6,854 had been vaccinated, *i. e.*, nearly 73 per cent. Taking the mortality at 17½ per cent. of those attacked, and the deaths this year in the whole country at 10,000, it will follow that *more than 122,000 vaccinated persons have suffered from smallpox!* This is an alarming state of things. Can we greatly wonder that the opponents of vaccination should point to such statistics as an evidence of the failure of the system? It is necessary to speak plainly on this important matter."—*Lancet*, July 15, 1871.

properly and efficiently performed, is not only a protection against the confluent form of smallpox, but that in no case does it cause either sores or any disease likely to shorten life. Any such cases that may and do occasionally arise, are those where the operation has not been properly and with efficient care performed."

Vaccination, when properly and efficiently performed, prevents confluent smallpox, and produces neither sores or any disease likely to shorten life; and when vaccination does not prevent confluent smallpox, and does produce sores and diseases likely to shorten life, then vaccination has not been properly and with efficient care performed.

pox is an undoubted fact, probably known to all of us. I have myself recorded 469 cases of persons, of all ages and both sexes, suffering from smallpox after vaccination, with 99 deaths—an average of 21 per cent.; and higher figures are given by Dr. Collic. Now, many of these sufferers showed good vaccine marks of the kind that would be deemed worthy of an extra grant from the Government-Inspector (at least, I used formerly to receive such grants for doing similar work); and yet they took smallpox—some within six days, some within six months, and some within six years of their vaccination."

Dr. Browning, therefore, recommends the disuse of humanized lymph, and direct vaccination from the calf.

The following candid view of the question is from the pen of one of the wisest physicians of his day, SIR HENRY HOLLAND:—*Present Questions Regarding Vaccination.* London, 1839. "The questions already stated bring us to those which regard the completeness of Vaccination as a preventive

remedy, the duration of its protecting power, and the changes its virus may undergo by long use and frequent transmission—the most momentous by far of all the inquiries affecting the subject. The events of the last 10 or 15 years have forced them strongly upon us, while apparently at the same time preparing evidence for their final determination. Not only in Great Britain, but throughout every part of the globe from which we have records, we find that smallpox has been gradually increasing again in frequency as an epidemic, affecting a larger proportion of the vaccinated, and inflicting greater mortality in its results. I do not enter into any detail of these facts, as they are now generally admitted. We can no longer deny that the protection given by Vaccination is unequal in different cases, or that it may be lessened or lost by time. Experience has here confirmed a presumption, which some ventured very early to entertain, and which, indeed, was sanctioned, prior to experience, by various considerations. The early enthusiasm for the great discovery of Jenner swept those doubts away; and they returned only tardily, and under the compulsion of facts. . . . And though more palpable at one time than another, according to the greater or less prevalence of epidemic causes, yet every succeeding year has multiplied them, and every statement from other countries has attested their truth. The circumstances, of late years, have greatly changed the aspect of all that relates to this question. It is no

longer expedient, in any sense, to argue for the present practice of Vaccination as a certain or permanent preventive of small-pox. The truth must be told as it is, that the the earlier anticipations on this point have not been realized."

Dr. G. F. Kolb, of Munich, Member Extraordinary of the Royal Statistical Commission of Bavaria, and the author of several statistical works of acknowledged value, says: "From childhood I have been trained to look upon the cow-pox as an absolute and unqualified protective. I have, from my earliest remembrance, believed in it more strongly than in any clerical tenet or ecclesiastical dogma. The numerous and acknowledged failures did not shake my faith. I attributed them either to the carelessness of the operator or the badness of the lymph. In the course of time, the question of vaccine compulsion came before the Reichstag, when a medical friend supplied me with a mass of statistics favorable to vaccination, in his opinion conclusive and unanswerable. This awoke the statistician within me. On inspection, I found the figures were delusive; and a closer examination left no shadow of doubt in my mind that the so-called statistical array of proof was a complete failure."

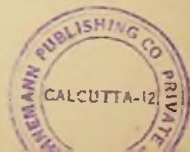
Dr. H. Boëing, for very many years a prominent vaccinator at Uerdingen, on the Rhine, says: "As I began these researches in the belief and with the hope to gain a sure guaranty for the correctness of the present protective theory of vaccination, nobody

can regret it more than myself that their result proved unfavorable to compulsory vaccination. . . . and every friend of humanity feels the constraint of being compelled to resign a prophylactic operation, the inventor of which is called yet to-day one of the greatest benefactors of mankind, and the real practical effect of which has to be placed among Hartman's illusions."³⁹

Having thus been forced to admit that vaccination does not prevent smallpox in the vaccinated, let us now determine what is its power in mitigating the disease. There are two points to be here considered: the ratio of deaths from smallpox, and the amount of disfigurement in those who recover; the latter being taken as a mark of the severity of the attack.

On the first point, Mr. Marson, who has for thirty-five years had charge of the Smallpox Hospital at London, is excellent authority. During that time he has had more than seventeen thousand cases of smallpox under his immediate personal supervision, and has had ready means of knowing the exact particulars of the entire English hospital experience. He has found, while the unvaccinated among these cases have died at the rate of thirty-five deaths to one hundred cases, the ratio among the vaccinated has only been about six to a hundred. But what is still more conclusive, as shown by this concensus of cases, is that the modifying power of vaccination

³⁹ *Facts on the Smallpox and Vaccination Question*, Leipzig, 1882.



is in direct ratio to the thoroughness and excellence of the operation, as shown by the cicatrices. The number of the vaccine-marks, and the quality of the vaccine, as proven by the appearance of the mark, enable him to determine beforehand the probable severity of the impending attack. The subjoined table clearly presents the facts to the eye.⁴⁰

Classification of Patients afflicted with Smallpox.	Number of Deaths per Hundred in each Class Respectively.
1. Unvaccinated	35.
2. Stated to have been vaccinated, but having no cicatrix	23.57
3. Vaccinated —	
<i>a.</i> Having one vaccine cicatrix	7.73
<i>b.</i> Having two vaccine cicatrices	4.70
<i>c.</i> Having three vaccine cicatrices	1.95
<i>d.</i> Having four or more vaccine cicatrices	0.55
<i>A.</i> Having well-marked cicatrices	2.52
<i>B.</i> Having badly marked cicatrices	8.82
4. Having previously had smallpox	19.

Among the vaccinated the influence of the quality of the cicatrix was remarkable. In those having one vaccine cicatrix, the death-rate, where the mark was good, was 3.83 per cent., while among the badly-marked it was 11.91. Those having two vaccine cicatrices, died at the rate of 2.32 per cent. when well-marked, and 8.34 when badly marked.

In studying this interesting table, there are certain points that should not be overlooked. The unvaccinated died at the rate of thirty-five in the

⁴⁰ Seaton on *Vaccination*. Reynolds' *System of Medicine*. Vol. I page 168.

hundred; but as I have already pointed out, this class was mainly recruited from infants who had failed to receive the benefit of vaccination, because of morbid physical traits which made the operation, to the mind of the parish vaccinator, undesirable. In other words many of them had been *refused* vaccination. As far as we can know, the death-rate from smallpox prior to vaccination and inoculation was, on the average, one out of every five cases. It is, therefore, reasonable to suppose that the additional deaths above that rate, viz., fifteen out of every thirty-five deaths, were due to the previous condition of the patients.

The second class includes persons who claimed to be vaccinated, but showed no evidence. Now, while it is possible that some of these patients may have tried to deceive the doctors by saying that they were vaccinated when they were not, men rarely lie without a motive, and it would hardly seem that there was here any adequate motive for prevarication. On the other hand, as the death-rate in this class was much above that of smallpox naturally, these were evidently severe cases; and as the disease in its virulent form effectually obliterates all traces of vaccination, we have at once the double explanation as to the reason these cases were fatal and why vaccine cicatrices could not be found. They had been obliterated by the severity of the disease.

Dr. Vacher, in a report of the smallpox epidemic at Birkenhead, in 1877, states "that there were 595

cases, of whom 223 were vaccinated, 72 unvaccinated, and 220 unknown. Of these there died 12 vaccinated, 53 unvaccinated, and 28 unknown. The mere assertions of patients or their friends that they were vaccinated, counted for nothing, as about eighty per cent. of the patients entered as unknown were reported as having been vaccinated." As a corollary to this I wish to refer to a report by Dr. Russell, of the Glasgow epidemic of 1871-72. "Sometimes persons were said to be vaccinated, but no marks could be seen, very frequently on account of the abundance of the eruption. In some cases of those which recovered, an inspection before dismissal discovered vaccine marks, sometimes 'very good'."

That this is the explanation of the high death-rate is evidenced by Mr. Marson's testimony: "The danger nearly always depends upon the amount of eruption upon the body. The unvaccinated who have confluent smallpox, die at the rate of 50 per cent., of semi-confluent smallpox the deaths among the unvaccinated are only 8 per cent. The death-rate from discreet smallpox among the unvaccinated is only 4 per cent., and even those 4 per cent. die of convulsions, or some other disease to which children are liable. Of 104 cases of corymbose smallpox 74 were vaccinated and died at 41 per cent., and 29 were unvaccinated, who died at 44 per cent., the remaining one being after inoculation. In corymbose smallpox the protection would seem to be very small."⁴¹

⁴¹ *Vaccination Evidence*, page 248 and 265.

It would be interesting to know in the cases of those having more than one cicatrix, how many represent distinct re-vaccinations. The value of several punctures at one operation would seem to be solely to give the vaccine disease in a severer form, while several re-vaccinations would represent so many successive attacks of the vaccine disease. The protection afforded by several cicatrices, is in any event remarkable; those having four cicatrices incurring but one-sixteenth the risk of those having only one.¹² Numerous cicatrices, however, do not prevent persons from having the smallpox. Patients entered the hospital having as high as seventeen good marks; yet even they caught the smallpox. Thus it is true that the "well-marked" and the "badly marked" alike find their way to the hospital. Twelve hospital reports during the last decennium (1871-80) show 19,779 cases of smallpox. These classified according to their marks are as follows:

¹² It is but fair to say that many Public Vaccinators protest against this large area of scars as necessary, useful or expedient. One of them in writing to the *British Medical Journal*, Dec. 9, 1882, says: "This practice, though supported by statistics, is pure fallacy, and has done more to make vaccination a bugbear than all the outcry of the anti-vaccinators. I believe an excessive amount of inflammation, as is caused by a large area of pustules, does more to damage the protective quality of the vaccination than to improve it. Vaccine virus is known to be capable of unlimited auto-multiplication. The lymph taken from a case in which one small pustule only has been developed, gives as good results as that taken from large and more inflamed pustules."

	CASES.
WITH GOOD MARKS—	
one mark	1,408
two marks	1,105
three marks	806
four marks or more	768
WITH IMPERFECT MARKS—	
one mark	2,062
two marks	1,733
three marks	1,211
four marks or more	653
Some hospitals do not separate in their report the good from the imperfect marks, these are	
WITH MARKS, QUALITY NOT SPECIFIED—	
one mark	1,124
two marks	1,722
three marks	936
four marks or more	741
OTHER VACCINATED CLASSES—	
Traces of vaccine marks	938
Doubtful cases	228
Number of marks	1,205
UNVACCINATED—	
No marks	3,139
Total	19,779

It will be seen, upwards of six thousand have three vaccine marks or more; or, 28.85 per cent.

It would seem therefore that, from the standpoint of Dr. Seaton, while the protection afforded by thorough vaccination is unequivocal, and that the protection is in exact proportion with the thoroughness of the vaccination, yet in certain consti-

tutions there is such a predisposition to the disorder, that even the most careful and repeated vaccination only lessens the chances, and does not prevent an attack.

That it does not protect invariably even for a year, is shown by the many instances where persons have smallpox within a few weeks or months after vaccination. Every table of smallpox statistics shows vaccinated deaths among the very young, where vaccination ought to be protective, if any where. Thus, in the epidemic in Scotland of 1871-73, there died of smallpox 762 infants under one year of age, who are classified in the return of the Registrar-General as:—

Year.	Vaccinated.	Unvaccinated.
1871	64	142
1872	314	64
1873	139	39
<i>Total,</i>	517	245

Thus 517 *died of smallpox* within less than a year after vaccination. Evidently vaccination did not mitigate the attack in these 517 cases.

With regard to the *duration* of the protective power of vaccination, the experiments of City Physician Schuppert, of New Orleans, are instructive. Schuppert vaccinated 30 boys, varying in age from 8 to 14; of these, 5 had had smallpox, and 4 others had been vaccinated. The vaccination succeeded with 7 only; of which 4 had had smallpox. The 25, who had proved insusceptible, were revaccinated every eight

days, from the pustules of the successful cases, with the following results:

23 vaccinated,	14 insusceptible.
14 " "	9 " "
9 " "	6 " "
6 " "	2 " "

Those who had been successfully vaccinated at the first three trials, were revaccinated three weeks after the scab had detached, with this result:

7 from the second trial,	0 insusceptible.
9 " " third	" 3 "
5 " " fourth	" 1 "

Of the 7, who had been successfully re-vaccinated, 6 were again for the third time successfully vaccinated. As a result, Schuppert lost faith in vaccination, and consequently had to resign his position as City Physician.⁴³

The following *resumé*, by Mr. Alex. Wheeler, of the statistics of the Homerton Fever Hospital, shows the number of cases and deaths from smallpox in 1876-77.

HOMERTON FEVER HOSPITAL.

