The Report of the Royal Commission appointed to inquire into the subject of Vaccination.
1896.

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In this report all the members of the Commission, with the exception of two, have expressed their belief in Vaccination & given the reasons for their belief. They have also indicated certain measures, which in their opinion should be taken, as likely to increase the prevalence of the practice of Vaccination. The remaining two members of the Commission have however not signed the Report of the majority, but have issued a smaller Report of their own, in which they state the grounds of their dissent from the other members, & give the reasons for their non-belief in Vaccination. I think that in these two Reports, which for convenience I may call respectively the Majority & the Minority Report, all the possible arguments, for & against Vaccination, may be found stated & answered. The corresponding arguments & answers are however scattered so widely through the two Reports that it is impossible

without a somewhat laborious search, to get them together so to be able to compare them & judge between them. It has therefore seemed to me that if I could arrange together the corresponding arguments & answers & put them as concisely as possible, it would form a great aid towards a thorough understanding of the Report, & at the same time of the subject of Vaccination. I have also criticised the different arguments to the best of my ability & tried to give to each its due weight. At the end of the thesis I have stated as shortly as possible the recommendations which the majority of the Committee have made in the interests of Vaccination, & have given my own opinion on them. Let us now turn to the Report.—

The Commission in the first place set themselves this question to consider,—

ajority Report
ctions 9-377
inority Report
ctions 2-176

First Question

The effect of Vaccination in reducing the Prevalence of, & Mortality from Small-Pox.

Majority Report
sections 9-377
Minority Report
sections 2-176.

j. Report
35-61
. Repot.
2-10
15-18

In regard to this they first consider shortly the History of Small-Pox. As there is no particular diversity of opinion on this subject I shall merely state briefly the more important points in connection with it.

Maj Rep
S. 35-61
Min Rep.
S. 2-10
S 15-18.

Small Pox seems to have existed in the East during the earlier centuries A.D. Introduced from there it became common in W. Europe in the 15th century, increased during the 16th & 17th centuries, & became very prevalent in the 18th century. During these latter two centuries our knowledge concerning it is chiefly derived from the "London Bills of Mortality". These Bills, though somewhat inaccurate, yet serve to show that during this time very many persons died in London from Small Pox. Very rarely during

the latter half of the 17th century did the yearly deaths fall below 500. The exact mortality is difficult to calculate because the population was not exactly known, but there is little doubt that during the 18th century the mortality in London from Small Pox was not below & often much above the rate of 2 per 1000. We learn also from the Bills that the disease was epidemic in character, & that in these epidemics the fatality varied very much. As regards the Provinces we learn from the records of various scattered places that Small Pox was at some places & times very prevalent, & at others very rare. At the end of a severe epidemic in Chester in 1774 only 7 % of the population had not had the disease in that year or previously. On the other hand we learn that in three small rural parishes in Kent with a united population of 1088, there were recorded only 10 deaths from Small Pox during 20

years in the latter half of the 18th century. The disease was much more distinctly epidemic in the Provinces than in London, but the severity & fatality of these epidemics were comparable with the same in London. One important character of the Small Pox in the 18th century was the large proportion of deaths among the very young. Thus in one graveyard in Edinburgh, during the years 1764-83, the proportion of deaths from Small Pox of those below the age of 10 years to every thousand deaths from that disease at all ages was 993.

The severity of Small-Pox continued till about the end of the 18th century, after which it began to decline, & the first quarter of the 19th century was characterised by a striking decrease of Small Pox, although the fall was irregular & marked by epidemics. In the London Bills of Mortality, the returns of Small Pox for the year 1800 are 2409. By 1818 they fell to 421. in spite

of the greatly increased population.
There was also a great decline in the provinces, & also in other countries

Thus far, there is no particular difference of opinion to be found in the two Reports, but when we come to consider the Cause of this decline in Small Pox in the first quarter of the 19th century, great differences of opinion at once appear. We shall see what the majority put down as the Cause, but let us first consider the Advent and Nature of Vaccination.