1876-1877.

Smallpox cases received into Hospital:—

	Total.
Vaccinated,	784
Unvaccinated,	131
	915

Divided as follows:—

Discreet cases—Vaccinated,	499
Unvaccinated,	22
	521

(Majority of vaccinated, 477.)

⁴³ Prof. Deschere.

Confluent cases—Vaccinated,	255		
Unvaccinated,	99		
		—	354
(Majority of vaccinated, 159.)			
Malignant cases—Vaccinated,	30		
Unvaccinated,	10		
		—	40 915
(Majority of vaccinated, 20.)			
Deaths of Vaccinated,	102		
“ “ Unvaccinated,	70		
		—	172
(Majority of vaccinated, 32.)			

SUMMARY.

	Cases.	Deaths.	Deaths per cent. of cases.
Discreet—Vaccinated,	499	2	.4
Unvaccinated,	22	0	.0
Confluent—Vaccinated,	255	70	27.0
Unvaccinated,	99	60	60.0
Malignant—Vaccinated,	30	30	100.0
Unvaccinated,	10	10	100.0
	915	172	18.7

Dividing these cases at puberty, shows the number of children who had smallpox and died of it.⁴¹

	VACCINATED.				UNVACCINATED.			
	Under 16 years of age.		Over 16 years of age.		Under 16 years of age.		Over 16 years of age.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Discreet Smallpox.	177	2	322	0	20	0	2	0
Confluent Smallpox.	72	20	183	50	80	49	19	11
Malignant Smallpox.	9	9	21	21	8	8	2	2

⁴¹ *British Medical Journal*, April 14, 1883.

Here evidently is a great mass of ineffective vaccination; *that is vaccination which does not protect*. The figures are official and their reliability cannot be questioned. The vaccinations were performed under governmental inspection, and their genuineness cannot be impugned.

Dr. Léon Colin, who is an acknowledged French authority, thus defines what really constitutes protective vaccination:—"We must not stop with each subject at a single vaccination. We must have in the minds of our lawgivers, and in that of the public, a firm conviction that vaccine prophylaxy rests not upon one practice, and the success of a single operation, but that it is only real and complete by a series of inoculations which should be periodically renewed in order to maintain immunity during the entire life. It will be possible to first impose repeated inoculations upon State officials, and then afterwards upon all classes of society."⁴⁵

This very nearly corresponds with the recommendations so earnestly urged by Dr. Warlomont, the chief of Belgian vaccinators. Dr. Warlomont was the inventor of what is now called *vaccinisation*. He insists that vaccination, as usually performed, is little better than make-believe, and that *vaccinisation* is the only real protective. This consists in subjecting the vaccinated again and again to the operation in quick succession, until vesicles cease to form after the insertion of virus. Then, and then only, is safety from smallpox thoroughly assured.

⁴⁵ *La Variola*.

Dr. Leander Josef Keller furnishes vaccine statistics, which deserve attention. The Austrian system of railways is all under one management, and Dr. Keller is the physician-in-chief. In the epidemic of 1872-73, he carefully examined the relative effects of smallpox on those who had been vaccinated, and those who had not. These railways employ about 37,000 officials and workmen; and these with their wives and children give quite a sum total. Among these there were 2627 cases of smallpox, of which 469 died, or 17.85 per cent. The ratio of deaths at various ages was:—

	Vaccinated.	Unvaccinated.
Under 1 year,	57.14	43.78
From 1 to 2 years,	52.05	38.96
“ 2 “ 3 “	34.15	17.86
“ 3 “ 4 “	21.88	16.88
“ 4 “ 5 “	23.64	13.70
“ 5 “ 10 “	19.23	7.76
“ or		
“ 3 to 15 “	15.41	10.32

These are the years usually considered fully protected by vaccination; but it will be seen in every case that the unvaccinated had the advantage.

Dr. Keller concludes his paper as follows:—

1. Generally more vaccinated than unvaccinated persons were attacked by smallpox.

2. Re-vaccination did not protect from smallpox, and did not lessen the general mortality.

3. Neither vaccination nor re-vaccination exercised a favorable influence upon the mortality of smallpox.”⁴⁶

⁴⁶ *Allgemeine Wiener Medizinische Zeitung*, August, 1873.

There is an unfounded opinion that smallpox was extremely virulent before the era of vaccination. It is true, there were mild epidemics and severe ones, but on the whole, in civilized communities, the death-rate was moderate compared with the total mortality. Dr. Lotz gives the statistics of smallpox during an epidemic in Posen, in 1798. The percentage of deaths to cases was under one year, 35.9 per cent.; under two years, 29.0 per cent.; under three years, 19.6 per cent.; under four years, 16.6 per cent.; under five years 13.4 per cent. That is of all the children under five years of age, who took smallpox, 22.9 out of 100 died. This corresponds very nearly to English hospital experience already quoted.

In the annexed table a comparison is instituted between two epidemics in the last century and that of 1871.

A COMPARISON OF SMALLPOX MORTALITY IN EPIDEMICS OF LAST CENTURY
WITH THAT OF THE YEAR 1871.

A.—*There died of Smallpox in last century in a population of which a small proportion was inoculated.*

AGE-CLASSES.	BERLIN, 1746.			THREE PRUSSIAN TOWNS, 1798.			OBSERVATION.
	Persons living.	Deaths per 1000.		Persons living.	Deaths per 1000.		
		No. of Deaths.	Rate.		No. of Deaths.	Rate.	
0-1 year . . .	2,000	41	20.5	400	13	32.5	Persons above the age of 20 did not at that time, as a rule, die of smallpox.
1-5 " . . .	6,560	129	19.5	1,386	124	89.5	
5-10 " . . .	7,120	15	2.1	1,493	44	29.5	
10-20 " . . .	13,360	1	0.1	2,626	4	1.5	
above 20 years . . .	50,960	0	0	7,425	0	0	
Average	80,000	186	2.3	13,330	185	13.8	

SMALLPOX IN BERLIN.

B.

1871.—*In Berlin, Duisburg, and Hamburg among a population of which at least 90 per cent. were vaccinated, there died of smallpox*

AGE-CLASSES.	1871 IN BERLIN.		1871 IN DUISBURG.		1871 IN HAMBURG.	
	Persons living.	Deaths per 1000.	Persons living.	Deaths per 1000.	Persons living.	Deaths per 1000.
0-1 year . . .	18,917	1,038	992	93	8,789	780
1-5 " . . .	69,176	1,189	3,586	143	30,922	1,024
5-10 " . . .	71,011	243	3,933	46	300,013	1,843
10-20 " . . .	144,422	172	6,072	28		
above 20 years . .	519,043	2,443	15,946	222		6.1
Average	822,569	5,085	30,533	532	338,974	8,647
				17.4		10.8

It will be noticed that in the well-vaccinated Berlin, of 1871, the deaths were three times the rate of non-vaccinated Berlin of 1746. This, by no means, proves that vaccination was a cause of mortality, but it does prove that vaccination did not prevent it. Dr. Müller writes that out of 179 cases of vaccinated children under one year of age, which came under his notice in Berlin, in 1871, more than one-half, namely 99, or 55.30 per cent. died.

That smallpox does not first attack the unvaccinated, and from them spread to the vaccinated, is shown by the statistics of many local epidemics during the past twenty years. Thus in the Cologne epidemic, of 1870, 173 vaccinated persons were attacked before the first unvaccinated one; in Leignitz, in 1871, 224 vaccinated, before one unvaccinated; and in Bonn, in 1870, 42 vaccinated, before one unvaccinated.⁴⁷ This would seem to be the "protected" infecting the "residual dangerous class."

Every one has heard of Müller's Orphan Home, at Bristol, England. As in all public schools in England, the children are all vaccinated. During the early months of 1872 an epidemic of smallpox prevailed, and 293 children had the disorder; with 19 deaths, or 6.66 per cent. This is a favorable showing, and would seem to be strongly confirmatory of the protective power of vaccination. But mild epidemics of smallpox occurred before vaccination, and therefore we can hardly insist upon claiming mild-

⁴⁷ W. J. Collins, M.D.

ness as a logical sequence of vaccination. Jenner, on page 54 of his Inquiry, says: "About seven years ago (1791) a species of smallpox spread through many of the towns and villages of this part of Gloucestershire. *It was of so mild a nature that a fatal instance was scarcely ever heard of*, and consequently so little dreaded by the lower orders of the community, that they scrupled not to hold the same intercourse with each other as if no infectious disease had been present among them. I never saw or heard of an instance of its being confluent. The harmless manner in which it showed itself could not arise from any peculiarity either in the season or the weather, for I watched its progress upwards of a year without perceiving any variation in its general appearance." And yet these were all unvaccinated cases.

That this was not a solitary instance, is shown by the following quotation from a pamphlet published by Isaac Massey, apothecary to Christ's Hospital, in London, in the year 1723: "The children of Christ's Hospital are generally a flux body of about nine hundred or more; and I affirm that in that place not one out of fifty have died these last twenty years of that distemper, and but one the last nine years of the smallpox, although near six hundred have been constantly in the house, and I believe some hundreds have been down of it." Dr. Wagstaffe, writing in the previous year of the same epidemic, states that the fatality amounted to hardly one in a hundred. If such a mild epidemic should

occur in this year of our Lord, 1885, how many there would be who would exclaim, Behold and see what a goodly thing vaccination is.

Very different was the epidemic at Birmingham, England, which culminated in 1874, and which called forth the remark, "Smallpox has lost its usual respect for vaccination." Dr. Alfred Hill, Medical Officer of Health for Birmingham, gives the total number of cases of smallpox during this epidemic, as 7,706, of which 6,795 had been vaccinated, 830 not vaccinated, and 81 doubtful. There had been 1,270 deaths, of which 840 had been vaccinated, 404 not vaccinated, and 26 doubtful.⁴⁵ The 830 not vaccinated, included 475 from the workhouse, mainly infants under one year of age, and too young, too weak, or too diseased to undergo vaccination. The 81 doubtful cases were persons claiming to be vaccinated, but in whom, owing to the severity of the attack, ocular demonstration was impossible. The number of adults over forty years of age, who died "not vaccinated" was *two*.

Dr. Henry Tompkins, of the Manchester Fever Hospital, reports 1,138 cases of smallpox; 932 were vaccinated, 46 claimed to be vaccinated, 64 were undetermined, and 96 were unvaccinated. Of the 1,138 cases, there died 195, or 17.13 per cent., which was about the ordinary death rate of smallpox before the vaccination era. Of the 932 vaccinated, 86 died, or

⁴⁵ *Daily News*, August 25, 1875.

9.22 per cent.; and of the 96 unvaccinated, 60 died.⁴⁹ The City of Manchester is vaccinated almost to the verge of its birth-rate, and these unvaccinated cases represent a class of infants which all tenement-house doctors recognize as hopeless cases, if overtaken by either of the zymoses.

The following table shows very conclusively that the average death-rate from smallpox remains the same now that it was a century ago.

	DATE.	AUTHORITY.	CASES.	VACCI- NATED.	DEATHS	DEATHS PER CENT.
BEFORE VACCINATION.	1723	Dr. Jurin quoted by Dr. Duvillard, . . .	18,066	None.	2,986	16.53
	1746-63	London Smallpox Hos- pital,	6,456	do.	1,634	25.30
	1763	Lambert quoted by Dr. Duvillard,	72	do.	15	20.8
	1779	Rees' Cyclopædia, . .	400	do.	72	18.0
				24,994		4,707
AFTER 40 TO 80 YEARS OF VACCINATION.	1836-51	Mr. Marson's Hospital Report,	5,652	3,094	1,129	19.97
	1870-72	Metropolitan Hospitals,	14,898	11,174	2,764	18.66
	1876	do. do.	1,470		338	23.0
	1871-77	Homerton Hospital (Dr. Gayton),	5,479	4,236	1,065	19.43
	1876-80	Dublin Hospital (Dr. Grimshaw),	2,404	1,956	523	21.7
	1876-80	Metropolitan (Jebb), .	15,171	11,412	2,677	17.6
	1881	Deptford (McCombie)	3,185	2,654	552	17.3
			48,169	34,526	9,048	18.78

⁴⁹ *The Amount of Protection Afforded by Vaccination against Smallpox.* London, 1883.

This Table shows that before the introduction of vaccination, the percentage of deaths from smallpox was no higher than it is at present. Inasmuch as the deaths in the second division include a large majority of vaccinated persons, it is further shown that vaccination has had no effect in diminishing the percentage of mortality. Smallpox as treated now, and smallpox as treated by the medical men of the 18th century, is the same *unmodified* disease. It exacts the same ratio of victims to cases, runs the same course, and is as fatal now as then.

Catlin, the historian of the North American Indians, though a firm believer in vaccination, mentions it as a curious fact, that amongst a tribe of Indians all those who were vaccinated, during an epidemic of smallpox died.

Dr. H. Oidtmann says: "Our German municipal records show thousands of cases of attack or death from smallpox, even in newly-vaccinated persons. The modern analogical proofs drawn from the experiments of M. Pasteur with anthrax or splenic fever, have been proved by the counter experiments of Dr. Koch to be miserable illusions. Artificial inoculation is one thing, the epidemic development of disease quite another; and to base the right of the State to enforce vaccination on the variolous test *a la Jenner*, is to occupy a position that cannot possibly be maintained."⁵⁰

⁵⁰ Address to the Reichstag.

The continued mortality from smallpox, in spite of the predictions of the more ardent pro-vaccinists to the contrary, drew from Joseph Baxendell, F.R.S., the following comparison: "As the best test of the value of vaccination, I have compared the results, in London, for the five years 1849-53, before vaccination was made compulsory, with those for the five years 1869-73, when compulsory vaccination had been twenty years in operation. In the former five years, when vaccination was voluntary, and the number of vaccinated persons probably did not amount to ten per cent. of the total population, the death-rate from smallpox in London was .292; but in the latter five years, when vaccination had been strictly carried out for twenty years, and the number of vaccinated persons was 95 per cent. of the population, the rate was .679, thus showing the extraordinary increase of 132.5 per cent." I do not quote this as indorsing it fully, but only as it bears on what is to follow. Smallpox being one of those diseases which appear in cycles, apparently dying out and then again gradually culminating, only again to diminish and then increase, and as it has been doing this for centuries, it is easy to so manipulate statistics as to prove either side of the question. By dextrous elision of epidemic years, smallpox can apparently be shown to be constantly decreasing in virulence; while by re-arranging the statistics it can be demonstrated just as clearly that it is rapidly increasing. As for instance in the five years 1853-7,

the smallpox mortality in London was 2,631, or an average per year of 526. In the five years 1868-72, there were 11,543 deaths, or an average of 2,308 per annum. Such conjuring with figures is misleading, and therefore dishonest. Smallpox is not rapidly increasing in virulence, although it must be admitted that recent epidemics have shown an unexpected malignancy.

Dr. Charles Cameron, M.P., the able champion of vaccination in the House of Commons, in a letter to the *London Times*, in May, 1882, said: "Since 1836 our statistics have been compiled so as to enable us to compare the mortality not merely in smallpox occurring in all classes of vaccinated persons at different periods, but in each separate class of vaccinated persons—in persons, that is, with one, two, three, or four good or indifferent marks. I have gone into these details, and found that not merely has the mortality in smallpox occurring after vaccination progressively increased in the aggregate, but it has increased in each class of cases, and increased enormously in the best vaccinated class of cases." When it is remembered that these are the words not of an opponent but of a defender of vaccination, their import will be duly realized.

During the ten years, 1870-9, the deaths from smallpox among the vaccinated in London was 10.10 per cent.⁵¹ This is undoubted evidence of in-

⁵¹ *Lancet*, Nov. 12, 1881.

efficient vaccination, and it is probably occasioned, in part, by using smallpox-cow virus instead of the true Jennerian cow-pox. The observations made by Drs. Edward C. Seaton and George Buchanan, during the epidemic of smallpox in London, in 1863, and published in the official report of the Privy Council, in 1865, shows this fact as to the quality of vaccination very plainly: "As the best means of obtaining information on this point, we examined the cicatrices on the arms of 49,570 vaccinated children in various schools, industrial establishments, and workhouses of London. Of these 50,000 children, only 180 in a thousand were found to be properly vaccinated. In one-fifth of the whole number of children examined, vaccination was found to be wholly bad."⁵²

During the past twenty years, since the above was penned, every possible effort has been made by the English government to secure perfect vaccination. An army of vaccinators have been deployed all over the kingdom, extra rewards for efficient service have been offered and paid, criminal prosecutions have been brought by the tens of thousands⁵³ against those who object to being thus parentally guarded by gov-

⁵² Lord Lyttleton, in the House of Lords, on April 12, 1853, showed that in 1852 the ratio of vaccinated to the birth-rate varied widely in different parts of the kingdom. Birmingham, 91 per cent.; Derby, 42; Leicester, 41; Loughborough, 18; Paddington, 16; Bideford, 11; Winchcomb, 6; Westminster, 4.

⁵³ A thousand at one time in a single town.

ernment, a sum aggregating upwards of ten millions of dollars has been spent to accomplish—what? To “stamp out” smallpox. How far all this paraphernalia of governmental interference has succeeded, the statistics I have given show. But we will suppose it *had* succeeded. We will suppose the tens of thousands of the vaccinated who took smallpox and died of it in the past twenty years, and the other and greater multitude of vaccinated who were attacked by the disease and recovered, never had it; that they were actually and really “protected” from the disorder. What then? One great fact stands behind all the statistics which have been brought forward during the past eighty years to prove the saving of life by vaccination.

Nowhere has it been shown that less smallpox means fewer deaths, and it cannot be shown. Zymosis continues a constant quantity, though showing various and subtle changes in appearance; one epidemic predominates for a time, during which the other forms of zymoses are in abeyance. As this particular form fades away, another takes its place, and the death-rate goes on with singular uniformity. The law of vicarious mortality is amply shown in every table of mortuary statistics. Living under certain conditions, the death-rate of a people will be a definite number every year per million living. Nothing will vary this number, to a sensible degree, excepting an alteration in the conditions of living. The prevalence of one disease means the subsidence

of others, which again in its turn subsides to make way for another. The law of compensation is shown for instance in Sweden, where, in 1825, smallpox killed 1,243 persons, and typhus 3,962; but in 1829, smallpox killed only 53, while the deaths from typhus rose to 9,264. Again, in 1846 the mortality from smallpox was only 2; and the total deaths from all causes 72,683. In 1851, smallpox being epidemic in spite of thorough vaccination, the deaths from that disorder was 2,488; and the general mortality 72,506. What is true of Sweden in this particular, is true of every country.

In Prague, from 1796 to 1802, the general mortality was 1 in 32, at a time when the death-rate from smallpox was 1 in 396 $\frac{2}{3}$; but in 1832-55, when that from smallpox was only 1 in 14,741 $\frac{1}{4}$, the general death-rate was still 1 in 32 $\frac{1}{4}$.⁵¹

Dr. Robert Watt, in 1813, was astounded to find that though smallpox abated when vaccination came into fashion, yet the death-rate in general did not diminish. Considering the terrible devastation smallpox had wrought among the young, he says: "I began to reflect how different the case must be now; and to calculate the great saving of human life that must have arisen from the Vaccine Inoculation. At this time (1813) above 15,000 had been inoculated publicly at the Faculty Hall, and perhaps twice or thrice that number in private practice.

⁵¹ Simon. *Papers Relating to Vaccination*, 1857.

In eight years (1805-12) little more than 600 had died in Glasgow, of smallpox; whereas in 1784 the deaths by that disease alone amounted to 425, and in 1791 to 607; which, on both occasions, exceeded the fourth of the whole deaths in the city for the year. To ascertain the real amount of this saving of infantile life, I turned up one of the later years, and, by accident, that of 1808, when, to my utter astonishment, I found that still more than a half perished before the tenth year of their age; I could hardly believe the testimony of my senses, and therefore began to turn up other years, but I found it amounted to nearly the same thing. To make the facts clear, let us bring the results of the past three decades together, thus:

GLASGOW MORTUARY STATISTICS. 1783-1812.

Decade.	From Smallpox.	Measles.	Whooping Cough.
1783-1792	3,466	211	851
1793-1802	2,894	398	914
1803-1812	1,013	1,655	1,151

Decade.	Children under two.	Children under ten.	Total Deaths all ages.
1783-1792	7,293	9,919	17,607
1793-1802	6,277	9,050	16,685
1802-1812	7,120	10,913	20,175

To ascertain in what way the deficiency occasioned by the want of smallpox was supplied by other diseases, he divided the years 1783-1812 into five periods, of six years each, and thus set forth the proportionate mortalities:—

GLASGOW MORTUARY STATISTICS. 1783-1812.

Years.	From Smallpox.	Measles.	Whooping Cough.
1783-1788	19.55	.93	4.51
1789-1794	18.22	1.17	5.13
1795-1800	18.70	2.10	5.36
1801-1806	8.90	3.92	6.12
1807-1812	3.90	10.76	5.57

Years.	Children under two.	Children under ten.	Total Deaths all ages.
1783-1788	39.40	53.48	9,994
1789-1794	42.38	58.07	11,103
1795-1800	38.82	54.48	9,991
1801-1806	33.50	52.03	10,034
1807-1812	35.89	55.69	13,354

“The first thing which strikes the eye on surveying the preceding table is the vast diminution in the proportion of deaths by the smallpox—a reduction from 19.55 to 3.90 per cent.; but the increase in the measles column is still more remarkable—an increase from .93 to 10.76 per cent. In the smallpox we have the deaths reduced to nearly a fifth of what they were twenty-five years ago, whilst, in the same period, the deaths by measles have increased more than eleven times. This is a fact so striking, that I am astonished it has not attracted the notice of other practitioners.”⁵⁵

In 1832, cholera replaced fever almost entirely as a cause of mortality, affecting the same class of persons who would have otherwise died of typhoid.

⁵⁵ *An Inquiry into the Relative Mortality of the Principal Diseases of Children, and the Numbers who have Died under Ten Years of Age, in Glasgow, during the last Thirty Years.* By Robert Watt, M.D., Lecturer on the Theory and on the Practice of Medicine in Glasgow. Glasgow, 1813, pp. 64.

In view of these facts what must be thought of such remarks as those made by Sir Spencer Wells, the world-famous ovariotomist, that "It may not be generally known, but it is true, that Jenner has saved, is now saving, and will continue to save in all coming ages, more lives in one generation than were destroyed in all the wars of the first Napoleon."⁵⁶

This idea of the displacement of one disease, by another of the same class, has been very hotly contested. Seaton makes a very elaborate argument in disproof; but while an excellent specimen of special pleading, it does not cancel facts.

Nor is this law of compensation a new thing. In 1665, John Graunt, a Fellow of the Royal Society, published a volume, giving the vital statistics of London yearly from 1604 to 1664, a period of sixty years. In the period 1604-11, there died of plague, 14,752 persons; of all other diseases, 50,242; total, 64,994; the proportion of deaths from the plague being 28 out of every 100 deaths. In the next period of eight years, 1612-19, there died of plague 171 persons; of all other diseases, 64,346; making a total of 64,517. Thus, when plague destroyed 14,700 persons, the general mortality was only 477 more than when plague killed the insignificant number of 171 persons.⁵⁷ John Graunt very quaintly

⁵⁶ To the Medical Officers of the Egyptian Expedition, Nov 21, 1882.

⁵⁷ Charles T. Pearce, M.D.

remarks, that "a true account of the plague cannot be kept without the account of other diseases."

It is interesting to note the similarity between the fluctuations in the death-rate of plague and small-pox. Compare the table on page 132 with this, showing the mortality from plague.

MORTALITY FROM PLAGUE IN LONDON, 1604-1651.

Year.	Deaths.	Year.	Deaths.
1604	896	1628	3
1605	444	1629	0
1606	2,124	1630	1,317
1607	2,352	1631	274
1608	2,262	1632	8
1609	4,410	1633	0
1610	1,803	1634	1
1611	617	1635	0
1612	64	1636	10,400
1613	16	1637	3,082
1614	22	1638	363
1615	37	1639	314
1616	9	1640	1,450
1617	6	1641	1,375
1618	18	1642	1,274
1619	9	1643	996
1620	21	1644	1,412
1621	11	1645	1,871
1622	16	1646	2,635
1623	17	1647	3,507
1624	11	1648	611
1625	35,417	1649	67
1626	134	1650	15
1627	4	1651	23

Leprosy, the black death, plague, spotted fever, cholera, and influenza have followed each other down the centuries. Sometimes one the chief cause of mortality and again another. Sydenham observes: "I conjecture that diseases have certain periods, according to the occult and unaccountable

alterations which happen in the bowels of the earth. And as there have been other diseases which are now either utterly extinct, or at least almost wasted by age, fade away and very rarely appear (of which sort is a leprosy and some other), so the diseases which now reign, will vanish in time and give place to other kinds, whereof, indeed, we are not able so much as to guess."

Addressing the House of Commons in 1878, Sir Thomas Chambers said: "You cannot show that vaccination has reduced deaths, or saved a single life. There may be no smallpox, but the disappearance of smallpox is by no means equivalent to a reduction of mortality."

Illustrations of this are as "plentiful as blackberries." As, for instance, take the year 1796, which was the worst year for smallpox of that decade, when 3548 died of it in London, and the whole numbers of deaths were 19,288. In 1792, when the smallpox deaths were only 1568, the general mortality was 20,213. That is, though smallpox increased two thousand, the total deaths fell off one thousand.

Again, comparing the forty years, 1841-80, and taking the three years when smallpox deaths were the lowest, and comparing them with the three years when it was the highest, we find, that while in the latter there were nine thousand more smallpox deaths, the average mortality remained unchanged.

	SMALLPOX DEATHS.	GENERAL DEATH-RATE PER THOUSAND.
Three lowest years . . .	1841 . . . 1,053	24.2
	1851 . . . 1,062	23.4
	1855 . . . 1,039	24.3
	Average . . . 1,051	23.9
Three highest years . . .	1863 . . . 1,996	24.5
	1871 . . . 7,912	2.46
	1877 . . . 2,551	21.9
	Average . . . 4,153	23.6

The only thing which has been found competent to contend with zymosis is cleanliness. As a people learn to keep their houses clean, their streets and by-ways clean, their water-supply pure, their food free from adulteration, their persons free from accumulations of effete tissue, they rise superior to the thralldom of zymotic disorders. Under unfavorable sanitary conditions a person insusceptible to one type of disease-element will fall a victim to some one of the other zymotic disorders to which his peculiar dyscrasia renders him liable. To protect him against any one of this class of diseases, still leaves him subject to the others, until by a complete change of his personal surroundings and habits, he is rendered proof against them all.