Maj. Report
11-19
24-26
28-32

Min. Report
34-38
45-47

The commencement of the practice of Vaccination dates from the publication of the "Inquiry into the causes & effects of the Variolae Vaccinae" of Edward Jenner in 1798. In this treatise Jenner recorded first a number of cases in which persons, who had accidentally taken Cow pox from the cow, seemed incapable of taking Small pox, either when exposed to contagion or when actually inoculated with Small pox.

Maj. Rep
S 11-19
24-26
28-32
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Min Rep
S 34-38
45-47
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This "inoculation with Small-pox" was known as the Variolous test. It originated from the observation that when a person who had had Small pox was inoculated, the wound of inoculation showed, as a rule, only a little inflammation, without any other symptoms; or in the rare cases in which further changes took place in the wound, there was no eruption of pustules elsewhere, or other general symptoms, such as occurred when the inoculation took place in a person who had not had Small pox. This Variolous test was therefore used to determine whether a person was capable of taking Small pox, or not.

Besides these cases of accidental Cowpox Jenner describes also some cases which he purposely inoculated with Cowpox, & relates that these also showed themselves to be insusceptible to Small Pox when tested by the Variolous test.
These experiments of Jenner attracted great attention & in 1799 Woodville & Pearson began making experiments also

In that year Woodville inoculated ~~with~~ ~~Cowpox~~ seven persons at the Small pox hospital with lymph from a cow in a dairy at Gray's Inn Lane, & from these cases he inoculated others in succession, eventually establishing the "stock of Woodville's lymph which was the beginning of the more general practice of Vaccination in this country & abroad, for Jenner's stock had come to an end. A great peculiarity of Woodville's cases was that in most of them there was an eruption of pustules over the body. Woodville came to the same conclusion as Jenner, that Cowpox protects against Small pox. This conclusion speedily found general acceptance in this country, on the Continent & in America. As regards the amount of Vaccination in England in the first Quarter of the 19th century there are no exact data. Probably by the end of this period, about half the children born during this period were vaccinated & many adults. In Sweden & Denmark the amount was

still greater.

Let us now return to the question "What was the cause of the decline in Small Pox in the first quarter of the 19th century?" We have seen how, during this time, the practice of vaccination spread very greatly. The authors of the Majority Report point to this spread of vaccination as the cause of the decline. They show that the decline dated from the beginning of vaccination, & point out that there was no corresponding decline in unvaccinated countries, as in Egypt or Brazil. The Opponents of Vaccination hold that Vaccination was not the cause of the decline & bring forward other causes which they say are the true ones. But before considering these other causes, let us see what are the arguments against Vaccination having been the cause, & how these arguments are met. –

Firstly. Much criticism is applied to Jenner's writings. In regard to his cases of accidental cowpox it is said that

Maj. Report S. 36-38.

Min. Rep S. 36-38.

the evidence only amounts to this - that Jenner in the course of several years inoculation practice collected 10 instances of insusceptibility to Small pox, in persons who stated that many years or months previously they had suffered from a disease which they called Cow pox. And in regard to his experimental cases, that they were only four in number, subsequent inoculation of whom within a few weeks or months, gave results upon which Jenner based his claim that Vaccination confers immunity from Small pox.

Secondly the value of the "Variolous test" is disputed. It is pointed out that Inoculation when performed even on those who had not had Cow pox, often produced no eruptive pustules on the body, & yet was regarded as effective. That this can be well seen in the results obtained at the end of last century by the Suttons & by Dimsdale in the modified form of Inoculation which they practised. That the results obtained by Jenner when he applied the Variolous test (ie inoculated)

Min. Report 39-44.

Min. Rep. S 39-44

to those cases to whom he had previously ~~of~~ given Cowpox were hardly less than those obtained by Sunisdale & the Suttons So that Jenner's mild results need not necessarily have been produced by the previously inoculated Cowpox.

Thirdly. It is paid that Woodville's cases must be rejected as evidence. That those cases of his in which pustules appeared on the body are now acknowledged to have been cases simply of Smallpox. That Woodville seems to have avoided carrying on matter except through those who had these eruptive pustules. That it is therefore probable that the whole of Woodville's cases merely a series of mild Smallpox inoculations, & that in any case they must be rejected as evidence of the immunity conferred by uncontaminated Cowpox against Smallpox. That yet it was mainly on these cases that medical authority in these early days declared for vaccination.