The London *Lancet* said during the epidemic of

1871: "Those who have been building up in their imagination a great and beneficent system of State medicine, under which the great causes of disease were to be controlled, must abate their hopefulness. It must be admitted that the existing system of public vaccination has been sadly discredited and almost mocked by the experience of the present epidemic."⁵⁸

The Registrar General (England) puts this whole question of the relativity of the zymoses to sanitation very tersely, when he says in his official report for 1880: "The decennium which closed with the year 1880 was one of lower mortality in London than any of the preceding decennial periods. . . . These facts are strong evidence that the sanitary efforts of recent years have not been unfruitful. . . . The evidence in support of this position is rendered still stronger, if, instead of fixing our attention upon the total mortality, we take into consideration its causes. For it will be found that the saving of life was almost entirely due to diminished mortality from causes whose destructive activity is especially

⁵⁸ At the Conference on Animal Vaccination, in London, December, 1881, Dr. Ballard, who gets thirty-five hundred dollars a year as a public vaccinator, in a speech, said: "That if it were not for the interference of such smallpox epidemics as that of 1871, the records of vaccination would be perfectly satisfactory;" whereon Dr. Enoch Robinson observed, "that Dr. Ballard reminded him of a bankrupt who avowed that he would be perfectly solvent, if it were not for his confounded losses."

amenable to sanitary interference—namely, the so-called zymotic diseases. . . . The death-rate from fever fell nearly fifty per cent. . . . that of scarlatina and diphtheria fell 33 per cent. . . . *One disease alone in this class showed exceptionally a rise, and no inconsiderable one. This was smallpox, which, owing to the two great outbreaks of 1871-2 and 1877-8, gave a death-rate nearly 50 per cent. above its previous average.*"⁵⁹

Thus it will be observed the only disorder which vaccination could mitigate; the only one for which it was considered necessary to provide a special prophylactic; the only one for whose prevention immense sums were voted out of the public funds; was the very one, and the only one, that failed to be ameliorated by the general improvement in the condition of the people.

Florence Nightingale observes that "every one

⁵⁹ Here are the figures:

Smallpox Deaths in London.	
1851-60.	7,150
1861-70.	8,347
1871-80	15,551

The deaths in England from the last three great epidemics of smallpox were:

	Deaths.
1857-9.	14,244
1863-5.	20,059
1870-2.	44,840

Dr. W. B. Carpenter, M.P., excuses the heavy mortality in the last epidemic by saying that never before had smallpox swept so terribly over the country. The protective power of vaccination which is only useful when the danger is absent is of singularly little value.

who knows anything of public health questions, will agree as to the practical unity of epidemics and their determining causes, and that exemptions from all alike must be sought, not by any one thing, such as vaccination, but by inquiring into and removing the causes of epidemic susceptibility generally."

In the official report on sanitation in India, we read: "The vaccination returns in India show that the number of vaccinations does not bear a ratio to the smallpox deaths. Smallpox in India is related to season, and also to epidemic prevalence. It is not a disease, therefore, that can be controlled by vaccination, in the sense that vaccination is a specific against it. As an endemic and epidemic disease, it must be dealt with by sanitary measures, and if these are neglected smallpox is certain to increase during epidemic times. Vaccination has no power, apparently, over epidemic smallpox. It would scarcely answer, in the face of these facts, to go on vaccinating the people to protect them from smallpox, while leaving them surrounded by such disease causes as the reports would show to exist in all the villages affected."⁶⁰

Again, in the following year, the same idea is enforced: "It must not be forgotten that the amount of smallpox depends not only on the proportion of unvaccinated people in a country, but also, and primarily, on the sanitary condition of the people and their

⁶⁰ *Report on Sanitary Measures in India, 1879-80, Vol. XIII, 1881.*

surroundings, and the influence exercised by these elements on their general health and resisting power against epidemics. . . . The whole history of Indian smallpox appears to show that it is essentially an epidemic disease, and, as such, it ought to admit of mitigation by ordinary sanitary procedure, like other maladies of the same nature."⁶¹

The last proposition that I set out to prove was that the less disfigurement now from smallpox, shows that it has been mitigated by the practice of vaccination. I have endeavored to find evidence that smallpox-marked faces are less frequently seen now-a-days than formerly. I supposed I would have no trouble to do so; but though I have ransacked every library in New York since beginning this chapter, I have been able to find not a particle of real evidence. I believe it to be so, but of *evidence* worth the name there is not a particle.

It would seem then that it is to sanitation alone that we can turn for any real solution of this problem. Lord Shaftesbury, whose death has but recently been chronicled, observed: "It is perfectly true that smallpox is chiefly confined to the lowest classes of the population; and I believe *that with improved lodging houses, the disease might be all but exterminated.*"

No doubt if, by some magical means, this entire class, as we see them, for instance, here in New York, could be lifted out of their present abodes and

⁶¹ *Report on Sanitary Measures in India, 1880-1, Vol. XIV, 1882.*

put into nice, clean dwellings, a large number of them would be permanently benefitted; but, fortunately, no such radical means can be adopted. The elevation of the lower classes of the population can only be practicably accomplished by opening wider the possibilities of self-advancement. Then, as is in fact being done now, the more thrifty and vital will work upward to a state of independence. Any elevation of the masses, which comes not from active acceptance on their part of enlarged opportunity, but from artificial, outside pressure, would be deleterious. It is not inhumane to say, that things being as they are, the extravagant death-rate among these classes is a National blessing. For if these thousands of diseased and weakly children, who now die because they have not vitality to sustain themselves under the circumstances into which they are born, were by a radical change in their surrounding kept alive, they would in a few years marry and multiply to such an extent as to overwhelm the thriftier and hardier portion of the race. Cruel as the fact may seem; lay the blame where you will; nevertheless, it is terribly true that the excessive mortality among the children of the vicious and degraded, alone prevents our civilization from being crushed out by them.

In conclusion, I think we are warranted in maintaining, that an impartial and comprehensive study of vital statistics proves, that the extension of the practice of vaccination cannot be shown to have any

logical relation to the increase or diminution of cases of smallpox; and that these same vital statistics, gathered from every quarter of the world, establish the fact that smallpox, like the other zymoses, originates from unsanitary modes of life, and can only be effectually conquered by removing the cause; and that, finally, vaccination is inoperative on the general death-rate where sanitation is defective, and superfluous where sanitation is efficiently enforced.

THE ALLEGED DANGERS FROM VACCINATION.

I have clearly perceived the progressive dangerous influence of Vaccination in England, France, and Germany.—*Alexander von Humboldt.*

HAVING thus determined the actual value of vaccination as a prophylatic power, we come now to the consideration of the dangers, which it has been alleged, await those who are subjected to the operation. These are of two kinds; first, the immediate danger from the operation, and secondly, the remote.

The persons who die from the immediate effects of a vaccination are inconsiderable, when taken in relation to the millions who are vaccinated. Still, taken by themselves, they make quite a ghastly list, extending down from the beginning of the century, and hailing from every clime. Dr. William Rowley, F.R.C.P., London, Physician to Her Majesty's Lying-in Hospital, Lecturer on the Theory and Practice of Medicine, wrote in 1805: "Out of 504 persons vaccinated, 75 died from the consequences. There is no question here of supposition, or calculation of probability—*it is truth.* It is evidence which seems to speak, and leaves no doubt. Now, if in the space of seven or eight years (from 1798 to 1805) Vaccination has shown itself so grievous to society, what may we not fear for the future."

In the year 1807, Mr. Birch, of St. Thomas Hospital, and Surgeon Extraordinary to the then Prince of Wales, mentions a number of cases as occurring at Chelsea, in Hertford, at the Lambeth Workhouse, and elsewhere. It is needless to give the details here. I compiled a list of upwards of a thousand instances of persons who had suffered permanent injury, or death, but I cannot give space for them. Of these, nine have been personally known to me. It is no infrequent thing, however, to hear a public vaccinator say that he has vaccinated a certain number of thousands and *has never seen* the slightest evil resulting. Well, one need not see the sun, if he will only resolutely shut his eyes. Again, I am sorry to say, that many medical men who recognize evil results, imagine that they may be covered up by prevarication. As if any good was ever done by a lie. But it is rarely that one is so outspoken as Dr. Henry May, who, in an article on "Certificates of Death," in the *Birmingham Medical Review*, January, 1874, thus expresses himself: "In certificates given by us voluntarily, and to which the public have access, *it is scarcely to be expected that a medical man will give opinions which may tell against or reflect upon himself in any way, or which are likely to cause annoyance or injury to the survivors.* In such cases he will most likely tell the truth, *but not the whole truth, and assign some prominent symptom of the disease as the cause of death.* As instances of cases which may tell against the medical man himself, I will

mention *erysipelas* from vaccination, and puerperal fever. A death from the first cause occurred not long ago in my practice, and although I had not vaccinated the child, *yet in my desire to preserve vaccination from reproach, I omitted all mention of it from my certificate of death.*" Dr. May but voices the practice of many of his cis-atlantic colleagues.

On the other hand, the most silly and extravagant charges are brought against vaccination. Mothers, in our tenement-house class, are prone to refer back to "the time when baby was vaccinated," as from whence came every subsequent ill which might happen to the child. In a lengthy hospital and dispensary experience, covering more than eighteen thousand cases, it has been my lot to hear many such preposterous charges. I have investigated at least fifty such that I have thereupon been able to declare utterly without foundation.

It is alleged that vaccinated children are more liable to die from other diseases (than smallpox) than those who have not been vaccinated. We have seen that the average death-rate has not declined with the lessened frequency of deaths from smallpox; but the proposition here advanced is, that vaccination, by weakening the child's constitution, or by implanting other diseases, tends to shorten life. Let us see if there is any warrant for this assertion.

It has been noticed that the death-rate from certain diseases has very greatly increased since vaccination has become universal, and that this increase

has been proportional to the extension of vaccination. Now, although this is true, it is by no means positive evidence that the doctrine *post hoc ergo propter hoc* applies, for many other influences are constantly at work, and these must be duly considered before passing judgment.

There are two classes of diseases which are supposed to be spread by vaccination. Those which are distinctly inoculable, as syphilis and scrofula, and those to which persons may be predisposed by a lowering of physical force, such as pneumonia, or typhoid.

Herbert Spencer, speaking of the deplorable ill-health of the rising generation, says: "We are not certain that the propagation of subdued forms of constitutional disease through the agency of Vaccination is not a part-cause. Sundry facts in pathology suggest the inference that when the system of a vaccinated child is excreting the vaccine virus by means of pustules, it will tend also to excrete through such pustules other morbid matters; especially if these morbid matters are of a kind ordinarily got rid of by the skin, as are some of the worst of them. Hence it is very possible—probable even—that a child with a constitutional taint, too slight to show itself in visible disease, may, through the medium of vitiated vaccine lymph taken from it, convey a like constitutional taint to other children, and these to others."⁶²

⁶² *Education*, page 181.—1881.

VACCINAL-SYPHILIS.

The existence of vaccinal-syphilis was until recently most strenuously denied. Says Simon (1857), "if syphilis could be diffused by the vaccine lymph of children with an hereditary taint of that disease, this possibility must long ago have been made evident on a scale far too considerable for question,"⁶³ and this was unquestionably the opinion of almost all competent practitioners down to that date; although Mosely, in Jenner's time, and other writers of later years had insisted upon the possibility of the propagation of syphilis in arm-to-arm vaccination. This opinion has since been very much modified. In 1862, M. Ricord, who up to that time was a disbeliever in vaccinal-syphilis, in a lecture in Hotel Dieu, in Paris, said: "it is not impossible that the disease [syphilis] was transmitted with the vaccine lymph, but in the estimation of facts which seem to establish such transmission, it is necessary to distrust the evidence of our senses; . . . let us admit a careful inquiry into these cases, and let us guard against any predetermined notions on the subject; but as to the interpretation offered, let it be received with an amount of hesitation and doubt, increased by the obvious fact, that *if ever the transmission of disease with vaccine lymph is clearly demonstrated, vaccination must be altogether discontinued*; for in the present state of science, we are in possession

⁶³ *Papers Relating to the History and Practice of Vaccination*, p. 66.

of no criterion which may permit the conscientious practitioner to assert that the lymph with which he inoculates, is perfectly free from admixture."

In the following year (May 19, 1863) standing in the same place, this eminent syphilographer said: "At first I repelled the idea that syphilis could be transmitted by vaccination. The recurrence of facts appearing more and more confirmatory, I accepted the possibility of this mode of transmission, I should say, with reserve, and even with repugnance; but to-day I hesitate no more to proclaim their reality."

In 1864, Dr. O. Kratz, a surgeon in the Confederate army, reported some cases of vaccinal-syphilis.⁶⁴

In 1866, W. B. Collins, M.D., of St. Bartholomew's Hospital, London, reported some cases.

In 1867, M. Depaul, the Chief of the Vaccination Service of the French Academy of Medicine, published an essay on the danger of syphilitic infection through vaccination. He enumerated half a dozen outbreaks of vaccinal-syphilis, in the course of which 160 children had been infected.⁶⁵

In 1868, Prof. Joseph Jones, M.D., of Nashville, Tenn., reported a large number of cases as occurring at Andersonville, and elsewhere, during the war.⁶⁶

⁶⁴ *Confederate States Medical and Surgical Journal*, Vol. I, page 104, 1864.

⁶⁵ Address at the Calf-lymph Medical Congress, by Charles Cameron, M.D., M.P., 1879.

⁶⁶ *Abnormal Phenomena accompanying and following Vaccination in the Confederate Army.*

In 1868, Dr. Ballard, one of Her Majesty's Vaccine Inspectors, observed: "There can be no reasonable doubt that the vaccine virus and the syphilitic virus may both be drawn at the same time, upon the same instrument, from one and the same vesicle. The vesicle which is thus capable of furnishing both vaccine and syphilitic virus may present, prior to being opened, all the normal and fully developed characters of a true Jennerian vesicle, as ordinarily met with."⁶⁷ In the same year (1868), B. F. Cornell, M.D., President of the Homœopathic Society of this State, declared in his Annual Address, that "to no medium of transmission is the wide-spread dissemination of this class of disease so largely indebted as to Vaccination."⁶⁸ Dr. Heim, public vaccinator, Wurtemberg, said: "I have myself transplanted syphilis from a child which seemed at the time perfectly healthy."⁶⁹ In 1871, Dr. Chas. T. Pearce, London, testified before the Parliamentary Committee, that "he had unwittingly transferred syphilis from lymph supplied by the Royal Jennerian Institution; had twenty such cases within four years at Northampton." He also quotes Whitehead, of Manchester, a very distinguished practitioner, "who had seen several instances of syphilitic taint, transferred from a true Jennerian vesicle." John Simon,

⁶⁷ *Essay on Vaccination.*

⁶⁸ Address delivered before the Homœopathic Medical Society of the State of New York, February 11, 1868.

⁶⁹ *Horrors of Vaccination*, page 26.

F.R.S., testified that there was "not the least doubt that syphilis has been communicated in what has purported to be vaccination." Dr. Bakewell, Vaccinator-General of Trinidad, "had seen leprosy and syphilis communicated by vaccination. Leprosy is becoming very common in Trinidad; its increase being co-incident with vaccination. Sir Ronald Martin, M.D., agreed with him that the leprosy arose from vaccination." Mr. Marson, of the Smallpox Hospital, London, "had never seen syphilis after vaccination, but M. de Meric, who is a very clever man, believes in it. Mr. Rollet holds a similar opinion. The fact that syphilis may be conveyed by vaccination has been proved in the Rivalta cases, also in France, and Germany." Dr. Wood, F.R.C.P., Edinburgh, "never listens to alleged cases of syphilis or scrofula. If those diseases show themselves soon after vaccination, they are unjustly ascribed to vaccination." Sir William Jenner, M.D., "has never seen syphilitic affections resulting from vaccination. Considers the assertion, that syphilis has been communicated by the lymph, of very little worth; though he admits that Ricord and Hutchinson are men of scientific position." Sir William Gull, M.D., "had never seen vaccinal-syphilis, and thought it would be the most insane thing to give up vaccination. Hunter, and others, maintained that syphilis could not be communicated by vaccination. Thinks Ricord's conclusion a very hasty one." Dr. West, as Physician to the Children's Hospital, had seen

60,000 cases [all diseases], "never had a case of syphilis in consequence of vaccination." Jonathan Hutchinson, M.R.C.S., "has seen the syphilitic contagion conveyed by vaccination in eleven cases; has had great experience in syphilis; has another series of cases strongly suspected to be of the same kind now under investigation, and has had many suspected cases sent him during the last fortnight. Ricord is certainly an authority. Is not sure the 540 medical men, quoted in the Blue Book of 1857, denied the possibility of syphilitic communication by vaccination; they expressed their own non-familiarity with it, and said they had never seen it happen. The general opinion held by the profession must doubtless greatly affect their interpretation of facts. Would attribute much less force to mere negative than to positive evidence. Having worked at the subject of syphilis specially, was able to detect appearances of that disease, which, possibly, might not be done by most medical men." E. C. Seaton, M.D., thinks the above "mistaking sequence for consequence. The danger of syphilitic communication quite infinitesimal. No doubt, the mode in which persons deal with facts is largely affected by the views they hold, and the profession would have been much less inclined to believe in such possibility than they would be in the future."⁷⁰

⁷⁰ All the above from the words "Parliamentary Committee," page 121, line 19, condensed from testimony before a Committee of the House of Commons, 1871.

In 1872, William Hitchman, M.D., D.C.L., of Liverpool, said: "That he had seen impure consequences following vaccination, even in the hands of Mr. Marson himself;" and speaking of certain ulcers, he said: "They owe their disgusting origin to the foul exudations of that indefinite, nameless, hideous thing now in course of active propagation throughout the land, yeleft vaccinal-syphilis."⁷¹

In 1873, Mr. Hutchinson again came forward, at a meeting of the Medico-Chirurgical Society, with the details of new cases of vaccinal-syphilis. "He also drew some general deductions from the facts as already ascertained, which, together with others elicited in the course of the discussion that followed, constitute the most important practical suggestions yet made in regard to this most unsatisfactory subject. That syphilis could be communicated by vaccination, was, though admitted abroad, long disputed in this country. Since the publication of Mr. Hutchinson's paper, and a communication by Mr. Thomas Smith to the Clinical Society, where the patient was exhibited, it can no longer be so. We have now emerged from the region of doubt, to one of belief in the possibility of such an untoward occurrence. . . . The facts now before the public will tend to rouse them, if they have not been roused already from the false security, into which they had been lulled."⁷²

⁷¹ *The Anti-Vaccinator*, December 16, 1872.

⁷² *Medical Times and Gazette*, February 1, 187 .

In 1874, Prof. A. Trousseau, M.D., Physician to Hotel Dieu, Paris, observes: "The transmission of syphilis by vaccination appears now to be an established fact. To the examples, which since the beginning of this century have been reported, and of which the number is singularly augmented of late years, I could add that which has come to our notice in our hospital. . . . If there are still some doctors, who doubt the possibility of the transmission of syphilis by vaccination, the greater number have succumbed to the evidence. . . . The assertion that blood only conveys the disease, is hypothetical. It is difficult to understand that what the blood serum contains the vaccinal serum does not contain also."⁷³ Prof. Germann, M.D., said: "Above all, the dire fatality, which lately occurred at Lebus, a suburb of Frankfort-on-the-Oder, would alone warrant the abolition of the vaccination laws. Eighteen school girls, averaging twelve years of age, were re-vaccinated, and thereby syphilised, and some of them died. . . . Yet the lymph, the syphilitic lymph, used in this case, was obtained from the Official Royal Establishment, and was the new regenerated or 'animalized' vaccine lymph so warmly recommended for the revaccination of schools."⁷⁴

In 1877, Brundenell Carter, F.R.C.S., L.S.A., etc., Surgeon to St. George's Hospital, London, observed:

⁷³ *Clinique Medicale*, Vol. I, pages 116-18, Paris, 1874.

⁷⁴ From an address to the Diet of the German Empire.

"I think that syphilitic contamination by vaccine lymph is, by no means, an unusual occurrence, and that it is very generally overlooked because people do not know either when, or where to look for it. I think that a large proportion of the cases of apparently inherited syphilis are in reality vaccinal; and that the syphilis in these cases does not show itself until the age of from eight to ten years, by which time the relation between cause and effect is apt to be lost sight of."⁷⁵ In the same year, Mr. Hutchinson, in a work on Surgery, again said: "There can be no doubt that the danger of transmitting syphilis by vaccination is a real and a very important one."⁷⁶

Prof. Robert Alexander Gunn, M.D., of New York, declared that, "the appalling evils that have been and are still produced by it, are sufficient to condemn the practice as a crime."⁷⁷

In 1878, the eminent and beloved Constantine Hering, M.D., of Philadelphia, wrote: "I have more than once plainly seen, and often heard of, cases where children remained ailing from the time of vaccination, who were previously in robust health."⁷⁸

In 1879, J. R. Newton, M.D., of Boston, said: "Were I to relate a few of the cases that have fallen

⁷⁵ *Medical Examiner*, May 24, 1877.

⁷⁶ *Illustrations of Clinical Surgery*.

⁷⁷ *Vaccination, its Fallacies and Evils*, page 13.

⁷⁸ From a letter to the Homœopathic Practitioners of Great Britain, Philadelphia, August, 1878.

under my observation of persons injured by this practice, it would fill the mind with horror." Sam'l Eadon, M.A., M.D., of Gloucester, said: "The sins of the fathers to the third and fourth generation is imported into the young organism." Prof. Alexander Wilder, M.D., etc., observed: "Hence a vaccinated people will always be a sickly people, shorter lived, and degenerate." Prof. Niemeyer, M.D., etc., of Tübingen, said: "It cannot be denied that vaccination sometimes leaves permanent impairment of health."⁷⁹ John Simon, F.R.C.S., etc., wrote: "Thus the vaccine lymph of the syphilitic may possibly contain the syphilitic contagion in full vigor, even when the patient, who thus shows himself infective, has not on his own person any outward activity of syphilis."⁸⁰

In 1880, A. G. Springsteen, M.D., of Cleveland, Vice-President of the National Eclectic Medical Association, said: "No one, who has given the subject the least consideration, doubts that impurities may be conveyed in this manner."⁸¹ Sir Thomas Watson, M.D., F.R.S., D.C.L., wrote: "There has fallen an ugly blot. . . . Such facts as Mr. Jonathan Hutchinson has demonstrated, constitute a rational excuse for objecting to compulsory vaccination. I can readily sympathise with, and even applaud a father who, with the presumed dread or misgiving in his

⁷⁹ *Text-Book of Medicine*. 1879.

⁸⁰ *British Medical Journal*, December 13, 1879.

⁸¹ *New York Medical Tribune*, January, 1880.



mind, is willing to submit to multiplied judicial penalties, rather than expose his child to the risk of an affection so ghastly."⁸²

In 1881, Dr. Desjardins gives a complete account of the syphilisation of 58 French recruits in Algeria. The most cautious silence was preserved by the military authorities; and not without reason, if vaccination is to retain its hold on popular credulity. Dr. Desjardins proposed to solace these soldiers by pensions for injuries which the Government cannot redress.⁸³

In 1882, S. B. Munn, M.D., of Waterbury, Conn., Ex-President of the National Eclectic Medical Association, declared: "That if medical men were made pecuniarily responsible for the ill-effects, no physician would ever vaccinate."⁸¹

In 1883, Dr. Brereton reports cases of invaccinated leprosy in Hawaii.

In 1883, Ch. Pigeon, M.D., of Fourchambault, addressed a letter to the Deputies of the French Chamber, relative to the proposed bill upon compulsory vaccination, in which he speaks of having then under his care some cases of vaccinal syphilis.

This chronological record of invaccinated syphilis is brief but conclusive. If need be, it could be swelled to a portly volume. Upwards of nine hun-

⁸² *Nineteenth Century*. June, 1880.

⁸³ *Journal d'Hygiene*, Aug. 25, 1881. Edited by Docteur de Pietra Santa, a scientific gentleman, of eminent reputation.

⁸¹ Address before the Eclectic Medical Association of Connecticut.

dred well-attested cases are on record; and when it is remembered with what difficulty even a single case can be indubitably sustained, the mind realizes the probably thousands, which have been overlooked or ignored. My own dispensary experience leads me to aver that a systematic, impartial, Governmental investigation would reveal an undreamt of multitude of cases. Such an investigation will never be permitted.

I have only space to give the details of one case which has come under my observation. In December, 1879, there came to the out-patient department of the Manhattan Hospital a mother with her little girl, twenty-one months old. The woman was a widow, whose husband had died some time previously, of pneumonia, leaving three children aged three years, twenty-one months, and seven months respectively. The two oldest were girls, and the infant, a boy, born I believe after his father's death. The mother supported them all by odd jobs of laundry work. Although very poor, they were neat, and attracted my attention thereby, before I had inquired into the cause, which brought them to my clinic. The woman's story was this: some seven or more weeks previously, the three children had been forcible vaccinated by a public vaccinator, in a house-to-house visitation. The arms of all the children had remained sore ever since. About a week ago she had noticed ulcers on the baby, and had obtained a salve from a drug-store; but the child continued

to get worse day by day. Yesterday she noticed places, breaking out on the second child, and she had, therefore, come to find out what was the matter. On examining the child, I found the place of insertion of the vaccine virus, a shallow, clean-cut ulcer, filled with a dirty exudation. The cellular tissue round about it was infiltrated and very hard, extending over nearly one-half of the upper arm. The axilla was tender, and the glands swollen. There were six ulcers on the body; four of them very small, just forming that day, and two somewhat larger, having appeared thirty-six hours previously. These ulcers began, like a blister, the size of a split pea, with a swollen indurated base of a copperish hue, and in all respects resembling syphilitic rupia. The ulcers were so characteristic, that I ordered the whole family to appear before me on the morrow. When, on the following day, I saw the infant stripped of its clothes, revealing no less than thirty dreadful ulcers, some of them as large as a silver dime; it made me heart-sick. Some of these had already begun to scab, showing the peculiar watch-crystal formation, so characteristic of this eruption. On the oldest child I found four small blisters on the back, and she also, in a day or two, had a full share of syphilitic sores. Here were three children, which a very careful investigation in the neighborhood, where they lived, showed that they had been, up to the time of their vaccination, in very good health, suddenly stricken with the most incontestible evi-

dences of this dreadful disorder. As many other children in the same neighborhood were vaccinated by the same vaccinator, I was loath to admit to myself that the vaccine could have caused the disaster. I therefore tried to discover some other means of inoculation. I examined the men whose clothes the woman had laundered, the woman herself most particularly, but was, at last, obliged to admit that there was no apparent means of infection, except through the vaccination.