Fourthly. It is said that this stock of Woodville's lymph was the great source

in. Report 48-51

Min Rep S. 48-51

in. Report 52. 62.

Min Rep S 52-62

from which in the early years the practice of vaccination was started, & that the bulk of the cases of "Vaccination" which during this time were submitted to the Variolous test had been inoculated with this lymph of Woodville's. That there is no evidence in the shape of Vaccination pure & simple to establish Jenner's contention.

in Report S. 71.

Fifthly. It is urged that the decline in Small Pox was too great to have been due to the amount of Vaccination which prevailed, & that, if such a small amount was able to cause such a decline, it is strange that its compulsory adoption should have been so uninfluential against more recent epidemics.

Min Rep S. 71

These are the five chief arguments against Vaccination having been a cause of the decline in Smallpox in the first quarter of the 19th century. How are they met?

aj Report S 351

Firstly. In answer to criticisms of Jenner's writings & cases, it is said that such criticisms even if true are of little importance.

Maj Rep S. 351.

If the experience of more than half a century has taught us that Vaccination is a protective against Small pox; then the probability that Jenner made mistakes will not weigh much against such experience.

Secondly as regards the value of the Variolous test. – Medical men at the close of the last century had had great experience in the practice of inoculation, & there can be no doubt that they had learnt to be able to say whether the results of any saved case of inoculation which they saw, were indicative of the desired immunity having been acquired or not. This being so there is no ground for believing that the test was invalid when applied to cases of Cow pox in proof of their immunity from Small Pox.

Thirdly. In regard to Woodville's cases. It is admitted that those of his cases which showed eruptive pustules contained an intermixture of Small Pox, & that they are therefore worthless as evidence. It is denied however that his cases were not cases of Cow Pox at all, but pure Small Pox.

v Report 16

Maj Rep S. 16

Report 21-23

Maj Rep S 21-23

All the lymph which he took from the local pustule & not from any of the eruptive pustules was true Cow pox lymph The test of immunity was applied both to cases with eruptive pustules & to cases without, & there is no evidence that the reality of the immunity was not as great in one class as the other. Besides in any case the error was of short duration, when once it was recognised.

Fourthly It is denied that this lymph of Woodville was the great source of the practice of Vaccination. Mention is made of several other sources, such as the Clark's Farm Lymph, Sacco's Lombardy Cow Pox Lymph.

Maj Rep S 20 S 27.

Fifthly In regard to the decline having been too great for the amount of Vaccination, - It is held however that the amount was very considerable, & that it must be remembered that fewer persons at that time required the protection of Vaccination than now, owing to the large number who had already had Smallpox, either naturally

Maj Rep S 86.

or by Inoculation.

Remarks on these arguments -

With regard to the criticism to which Jenner has been subjected, I think that it can be put aside. No doubt Jenner made mistakes. He, for instance, claimed that the protection conferred by Cow Pox was both absolute & permanent, neither of which statements is now allowed to be correct. The importance of Jenner's cases seems to me to lie not in what they proved, but in what they led to. To regard them as proof of the efficacy of Vaccination would be absurd; their real value seems to lie in the fact that they induced others to experiment in the same direction.

As regards the value of the Variolous test, it would seem that in the vast majority of cases the different effects which it produced in those who had & those who had not had Small pox were perfectly recognisable.

In regard to Woodville's cases. - There is no doubt that a great error

was introduced here. I am much inclined to agree with the minority that probably all of his cases were, if not cases of pure Small Pox, at least cases, in which the Small pox element was strongly represented. The argument of the Majority, that the test of immunity gave the same evidence of immunity when applied to cases with no eruptive pustules, as when applied to cases with eruptive pustules, seems to me to be at any rate as much in favour of the cases being Small Pox as of them being Cow pox.