The infant was the most severely affected, and the oldest child the least. I had them under treatment for about four months, during which time they were seen by a number of physicians. At the end of that time the ulcers had all healed and the children were apparently well, but I unfortunately lost all trace of them by the mother moving out of the neighborhood.

Meanwhile, syphilis is a constantly increasing factor in infantile mortality. In the appendix to the 37th Annual Report of the Registrar General of England, Dr. Farr, page 221, writes: "Syphilis . . . was twice as fatal in the five years, 1870-74, as it was twenty years ago. Its most fatal recorded forms occur in children under one year of age."⁸⁵ The following table gives the relation between vaccination, smallpox and syphilis during a period of 44 years.

⁸⁵ Since the above was written Dr. Farr has died. His memory deserves a tribute of respect from all who are interested in sanitation. Although a believer in vaccination, the labors of his long official life furnish a repertory of statistical facts, which show its utility as at present practiced.

A TABLE OF MORTALITY IN ENGLAND AND WALES,

SHOWING

The DEATHS from SMALLPOX and SYPHILIS; also the number of SUCCESSFUL PUBLIC VACCINATIONS. Compiled from the REPORTS of the REGISTRAR-GENERAL, from the First Year of Official Registration, by W. T. STEPHEN, 61 Victoria Road, Finsbury Park.*

Years.	Population.	Successful Vaccinations at the expense of the Poor Rates.	Deaths from Smallpox in Periods.	Deaths from Smallpox.	Deaths from Smallpox. Million Pop.	Deaths from Smallpox. Average for each five Years.	Deaths from Syphilis. Annual Average for each five Years.	
1838	15,287,099		35,833 (3 years) 1838-40	16,268	1,064	159	10 9 12 11 11 10.6 1838-42	
1839	15,514,255			9,131	589	142		
1840	15,730,813			10,434	663	195		
1841	15,929,492			6,368	400	177		
1842	16,130,326			2,715	168	178		
1843	16,332,228							
1844	16,535,174			576.8				
1845	16,739,136			1838-42				
1846	16,944,092							
1847	17,150,018	No official account of vaccinations before 1852.	29,522 (6 years) 1841-50					
1848	17,356,882			4,227	246	565	32	33.0 (3 years) 1847-49
1849	17,564,656			6,903	308	575	33	
1850	17,773,324			4,644	264	595	34	
				4,665	263	554	31	
				292.7 (4 years) 1847-50				

From 1843 to 1846 inclusive the causes of deaths were not analysed by the Registrar-General.

* From 11th Annual Report of Local Government Board, p. 346.

1851	17,982,849	397,128	42,071 (10 yrs.)	6,997	396	253.6 1851-55	508	34	37.2 1850-54
1852	18,193,206	366,593	1851-60	7,320	409		623	35	
1853	18,404,368	677,886		3,151	174		622	34	
1854	18,616,310	448,519		2,808	153		964	52	
1855	18,829,000	422,281		2,525	136		947	51	
1856	19,042,412	411,268		2,277	121		879	47	
1857	19,256,516	455,004		3,936	206	197.0 1856-60	957	50	50.9 1855-59
1858	19,471,291	445,020		6,414	329		1,006	52	
1859	19,686,701	485,927		3,798	193		1,089	56	
1860	19,902,713	425,739		2,713	136		1,067	54	
1861	20,119,314	437,693		1,290	64		1,177	50	
1862	20,371,013	646,464		1,579	78	218.8 1861-65	1,245	62	63.6 1860-64
1863	20,625,855	529,479		5,891	286		1,386	68	
1864	20,883,889	578,583		7,624	365		1,550	75	
1865	21,145,151	454,885	34,786 (10 yrs.)	6,361	301		1,647	81	
1866	21,409,684	490,598	1861-70	2,977	139		1,662	79	
1867	21,677,525	513,042		2,467	114	104.8 1866-70	1,698	80	82.3 1865-69
1868	21,948,713	524,143		1,994	91		1,886	88	
1869	22,223,209	472,881		1,482	67		1,859	85	
1870	22,501,316			2,547	113		1,858	84	

Years.	Population.	Successful Vaccinations at the expense of the Poor Rates.	Deaths from Smallpox in Periods.	Deaths from Smallpox.	Deaths from Smallpox per Million Pop.	Deaths from Smallpox. Annual Average for each five Years.	Deaths from Syphilis.	Deaths from Syphilis. Annual Average for each five Years.
1871	22,788,466	693,104	{ 57,422 (10 yrs.) 1871-80 }	23,062	1,012	{ 411.4 1871-75 }	1,742	{ 81.0 1870-74 }
1872	23,095,819	669,320		19,022	824		1,881	
1873	23,407,317	501,189		2,303	98		1,843	
1874	23,723,017	493,285		2,084	88		1,997	
1875	24,042,974	498,952		849	35		2,142	
1876	24,367,247	566,587	{ 78.4 1876-80 }	2,408	99	{ 88 85 87 80 84 }	2,141	{ 85.7 1875-79 }
1877	24,695,894	529,376		4,278	173		2,085	
1878	25,028,973	513,575		1,856	74		2,191	
1879	25,366,544	519,715		536	21		2,036	
1880	25,708,666	513,283		648	25		2,162	
1881	26,055,406	533,005		3,098	119		2,097	86

VACCINATION ACTS.

1840.—To extend the practise of Vaccination.

1841.—To amend the Vaccination Act.

1853.—Vaccination made Compulsory.

1861.—To facilitate prosecutions.

1867.—To consolidate and amend the Acts.

1871.—To amend and more rigorously enforce the Act.

1874.—To explain the Act of 1871.

VACCINAL-PHTHISIS.

It is alleged that phthisis has greatly increased since vaccination, and in consequence of it. This is totally denied by some authorities, and others, such as Mr. Seaton, while admitting that tuberculosis has greatly increased, say that children, who would have died of smallpox, are saved by vaccination until adolescence, to die of consumption. Now it is evident that whatever may be true of phthisis, this last assertion cannot be true. For we have seen that the death-rate among young children has not been lowered, to any considerable extent, by the diminution in smallpox mortality; but that those who formerly were killed by smallpox, now die of measles, scarlatina, whooping-cough, bronchitis, or syphilis. The increased ratio of deaths from tuberculosis must, therefore, be explained in some other manner.

Those who state that vaccination is a cause of phthisis, bring forward the following arguments in favor of this position: That vaccine-virus, having its basis in horse-grease, is a product of scrofula, and that scrofula and tuberculosis are interchangeable terms; that vaccine-lymph taken from a tuberculous person will convey both viruses, just as it has been shown that vaccine-lymph taken from a syphilitic subject, will transfer to the inoculated both vaccinia and syphilis; and that an attack of smallpox, if recovered from, extinguishes the tendency toward scrofula and tubercle, and that therefore vaccina-

tion, so far as it keeps such persons from taking smallpox, reserves them for a more lingering and painful death.

Let us examine critically these three propositions. Glanders, farcy, and grease are claimed by some veterinary surgeons to be varieties of the same thing, and that they are the equine analogue of scrofula; that farcy buds and grease grapes are essential manifestations of the same disorder, just as scrofula shows itself in multiform appearances.

This virus, which is the true Jennerian cow-pox, engrafted upon a healthy human being might produce no effects, except at the point of puncture. But in a person predisposed to scrofula, it would very likely light up the latent disorder, and show itself in no uncertain form. Nor must it be forgotten, that as invaccinated and hereditary syphilis may lie latent and unsuspected through many years, so tubercle, engrafted into the system, may remain quiescent until some critical period enables it to assert ascendancy over the heretofore restraining vital force.

That tubercle or scrofula can be engendered or intensified by vaccination is no new theory. Dr. Squirrel suggested the idea some seventy years ago, and the experiments of Connheim, Fox, and Tous-saint confirm his hypothesis. That the danger is a real one, probably as important as its cognate, vaccinal-syphilis, seems now, in the presence of recent investigations into the inoculability of tubercle, al-

most affirmed as a scientific fact. Professor Conheim has declared that the test for tubercle is, that virus inoculated on a guinea-pig will produce tubercle. Wilson Fox has shown that vaccine virus inoculated on a guinea-pig does produce tuberculosis; that vaccine is tubercle. Toussaint took lymph from a tuberculous cow and vaccinated various animals, who all subsequently became tuberculous, proving that the quality of the lymph, which was not previously tuberculous, was altered by the media (*i. e.*, the tuberculous animal) through which it passed.

That scrofula and tubercle have an increasing influence in the ratio of the extension of vaccination, is shown by successive Reports from the Registrar General's office (England). I give the figures, and leave the reader to draw his own conclusions.

The annexed table, compiled from a Parliamentary Return (No. 392, 1880), gives the figures in three periods, corresponding with the changes that have been made in the Vaccination laws, whereby a more thorough vaccination has been secured:

	ENGLAND.		
	Vaccination Voluntary, 1847-1853.	Vaccination Obligatory, 1853-1867.	Vaccination Enforced, 1867-1878.
Deaths under one year of age, annually, per million births, from—			
Scrofula	351	611	908
Syphilis	564	1206	1738
Skin Diseases	183	253	343
Pvæmia	—	155	180
Mesenteric tuberculosis	2981	3371	4373

MEAN ANNUAL RATE OF MORTALITY IN ENGLAND from Smallpox, and from six directly or indirectly inoculable causes, during each Quinquennial of 30 years, 1850-80. (P. lxxix, Table 34, of the 43d Annual Report of the Registrar-General, 1882.) N. B.—Vaccination made compulsory, 1853; more stringently so, 1867.

CAUSES OF DEATH.	ANNUAL DEATHS PER MILLION LIVING.							Increase of Mortality per cent. 1880 over 1850.
	1850-4	1855-9	1860-4	1865-9	1870-4	1875-9	1878-80	
Smallpox*	273	199	190	147	433‡	81	40	
Syphilis	37	60	63	82	81	85	81	127 per cent.
Cancer	302	327	368	404	442	492	510	70 per cent.
Tabes Mesenterica	264	261	272	315	298	330	340	29 per cent.
Phlegmon and Py- æmia	20	18	23	23	29	39	40	100 per cent.
Skin Disease	11	15	15	17	18	23	23	109 per cent.
Bronchitis †	1,016	1,358	1,658	1,839	2,105	2,464	2,505	144 per cent.
Total 6 causes	1,650	2,029	2,399	2,680	2,973	3,433	3,502	112 per cent.

Increase 1,852, or, in round numbers, 48,000 annually. ‡

* Smallpox is an epidemical disease, and there has occurred but one great outbreak (1871-72), 18 years subsequent to the introduction of enforced vaccination, and four years after the further and more stringent act.

† Bronchitis, though not, perhaps, directly inoculable, is often observed by intelligent medical authorities to supervene upon, or soon after, vaccination; and it is obvious that diminished constitutional vitality will render recovery from any disease more precarious; hence

As showing how infant mortality on the whole has steadily increased during these same periods, I quote from the Parliamentary Return, No. 433, 1878, the following statistics:—

Average number of deaths per annum of Infants under one year of age from 15 specified diseases which are inoculable, or presumably intensified by vaccination:

Prior to Vaccination Act—1847-53—

Infants died, 1847, 62,619
 Out of a population of 17,927,009.

Vaccination obligatory—1854-67—

Infants died, 1854, 73,000
 do. 1867, 92,827
 Out of a population of 20,066,224.

Vaccination enforced—1868-75—

Infants died, 1868, 96,282
 do. 1875, 106,173
 Out of a population of 22,712,266.

Thus, while the population of England had increased from 18 millions to 23 millions, the deaths of infants from 15 diseases had risen—in the same period—from 63,000 to 106,000. Had the mortality kept pace with the population, the deaths in 1875

the benefit derived by newly-born children from improved sanitation is nearly neutralized by vaccination.

‡ The single epidemic (1871-72) carried off 44,000 only, the general death-rate of the years being somewhat under the average of the period. There was, therefore, no loss thereby, because, had smallpox not been the epidemic, more would have died from other causes; nevertheless, we see that in the vain attempt to prevent this erroneously supposed loss in two years out of thirty, 48,000 lives are now *annually* sacrificed.

would have been only 80,000; that is to say, in 1875 there perished in England, 26,000 infants under one year of age *more*, than should have died under the ratio of 1847; and this in spite of greater attention to sanitation, and the consequent lowering of the total [all ages] death-rate from 22.4 for the decennium 1841-50, to 21.4 in 1871-80.

The difficulty of obtaining reliable statistics, extending over a long period of time, is very great. The following figures, however, from the Newcastle, England, Dispensary, extending over a period of a century, are trustworthy. During this period, the Dispensary has treated 250,637 cases, of which 2,616 were of smallpox, or about one per cent. The total deaths during the century were 14,088, of which 428 were caused by smallpox or about 1 in 33, whilst scarlatina killed 1 in 18; diarrhoea 1 in 30; and whooping-cough 1 in 35.⁸⁶

NEWCASTLE, ENGLAND.				
	1777-1802	1803-27	1828-52	1853-77
Smallpox—				
Cases	365	273	925	1053
Deaths	90	57	152	129
Scarlatina—				
Cases	355	795	1856	3659
Deaths	33	30	155	567
Measles—				
Cases	186	435	1572	2537
Deaths	16	22	83	123
Whooping Cough—				
Cases	245	220	743	1716
Deaths	22	23	112	241
Diarrhoea—				
Cases	1390	1529	3995	6117
Deaths	67	7	43	362

⁸⁶ *Report of the Newcastle Dispensary, from its Foundation in 1777.*
Printed by order of the Committee. Newcastle-upon-Tyne, 1878.