As regards Woodville's lymph having been the only source of the practice of Vaccination. The evidence on this point is very long & contradictory & I have refrained from inserting it. The chief point to be noted however would seem to be that if Woodville's lymph was the chief source, it at any rate soon lost its Small pox character. I think it is hardly likely however that this lymph would remain the only source, as many people would take advantage of the occurrence of cases of

cow pox in their neighbourhood to obtain lymph for themselves, especially as it became known that Woodville's lymph involved an error.

The statement that the decline in Small Pox was too great to have been caused by Vaccination, is a mere assertion & supported by no evidence whatever.

We have now considered the arguments against Vaccination having been the cause of the decline in Small Pox in the first quarter of the 19th. century; & also the answers with which these arguments are met. What other causes are brought forward to explain the decline.

Causes suggested other than Vaccination.

1. The decrease in Inoculation.

The Practice of Inoculation consisted in the artificial introduction of the Small pox virus into the system by the insertion of fluid from a variolous pustule into artificial wounds in the skin. This practice had become very prevalent before the introduction of Vaccination,

& it is suggested that it had greatly increased the amount of Small pox, & that the decline in Small pox was due to the decrease in Inoculation, which occurred when Vaccination was introduced. Let us first consider shortly the History of Inoculation.

j. Report 64-68

Maj Rep S 64-68

The first clearly recorded case in England was that of the daughter of Lady Mary Wortley Montagu, who was inoculated in London in 1721. Other cases soon followed in England & in other countries of W. Europe. The attacks induced were as a rule milder than those of the actual natural disease. The occurrence of some fatal cases made the practice for a time less popular, but after 1740 a revival in it took place. During the latter half & especially during the latter quarter of the 18th century, it was very widely practised, - due largely to the "improved method" introduced by Sutton in 1763, a method which had for its object the making of the attack as mild as possible, while still preserving its immunity-giving properties. The

practice was widespread till the end of the century when it was replaced by vaccination. Finally by the Act of 1840 it was made a penal Offence.

Let us now consider the arguments in favour of the decline in Smallpox in the first quarter of the 19th century, having been due to Decrease in Inoculation. —

Repnt 2-30

It is said that owing to its being contagious, Inoculation spread the disease, when introduced into places where Smallpox was infrequent. Thus Dr Haygarth writing in 1722 instanced the case of the town of Hertford where this plainly occurred. So also we learn on the authority of Haygarth writing in 1793 that in Kent & Sussex where inoculation was carefully avoided, the Smallpox mortality was very small. In Kent for instance in the last century it did not exceed 1 in 20.000 annually. Haygarth could find no similar immunity in any place where inoculation was freely allowed, & where at the same time no steps were taken to prevent inoculated

Imm Rep S 22-30

persons from spreading contagion.
So long as inoculation was not uni-
versal, (& such universality was never
attained) inoculated persons were
centres of contagion to the susceptible.
The effect would depend on the pro-
portion of the inoculated to the susceptible.
Thus the evil effects would not be so
great in a town where the disease had
been long prevalent, as in country
districts which had been exempt from
Small pox. And yet the effect of inoc-
ulation can be seen even in London
when Small pox was allowed to run riot.
Thus in the London Bills of Mortality we
see that while in the first quarter of
the 18th century the deaths from Small
Pox were 7·6% of the total deaths, in
the last quarter they amounted to 9·2%
The Committee of the House of Commons which
reported on Jenner's petition, was of opinion
that "the general practice of inoculation
tends to spread & multiply the disease itself"
Sr. Heberden writing in 1801 was of the
same opinion.

Report 26.

Min Rep S. 26.

How are these arguments met in the Majority Report? —

In the first place it is denied that the London Bills of Mortality show an increase in the proportion of Small pox deaths to deaths from all causes. Not only this, but also the death rate in proportion to the estimated population from all causes, and from Small pox showed a decline in the last quarter of the 18th century.

Also the inoculated Small pox was much less fatal than the natural disease, so that the class of inoculated persons may have contributed less to the fatal cases, than if they had been left to the chances of natural contagion.

The records of Boston USA show that inoculation may have the effect of largely diminishing Small pox

While therefore inoculation, on account of its contagious nature, may have had an unfavourable influence on Small pox, it would also seem to have had a favourable influence on it, & it is probable that between these two influences it had but little effect.

Maj Rep. 69-76.

Maj Rep. 69-76.

Remarks as to this alleged cause.
The evidence derived from the London Bills of Mortality concerning the proportion of Small pox deaths to deaths from all causes in the different quarters of the 18th century is certainly very contradictory. The real facts would seem to be that in the first two quarters the proportion remained stationary i.e 7·6 ⁰/₀, in the third quarter it rose to 10·3 ⁰/₀, while in the last it fell again to 9·2 ⁰/₀. This represents a rise of less than 2 ⁰/₀ in the course of the whole century. If this was all the effect which Inoculation could produce, it seems hardly likely that its decrease could cause the remarkable decline in Small Pox which took place Besides it is also claimed by the majority & not denied by the minority that the death rate from Small pox in proportion to the estimated population, and the total deaths from Small pox, increased as much in the first quarter, when there was no inoculation, as in the last, when inoculation was widely practised.

Min. Rep. S. 25.

It would seem therefore to be impossible to regard inoculation as having through its decline caused the decline in Small Pox.

Another cause suggested to explain this decline is Improvement in Sanitary Conditions. Min. Rep. S. 18-21
What are the arguments in favour of this:- . Report 18-21

It is claimed that the London Bills of Mortality show, in respect to the heading "Fevers" a decline, during the first quarter of the 19th century, comparable to the decline in Small pox, - that the former is to be explained by Improved Sanitary Conditions, & the latter in the same way. It is said that, during this time, great sanitary improvements were being made in our towns, the Public Health more cared for & Small pox was being rooted out of our prisons. Arguments against this as a cause. Maj Rep S. 77-82
There is no evidence that these improvements differentiated the first quarter of the 19th century from the last quarter or half of the 18th century, in any way at all comparable with the extent of the . Report 77-82

differentiation with regard to Small pox. Also, admitting that insanitary conditions tend to increase the prevalence & mortality of Small pox, there is yet no adequate evidence to show that the dependence of the prevalence & mortality from Small Pox on the lack of Sanitary conditions was a feature of the history of Small pox during the 18th century. Also the decline in Small pox occurred in countries in W. Europe where the sanitary conditions were widely different, & in many of which insanitary conditions even now continue to prevail with regard to the decrease in "Fevers" this will be discussed later on.

Remarks As this subject of "Improved Sanitary conditions" will be again returned to, it is only necessary at present to say that there is no evidence brought forward to show the extent of the alleged improvement which took place in them during the first quarter of the 19th century. One would have thought that if there had been enough improvement to account for the sudden decline in Small pox,

there would have been some proof forthcoming as to it.

We have now discussed the various causes which have been suggested to explain the decline in Small pox in the first quarter of the 19th century. We have seen that the two causes other than Vaccination i.e. Decrease in Inoculation, & Improved Sanitary Conditions are inadequate to explain it, & we are therefore forced to regard Vaccination, the arguments against which are not strong enough to justify us in rejecting it, as the true cause of the decline during this time.

The decline in Small pox did not stop at the close of the first quarter of the 19th century. On the contrary it was maintained. But, so far as England is concerned a new epoch began in 1837, for in that year the present system of Registration of Deaths began in England; so that, since then, more exact statistics

of Small pox mortality are available.
In Scotland a similar system began in
1855, in Ireland in 1864
The majority therefore now ask themselves
the question – Does the History of Small pox
since 1837 afford warrant for a belief
in the protective effect of Vaccination?
In discussing this question they follow
the following lines of enquiry –
I The Influence of the spread of Vaccination
on Small pox mortality at different epochs
II The Change of the Age Incidence of Small pox
III IV V The Fatality, Attack-rate & Severity
of the disease in the vaccinated & the
unvaccinated respectively.
VI Revaccination VII Relation between the
thoroughness of Vaccination & its protective
effect VIII Evidence from foreign countries.