The increase, beyond actual expectancy of various other disorders, have been ascribed to vaccination, with some slight show of evidence; but it is not necessary to enlarge upon such here.

What more nearly concerns us is to rescue vaccination, if possible, from this reproach. Dr. Charles Cameron, Dr. Lyon Playfair and other distinguished gentlemen have commended the use of animal virus; that is direct inoculation from the cow. In this way it is hoped to get rid of the danger of inoculating other diseases along with vaccinia. But it must not be overlooked that domestic animals are as likely to suffer from constitutional disorders as human beings; and that an incipient tuberculosis in a cow, or a latent farcy in a horse, may be just as readily engrafted upon a child, as it is now admitted a latent syphilis or phthisis, of human origin, may be unwittingly invaccinated along with vaccinia.

We have seen that so good an authority as Prof. Simonds, after forty years experience among animals, declares that the bovine race do not suffer naturally from pox; that, if they have it, it must be inoculated upon them. In order to obtain animal virus, therefore, it is absolutely necessary to inoculate a calf with smallpox or horse-grease. The use of virus obtained by smallpoxing a calf spreads, according to Sir Thomas Watson, M.D., a mitigated smallpox by infection; and not so very mitigated either, for people take it, and die of it. And if, upon the other hand, we adopt horse-virus, there is con-

stantly the liability of a recurrence of such horrible outbreaks as was seen in Italy, in 1879.⁸⁷

Nor are the authorities by any means agreed as to the advisability of the use of animal virus. Says Dr. John Shorthouse: "Some crazy enthusiasts recommend that lymph be taken direct from the cow. They cannot surely have seen those frightful pictures of the disease so produced which were published by Ceely, of Aylesbury, some thirty years ago. Ceely carried out numerous experiments at the instance of the Provincial Medical and Surgical Association. Those experiments were carefully and minutely observed, and their results faithfully and graphically recorded. Those observations and experiments are illustrated by a great number of beautifully executed plates drawn from life. Some of the pictures are something frightful. There is one which shows the back of the hand and arm of a youth who got inoc-

⁸⁷ The following is from the *Lyon Medicale*, of June 22, 1879: "On April 26 and 28, the local doctors vaccinated with this lymph (animal virus) thirty-eight children, all aged less than twenty months. Whilst they were awaiting the incubation of the vaccine pustules, they soon perceived that they had inoculated one of the most horrible of maladies, and that they were the involuntary authors of a real massacre of the innocents. The gentleman who sent these particulars to *The Gazette d'Italia* betook himself to San Quirico. He saw the victims. He observed vast phlegmons laying bare the muscles and penetrating into the joints, accompanied by eclamptic symptoms. To him it appeared very probably to be an epidemic of glanders." See also *The Gazette d'Italia*, for May 21, 1879. The disaster occurred at Castiglione d'Orcia, in the Province of Siena, and among the victims was the granddaughter of the Syndic.

ulated accidentally while milking a cow. There is another which depicts a corroding ulcer on the thumb of a man who got inoculated in the same manner. If these enthusiasts inspected the pictures, I think they would be induced to pause before they advocated the practice of inoculation direct from the cow." Having studied these illustrations, I can fully agree with Dr. Shorthouse.

The possibility of the transmission of bovine tuberculosis is admitted.⁸⁸ Even Simon says: "When a given body is possessed by one of these constitutional diseases, no product of that body can be warranted safe not to convey the infection." As to the probability of its transmission, one has but to remember that bovine tuberculosis is hereditary, and occurs in 4.75 per cent. of any given number of cows. The risk, therefore, of invaccinating this formidable disease by the use of the so-called "calf-lymph," is evi-

⁸⁸ "M. Touissaint vaccinated a cow in an advanced stage of tuberculosis with lymph absolutely pure. The vesicles progressed normally, and with the lymph obtained from them he vaccinated different animals, all of whom subsequently became tuberculous. The significance of these experiments can scarcely be over-rated, for though a judicious vaccinator would not use lymph taken from a child who exhibited already evidence of the disease, the chances of cows in whom spontaneous vaccinia may appear, and whose lymph would at the present time be eagerly sought after, being, like so many of their species, tuberculous, would be great; and it would seem in consequence that the dangers of animal vaccination may be greater than those of human, which are supposed to be avoided by having recourse to the cow."—*Medical Times and Gazette*, Sept. 3, 1881.

dently very great, and its use inexpedient and dangerous.

It is evident, therefore, that we are unable to measure the dangers which may lurk in any specimen of vaccine; that it can only be tested by its results; that these results are not immediate and obvious, but are often not completely developed until years after the vaccination; and that no amount of care on the part of the vaccinator will obviate the possibility of danger and disaster.

COMPULSORY VACCINATION.

I am strongly opposed to Compulsory Vaccination.—*Herbert Spencer.*

It is an intolerable tyranny to compel vaccination by law.—*Constantine Hering.*

WHATEVER may be the verdict in regard to the value of vaccination, there can be but one opinion, among lovers of human liberty and equal justice, as to its compulsory enforcement. Even though vaccination had proven all that Jenner, in the flush of his early triumph, so confidently claimed for it, to make it compulsory would be a wrong without justification in law or morals. Vaccinia is a disease, and no man has a right to disease another against his will. Disease is a crime, and never anything but the result of the disobedience of law. To, therefore, command the infraction of law, in the name of law, is a complete subversion of the very principle upon which law is based. Vaccinia permanently impairs the integrity of the body; as does every attack of disease. A man once ill is more vulnerable for every other ill. And while every man has a right to chose for himself, what appears to him, the lesser of two evils, no man, nor any assemblage of men, no matter by what name called, nor with what powers vested, have the right to violate by force the physical integrity of another human being.

This system of compulsory vaccination is founded upon a formulary too preposterous for a moment's serious argument. It arose from the curious dogma that a healthy person was a focus of disease; and that not having been diseased (*i. e.*, vaccinated) he would be the propagator of disease (smallpox) to those who had been diseased (vaccinated). If vaccination protected the vaccinated, they would have no occasion to fear infection. While, if vaccination does not protect the vaccinated from taking smallpox from the unvaccinated, it is a monstrous fraud on human credulity. In either event the vaccinated have no reason to find fault. If they really believe that vaccination protects them, all is well; while if they do not so believe, then they have not the shadow of an excuse for forcing it upon others who do not believe.

No American can dispassionately view our compulsory vaccination laws without a blush of shame. For while vaccination is not here openly enforced as it is in England, yet we have permitted a meaner kind of compulsion to crawl into our statute books; more repulsive to every humane mind, for it is a law that bears only upon the poor.

Vaccination is the key that opens Castle Garden to every immigrant that comes into this port, and the public school to every poor man's child. Be re-vaccinated, or stay out, we shout aloud to every immigrant that approaches our shores; be vaccinated, or grow up in ignorance, is commanded to

every child who knocks at the school-house door. But vaccinated with what? Shall it be with syphilitic lymph, or tuberculous lymph, with horse-grease, or smallpox, or shall it be with some innocuous preparation from a spontaneous cow, that bears no relation to smallpox other than as a charm or a fetich? In this, the law is conveniently silent. No man knows what lies latent on the vaccinator's lancet, and no man less than the vaccinator himself; but be vaccinated, and take the chances, is the fiat nailed on every poor man's door.

To command a person to do that of which the results can only be known after they have occurred, and which involve conditions so serious to the individual and to society, is a monstrous tyranny; and that such a law has been permitted to find a place on our statute books, I believe is solely due to the fact that neither the laity nor the medical profession have ever really seriously considered the matter.

I have faith in the medical profession—in the noble, self-sacrificing, humane men of which its body is composed—to believe, if they could be induced to study this subject, as I have done, unbiased by the fanatical clamor of a few, or the specious reasoning of those interested pecuniarily in the spread of the dogma, that they would demand the abrogation of all vaccination laws, with overwhelming unanimity.

To my colleagues everywhere, I appeal for a sober,

thoughtful consideration of this subject, as one of the most momentous questions of the day. A question which no man can rightfully set aside. The silence of medical men who are skeptical as to the value of vaccination, gives opportunity to ardent pro-vaccinists to claim that the medical profession are unanimously in its favor; that the argument is closed; that vaccination is proven beneficent beyond peradventure. But it is not closed; it is a wide open question. And we, who have patiently studied its history and results, will never be silenced, until every compulsory vaccination law is swept away, and sanitation recognized as the only scientific protective.

If anybody chosēs to be vaccinated, like Dr. Cory, the chief of the Lamb's Conduct Street (London) Vaccine Station, let him be vaccinated. This incredulous gentleman, desiring to prove that vaccine lymph could not convey syphilis, invaccinated himself from a syphilitic subject, with such serious results, as to forever silence disbelief. If, on the other hand, anybody chooses not to be vaccinated, the whole history of vaccination, from its inception to the present hour, gives him amply warrant.

How true it is, that every wrong, in seeking to perpetuate its power, commits *felo de se*. The surest way to destroy faith in the vaccination dogma, was to resort to compulsion. The attempt to enforce repeated vaccination upon those who were skeptical as to its prophylactic value, has aroused fierce opposition in every land where it has been tried. An

opposition, which having reason and history upon its side, has conquered in Switzerland, and will surely triumph everywhere. Vaccination is destined, sooner or later, to take its place by the side of Inoculation as an exploded medical theory. It has been tried and found wanting, and the frantic efforts of its devotees may postpone for a time, but cannot avert the downward plunge of the sword of Damocles. *Die Weltgeschichte ist das Weltgericht.*

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Appendices.

APPENDIX A.

I.

THE VACCINATION OF IMMIGRANTS.

I left Bremen, on the Neckar, of the North German Lloyd line, in the midst of a severe rain-storm, which was accompanied by a strong wind. During the voyage two accidents occurred, the first being the death of an eight-year old child in the steerage from the effects of brandy. The parents being very sea-sick, the child, unobserved, obtained possession of a bottle of brandy which they had, and drank sufficient of its contents to cause death. A young lady also died, from heart disease it was said; but we brought into port the same number of passengers as we left with, for there were two births on board. Besides 110 cabin passengers, the Neckar carried between 700 and 800 in the steerage. The United States law provides that every immigrant, without regard to age or physical condition, shall be vaccinated within twenty-four hours after leaving the foreign port. Many of those on board were exceedingly ill, and to any one who has ever suffered the pangs of sea-sickness, it will be apparent that that was not a favorable nor a proper time for vaccination. But it must be done, for the law is clear and peremptory: there is no evading it, for on arrival at New York, all those who cannot show a certificate from the ship's surgeon are consigned to Blackwell's Island.

During the three days following our departure from Bremen, vaccination was the order of the day in the steerage. I was enticed thither by curiosity, and what I there saw was suggestive, to say the least, to me, and may be of interest to you. The surgeon sat on a box in the store-room, lancet in hand, and around him were huddled as many as could be crowded into the confined space, old and young, children screaming, women crying; each with an arm bare and a woe-begone face, and all lamenting the day they turned their steps toward "the land of the free." The lymph used was of unknown origin, kept in capillary glass tubes, from whence it was blown into a cup into which the lancet was dipped. No pretence of cleaning the lancet was made; it drew blood in very many instances, and it was used upon as many as 276 during the first day. I inquired of the surgeon if he had no fear of inoculating disease, or whether he examined as to health or disease before vaccinating. He replied that he could not stop for that, besides, no choice in the matter was left with him. The law demanded the vaccination of each and every one, and he must comply with it or be subjected to a fine. I thought it a pitiful sight, and am persuaded that could the gentlemen through whose instrumentality the law was enacted, see what I saw of the manner in which it was carried into effect, they would be as zealous in seeking its repeal. As conducted the law is an outrage, and no one can estimate the number of helpless, innocent children, as well as adults, who are inoculated with syphilis or other foul disease, on every ship bringing steerage passengers to our shores.

G. H. MERKEL, M.D.,

In the *Massachusetts Eclectic Medical Journal*, November, 1882.

II.

THE VACCINATION OF IMMIGRANTS.

When there is an outbreak of smallpox in the United States, it is frequently ascribed to the presence of unvaccinated immigrants, and quarantine is said to be defective. It so happens, however, that immigrants are carefully vaccinated, and often re-vaccinated, as will be seen by Dr. Merkel's statement, above; but it is not unlikely, through overcrowding on shipboard, aggravated by vaccination, and unwholesome quarters on shore, they are peculiarly liable to variolous disease. The following letter, describing the painful treatment to which immigrants are subjected, is from a layman. While not agreeing with some of its harsh expressions, I give it place here, as a picturesque description of an every-day occurrence. It is needless to say, cabin passengers are exempted from this brutal imposition.

Brooklyn, New York, May 7, 1883.

DEAR SIR.—I found the vaccination tyranny much more than sentiment on board the "Adriatic." Aboardship, as everywhere, it has attained terrible proportions, which makes it probable that in the near future it will become The Great Terror that shall "cause that as many as will not worship the image of the beast shall be killed," and that "no man may buy or sell save he that has the mark of the beast."