I The Influence of the spread of – etc.
Maj. Rep 127-166.
"There exist no figures comparable throughout Maj Rep
the period 1838-94 by which we can measure S. 127-166
the extent to which at one time as
compared with another the practice of
Vaccination prevailed in England & Wales

in those years. The practice has without doubt largely grown. During this time there have been several Acts of Parliament passed in relation to Vaccination. The most important of these was the Act of 1853 in which vaccination was made compulsory in England & Wales. A similar Act made it compulsory in Scotland & Ireland in 1863. In subsequent years all these Acts were amended & strengthened. The records kept under the Act of 871 show the amount of primary vaccination, performed within a certain period of birth, of children whose births were registered between 1872 & 893. These records show that between 872 & 883 the proportion primarily vaccinated remained about the same. From 884 to 893 it diminished gradually owing to the growth of opposition to the practice. The proportion of the population, which had, at some time of their lives, been vaccinated, has, so far as we can judge steadily increased since 1840 down to recent years at least. The same increase has occurred in Scotland

& Ireland since 1863. Now when we examine the Small pox mortality in these countries, we find in all a marked though irregular decline, - in England since 1838 & in Scotland & Ireland since 1864. That this diminution should be seen year by year was not to be expected on account of the epidemic character of Small pox. The occurrence of the conditions which cause these epidemics has no relation to the state of the people as regards vaccination. Vaccination can only limit the extent & fatality of the epidemic when it occurs. All that one could expect would be that over a long series of years there should be a diminished mortality from Small pox corresponding with a better vaccinated condition of the people. The occurrence of epidemics therefore does not prove the non-efficacy of vaccination.

This continued decline in Small pox is admitted by the minority, but they attempt to explain it apart from Vaccination.

Min Report S. 19

They ascribe it, just as they ascribed the beginning of the decline in the first quarter of the century, to Improvement in Sanitary conditions, & they bring forward the same argument as before, but brought up to date, ie the corresponding decrease in "Fevers". They show that this decrease still holds good between 1840 & 1890 as it did between 1800 & 1840, & argue that Improved Sanitary conditions are the cause of the decrease both in "Fevers" & in Small pox.

Min. Rep S 19

Maj. Rep 146-166

In answer to this the Majority say that though, without doubt, there have been great improvements in Sanitary conditions, yet, on the other hand, there have been changes acting in the opposite direction, ie an increased density of population in England & Scotland, & a continually growing proportion of the people living in the large towns in England Scotland & Ireland. Also that in all three countries there has been an enormous extension of movement among the population. So it is urged that there have been changes acting in both

Maj Rep S. 146-166

ways, & that when both are considered, Improved San. Conditions do not afford an adequate explanation of the decline in Smallpox. Also, it is argued, why have not these Sanitary Improvements had a similar effect on other infectious diseases as measles, Scarlet fever, & Whooping-cough. There has been no decline in any of these, comparable with that in Smallpox.

With regard to the corresponding decline in "Fevers", the returns under this were dependent on diagnosis & nomenclature, a difference in which would make a large change in the numbers found under this heading, without any change in the actual diseases themselves. This will not explain altogether however the decrease in the mortality from "Fevers" which has undoubtedly been great. Let us see what Sanitary Improvements consist in. They may be classed as follows - I Drainage - including removal of moisture from damp places, & efficient removal of the excreta from the bowels & kidneys.

II Ventilation of dwellings III Lighting of ditto. IV Supply of a pure drinking-water. V Increased knowledge of contagion & how to avoid its spread. It is obvious that these Sanitary changes do not affect all zymotic diseases to the same extent. The three chief "Fevers" are Malarial, Typhus, & Typhoid. Now Malarial Fevers are dependent on swamps, & so are abolished by drainage. Typhus is eliminated by the abolition of over-crowding in dark ill-ventilated houses. Typhoid, again, is dependent on the contagia from the excreta, & so is prevented by adequate drainage & cleanliness. So all these diseases are dependent on special circumstances which Sanitary improvements tend directly to remove. Not so Small pox. It rather resembles measles in that it is not connected with any particular Sanitary fault & therefore Improved Sanitary conditions form no adequate explanation of its decline.

In reply to this again the Minority say that - as regards the alleged

Min Rep S. 20 & 21.

Min. Rep S 20 & 21

varying in the nomenclature of "Fevers", the Registrar-General has, since 1869, seperately distinguished deaths from Typhus Typhoid & Simple fever, & that the decline has been shared by all.

Min. Rep S. 141. That as regards the alleged analogy between Small pox, & measles & Whooping-cough, these two latter fevers chiefly affect children, while Small pox affects all ages, & adults largely.

Maj Rep S. 155. To this latter argument however the majority again reply that (i) in former days Small pox was much more fatal to children than to any other class, & (ii) that it is difficult to see why improved Sanitary conditions should have enabled children to escape & overcome Small pox rather than measles, Scarlet fever & Whooping cough.

Remarks.

I must say in the first place that the argument of the majority that an increased density of, & movement among, the population would quite counteract

the beneficial effects of Sanitary Improvements, seems to me rather weak. Surely a thickly populated but well-kept & ordered town is more healthy than a smaller town without any attempt at sanitation. By their other argument however, I think the majority may claim to have proved their point. The minority claim that Typhus is more analogous than measles to Small pox, but do not say in what way it is analogous. Neither do they explain in any way why measles has not yielded to Sanitary Improvements. The reason which the majority give viz. that it is not due to any particular sanitary fault, seems a probable one. I rather think however that Small pox is more dependent on a particular sanitary fault (viz dirt & overcrowding) than measles is. But not probably to the same extent as Typhus Typhoid & Malaria are. On the whole I think we must reject Sanitary Improvements as the primary principal cause of the continuance of the decline

in Small pox, though it may have helped considerably. Therefore as there is no other cause of the decline suggested we must fall back again on Vaccination, & regard the result of the first line of enquiry as favourable to it.

II

Change of Age Incidence of Small Pox.

maj. Rep. S 170-201 min Rep 131-148.

In the 18th & probably also in earlier centuries Small pox was chiefly fatal to children, adults being usually protected by a previous attack. This source of protection has now however largely diminished, so that, if Vaccination be more potent during the earlier years afterwards, we should expect to find that now children are the best, adults the least protected. And this is just what we do find, when we examine the deaths from Small pox at different age-periods. Instead of children contributing by far the largest proportion of deaths as before, we now find deaths amongst children much less common than among adults. And also this we notice, that the times of more rapid

Maj Rep S. 170-201 Min. Rep S. 131-148

change which have occurred from time to time in the Age Incidence of Small pox have borne a wonderful relation to an increase in Vaccination produced by the passing of different Vaccination laws from time to time. Thus a certain time after ~~and~~ any of these laws was passed it was always noticed that the change in Age Incidence took place for a time more rapidly. Specially valuable evidence is to be found in investigations which have been made into <u>six recent local epidemics</u>, either by men appointed by the Commission or by Medical Inspectors of the Local Government Board. These epidemics were in Sheffield 1887-8, Dewsbury 1891-2, Leicester 1892-3, London 1892-3, Gloucester 1895-6. Warrington 1892-3. During these epidemics the percentage of the total Small pox deaths borne by those between the ages of 0-10 was as follows.-

Warrington	22.5	Dewsbury	51.8
Sheffield	25.6	Gloucester	64.5
London	36.8	Leicester	66.6

The differences between these towns is striking. What is the cause of them? If ~~we examine~~ the returns of vaccination in these towns be examined we find that the children not finally accounted for as regards vaccination amounted to -
In Sheffield, during 1878-87, 4·5 % of the births
" Warrington " 1883-92, 4·8 % "
In the other towns the percentage of births unaccounted for had risen greatly as follows -
In London from 6·5 % in 1883 to 16·4 % in 1891
" Dewsbury " 12·6 % " 1882 " 37·7 % " 1892
" Leicester " 43·8 % " 1883 " 80·1 % " 1892
" Gloucester " 10·6 % " 1885 " 85·1 % " 1894.
Thus we see that the more well-vaccinated the child population the smaller the proportion of deaths borne by that class. This is to be explained on the theory that vaccination has a powerful protective influence for 9-10 years.

Min. Rep 131-148.