The first intimation that I had that vaccination was a requisite for free travel in America was an "Important Notice" on the stairway to the effect that passengers not provided with certificates of vaccination were liable to be detained in quarantine on arrival, and that the ship's medical officer was prepared to give certificates to those unprovided on showing marks of successful vaccination.

In a few days I heard of this ship's medical officer magnifying his office down among the women and children. I conversed with one young woman who had submitted to

the great ordinance, and after characterizing the whole business as the most idiotic folly of the times, I begged of her to suck the poison out of her arm. But many hours had elapsed, and the endeavor failed. Day by day she had to carry her burden of pain until she landed. Whether she is now rejoicing in enhanced health as a consequence of the smallpox proofing process, or whether she is suffering from the weary illness that is often its "accident," I have no means of knowing.

I was anxious to know to what extent the immigration vaccination law was enforced at New York, and had a chat on the subject with the chief steward. His information was terrifying. Said he, "when we get to New York the doctor comes aboard, sometimes with half-a-dozen policemen, and you have to be vaccinated." "But," said I, "suppose you refuse to be vaccinated, what then?" "Then they'll sling you into the tender, and clap you in gaol till you submit." "But I won't be vaccinated. I'll stay out of New York forever first." He replied: "No use; you'd have to be. Five of our crew, once, refused to be done; but they just put 'em into quarantine and kept 'em there until they came to. They might as well have been done first as last; they only delayed the vessel."

One morning it was rumored that the doctor was coming to examine the passengers, and I went with two friends to the surgery to state our objections. I told him that as we had been vaccinated, if that fact would let us pass without further trouble, we could satisfy him; but if not, vaccinated we would never be. Like most doctors, he was without capacity to understand our conscientious objections, and the degradation involved in submission to the rite. He curtly told us the law was not his; it was United States

law. He should come forward at two o'clock, and if he showed him that we had been vaccinated, he would give us a certificate, and if not, he would vaccinate us if we chose; if not, we must take the risk of passing the doctor at the port. It mattered nothing to him.

About two o'clock there was a great commotion for'ard. Such a stripping of clothes, rolling up of sleeves, and searching for "marks." Some were craning their necks over their shoulders in a half-hopeless search after obliterated or invisible scars; some calling in the help of a neighbor to make them out; and some raising an excited discussion as to whether a certain indentation was a vaccination mark, or a forgotten boil, and going into an ecstasy of satisfaction when they had settled it was exactly what was wanted. Others, in despair of vaccination marks, recollected that they had had smallpox, and set up a search for pock-marks. Some, after a protracted quest for marks, vaccine or variolous, put on their coats sadly, with the air of criminals about to be hanged. It was a sight to make men blush with shame for the devilish superstition that has taken possession of the Christian civilization of the nineteenth century.

By-and-by came the doctor in his gold-laced cap, with his bottle of "lymph," pure from the sores of children or heifer's buttock, and commenced operations. First a rope was stretched from a post, and held by two stewards in a horse-shoe form, and into this enclosure passed, one by one, the victims of an insane medical legislation, and bared their arms to the Medical Ignoramus, who stood on the other side. If he there saw the orthodox scars, he forthwith bestowed a ticket like this:—

WHITE STAR LINE.

S. S. "Adriatic."

VACCINATED.

C. S. MURRAY,

Surgeon.

14th April, 1883.

Which further had this exhortation on the back:—

P A S S.

Keep this card to avoid detention at quarantine, and on railroad in the United States.

If a poor wretch could not show vaccine or pock marks, he got no ticket, and was asked whether he would be vaccinated, or risk being stopped at landing. All preferred the first alternative as the lesser evil. The doctor, dipping his lancet in the bottle of mystery, wiped it on a spot on the arm, and cut and cross-cut the skin, and then, after rapidly stretching and closing the incisions with his thumbs, gave the wretch his ticket and passed him on. Such was the ordinance of vaccination—a sight not to be forgotten. A crowd of hundreds passing forward to prostrate their conscience or manhood, or lack of them, at the shrine of the most outrageous humbug of these latter days! A

mixed crowd of big and little, fat and lean, dirty and clean, reputable and disreputable, sober and drunken, healthy and diseased, all ground down to the dead level of VACCINATED. There was nothing in common among them save their degradation, and, as I thought, the most degraded of the lot was the Vaccinator. How a man with any sense of decency and the congruity of things, could for mere pay consent to the folly that the individuals of such a heterogeneous crowd were *all alike liable* to smallpox, and were *all alike saved* by his performance, passes my understanding. It is hard to believe in a man's sincerity in view of such absurdity; and yet he may be sincere. When a lie is taught, and still more when a lie is practised, it confounds the intellect, and is ultimately taken for the truth of truth.

Yours truly,

F. SCRIMSHAW.

III.

VACCINATION OF IMMIGRANTS.

The abuses which are possible in compulsory vaccination are forcibly illustrated in a pathetic instance which has come under our notice during the past week. An Irish servant girl in the city has been for a long time saving up her earnings that she might be able to pay the passage of her brother to this country, and by economy and persistence she at length accomplished her object.

Last week the lad arrived, but he had, with others, been compelled to submit to vaccination on shipboard, and he now lies at death's door from the effect of the use of impure virus. The surgeon of the ship in a case like this ought to be brought to strict account. Steerage passengers

are at least human, and their lives should not be left at the mercy of every careless practitioner who prefers to risk their health rather than to take the trouble of ascertaining the safety of his materials.

The case of which we speak seems especially cruel, as the poor girl is nearly heart-broken that her labor has resulted only in bringing her brother to die in a strange land; but as a matter of fact, it is only one instance among many. The matter is one that needs looking to closely; since even the most determined opponents of immigration can hardly be prepared to go to the length of legal murder as a means of preventing it.—*Boston Courier*, May 3, 1883.

APPENDIX B.

INFECTION AND DISINFECTION.

The following passages of an article in the *Wiener Medicinische Wochenschrift*, of June 3, 1882, may enlighten the ignorant and reassure the timid. Dr. Lorinser, one of the leading physicians of Vienna, writes as follows:

“A great deal of printer's ink has of late been wasted in discussions on the spread of the so-called ‘infectious’ diseases, and on the best means of preventing it. In all these discussions public attention is more particularly drawn to smallpox. It is easy to describe the dangers and the contagiousness of such a disease, and when this has been done, it requires but little pleading to obtain the public sanction for a series of defensive or preventive measures apparently as efficacious as they are vexatious and tyrannical. The first cry is for a more vigorous enforcement of vaccination, then schools and markets are to be closed, fairs to be prohibited, and as cabs cannot be prevented from conveying variolous patients and convalescents, and as the dangerous contact with members and frequenters of infected households cannot altogether be avoided, a universal disinfection with the irrepressible carbolic acid becomes a matter of urgent and obvious necessity. The measures recommended by the sanitary authorities which might have reassured the public are then emphasized and gloated over by newspaper writers in such a silly manner, that the public, instead of being reassured, is frightened and alarmed without any necessity.

“The doctors, who are in a great measure responsible for this state of public feeling, ought to remember that *the shafts they have caused to be directed against the public may at any*

moment be turned against themselves. Already there are people who dread their doctor's visit, not knowing whether he might not come fresh from a smallpox patient, conveying the dreaded poison in his clothes and in his very breath.

“Under these circumstances it would seem opportune to inquire, for once, how much of these opinions concerning variolous infection has been scientifically ascertained. What has been *proved* is only this—by subcutaneous inoculation of liquid variolous lymph we can produce either a local crop of pustules or general variola. We also know from the Chinese, that the same disease can be induced through the inhaling of the dust of dried variolous scabs into the cavities of the nose. Consequently variola can be propagated by the contact of variolous matter either with the broken skin or with the mucous membrane. But it is *not this fixed contagion* which is dreaded so much, and which is to be disinfected; such a substance (whether fluid or solid) being hardly liable to be altered by the fumes of carbolic acid. That which is most dreaded and most eagerly combated is a ‘*volatile gaseous*’ substance, which, fortunately, thus far has not been proved to exist outside the imagination of the learned. If we take for granted that such a volatile contagion fixes itself on the skin or the hair, on clothes and utensils, and that it can remain there for days or weeks without losing its efficacy, it becomes easy enough to explain the spread of the disease. But when we ask whether there is a single fact that could prove the existence of such a contagion, and its power of conveying the disease, we are bound to reply in the negative. We know, as a matter of fact, that thousands of persons, though living in daily contact with variolous patients, have *not* caught the disease; but that one single person has ever caught it by inhaling the “volatile contagion” *can never be proved*, con-

sidering that variola, like all other diseases, *can also break out spontaneously*. Nevertheless, both doctors and patients cling fondly to this belief in a volatile contagion: the doctors because it frees them from the necessity of investigating the genuine causes of the disease; the patients because individuals (like nations) prefer to seek the causes of their sufferings in their neighbors, their own sweet body being quite incapable of generating such loathsome disease.

"Thus indolence and *amour propre* are the chief support of this popular belief. Unfortunately, this dogma can neither be disproved nor proved; but if it were true, if such a thing as volatile contagion really existed, it would be found in its greatest concentration and virulence in small-pox hospitals, and nothing would be more natural than that the attending doctors and nurses should be those most frequently affected by it. *Yet such is not the case*. Neither in the terrible epidemic of 1871, nor in any subsequent epidemic, have I heard of a single case of a doctor or a nurse catching the disease in the Vienna smallpox hospital. . . .

"The remarkable immunity of hospital attendants, whatever it may prove concerning the volatile contagion, proves clearly that even the *fixed* contagion cannot possibly be considered as a very formidable agent. And this being so, the question arises, What is it we want to disinfect? What is it we dread? In truth *we do not know*. That is the only answer we can give or we ought to give. The belief in infection has no scientific basis, and the efficacy of disinfection is on a par with that of vaccination and re-vaccination, which even credulous physicians are beginning to doubt.

"There is no royal road to health, and preservatives like these can only act where they are not wanted—in persons who know how to keep their skins clean and their blood pure, and by leading a proper life."

APPENDIX C.

WHAT TO DO ABOUT ANIMAL DISEASE.

The following editorial from the *New York Tribune*, March 18, 1884, will apply just as well to smallpox, and will be instructive reading during the next smallpox scare.

There has not been before in many years such general health among American cattle and hogs as there is now. The late Swine Commissioners—one of whom visited twenty-six States—found practically no disease. There is, and probably always will be, occasional trichinæ, a very small percentage, but the “experts” know little or nothing of its cause; it effects our pork, perhaps, no more than that of other countries; and the one and easy safety is in thorough cooking. The “cholera,” which has been made excuse for selfish sensationalism so costly to producers, had “disappeared” last fall, according to official admission. But how about pleuro-pneumonia? Not an item of proof has been brought against the many competent witnesses who testify that there is very little of that.

Whence, then, all this noisy affirmation? It emanates from a few persons already in Government employ and naturally anxious to enlarge and perpetuate their easy places. Every slight local sickness is magnified and telegraphed over the whole land, as was the case the other day in Columbia County, N. Y. The alarmists are thoroughly organized; they have been working toward this one end half a dozen years, and it is proverbial that Plea is much more active than Protest. But we are not saying—and

have never said—that there is no pleuro-pneumonia in the Atlantic States. It would be strange, if there were not, with our frequent cattle importations from the infected fields of Europe. Let what there may be “stamped out,” but do it in a sensible, business-like way.

If the few States, claimed to be infected, are not deemed capable of dealing with the disease, as in Massachusetts and elsewhere, then let Government put the whole matter into the hands of some one practical, honest business man, with authority to quarantine, to buy, to kill and bury or burn, calling to his aid all necessary assistants and co-operation; and then let him present the bill, with vouchers for every item of expense. But to organize for this simple work the proposed new “Bureau of Animal Industry,” and that, too, in connection with the not highly esteemed “Agricultural Department,” at Washington, and equip it with a quarter of a million dollars, and twenty men appointed by political intrigue, is to repeat on a mammoth scale the “hog cholera” disgrace and the “grasshopper” folly of past years.

So of “foot-and-mouth disease,” of which we have lately heard in Maine and Kansas. That, too, if it is here at all, was also imported. Get rid of it at once, in the same simple way above suggested; and our coasts once clear of these much-talked-of sources of danger, let us see that we stop bringing any more of either infection across the Atlantic—since quarantine restrictions seem to prove ineffectual. For why should the whole vast cattle interests of America be put in jeopardy for the profit of the few who ship cattle here for speculative purpose? We have a good plant of all the leading thoroughbreeds of Europe; let us make the best of them, and likewise of our own hardy, healthy natives which contain elements capable of unsurpassed development.

But, after all, it is one comfort to reflect that this costly sensationalism, which has characterized the agitation of "contagion," will not be wholly without compensating results, if it serve indirectly to draw attention to the important truth that health in domestic animals, as in human creatures, can only result from wholesome food, pure air, comfortable quarters and general provision for maintenance of strength. Western hogs cannot keep well, nested in mud and cold, or in sties reeking with filth, and eating frozen, mouldy corn; nor Eastern cows in crowded, unventilated stables, with fermenting brewers' grains, glucose meal and half-decayed ensilage as insufficient feed. When all stock-keepers humanely regard the comfort of their animals, there will not be a hook left for hungry alarmists to lay hold upon.



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