The Minority, whilst admitting that there has been a change in the Age Incidence of Small pox, say that it is not to be explained by vaccination. They say that ~~the~~ it depends wholly on the

Min. Rep S. 131-148

frequency of the epidemics; that in a place where an epidemic occurs once in 20 years, there will not be the same proportion of deaths under 5 years, as in a place where it comes in a period of less than 5 years. The Minority also urge that there has been a change in the Age Incidence of Fevers also, similar to & not much less than that of Small pox. That the following table shows that the percentage of deaths under five to deaths at all ages has fallen considerably in Typhus & Typhoid.

	1871-5	1876-80	1881-5	1886-90
Typhus	6·4	6·1	3·5	3·4
Typhoid	17·4	16·0	9·3	7·5

So also in Influenza, for the epidemic of 890-1 was distinguished from the epidemic of 1847-8 by the greater comparative severity with which it attacked those of middle age.

It is said that Improved Sanitation is the cause of the diminished mortality amongst children, as "it is against the noxious influences to which the young are specially sensitive" that these improvements

are directed; and in proof of this it is asserted that in "healthy" districts the reduction of Small pox mortality has been greater, among the young, than in "unhealthy" districts. A comparison is made between two Tables of Mortality, the one derived from a Liverpool Life Table, the other from a Life Table for certain selected "healthy districts" in England & Wales. From these tables it appears that whilst in Liverpool the percentage of deaths from Smallpox expected under 5 years was 63·5, in the "healthy districts" it was only 25·5.

To these arguments the Majority thus reply:- That as regards the alleged change of Age Incidence in Fevers, there was no change of any importance till 1881-5, when it was suddenly large. That there has been no further change since. (see Table above). That this sudden fall was probably due to improvement in classification - for instance cases of Intermittent Fever, which had been previously classed with Typhoid,

Maj. Report S 198.

Maj. Rep S 198.

were after 1880 transferred to Malarial
aj. Rep 199. diseases. As regards Influenza the Maj. Rep S. 199
comparison which has been made between
the two epidemics relates to two years only,
& is of little value.

aj. Rep 197. As regards the reduction of Small pox Maj. Rep S. 197
mortality in "healthy districts" as compared
with "unhealthy" ones, this is to be explained
by the fact that towns differ from
rural districts especially in this, - that
in the former large numbers are gathered
together in close proximity, however perfect
the sanitary arrangements may be. In
rural districts this is not so. Owing
therefore to this greater density of population
in the towns, Small pox will be more
constantly present there, & also more often
epidemic than in the country. Therefore there
will be more persons over the age of five
years, susceptible to Small pox, in the
country than in the town.

It must also be remembered that a much
larger number will attain to beyond 5
years of age in healthy districts than
in Liverpool, so that Small pox, which

attacks at all ages, was to be expected to cause a much larger proportion of deaths above 5 years in the former than in the latter.

Remarks on the Change of Age Incidence of Smallpox

I think we may take it that there is no real dispute as to this change having taken place. The difference of opinion arises when the question is asked "What was the cause of it?" There is no attempt at all made by the minority to upset the evidence afforded, in favour of vaccination having been the cause, by the investigations into the six epidemics. So that we may regard this evidence as valid. The same may be said with regard to the precise evidence afforded that the various vaccination laws each produced increased rapidity in the change of Age Incidence which was all the time proceeding.

Now, these two pieces of evidence seem to me to be overwhelmingly superior to any that has been brought forward in support of anything, other than vaccination, as a cause. The explanations

or rather, the different explanations given by the Minority are fragmentary, contradictory, & inconclusive. I have not included some of the arguments, to which I could find no answer in the Majority Report, & which indeed seemed hardly worth answering (as in Minority sections 134 & 147) Their chief argument that Sanitary Improvements were the cause has been, I think, fully answered by the Majority. In short it can hardly be doubted I think by any fair minded person that Vaccination & nothing else was the cause of the change in the Age Incidence of Smallpox & that therefore the second line of enquiry has resulted in more proof as to the efficacy of Vaccination.

Let us now take the third line of enquiry

III

Maj Rep S. 202-230
Min. Rep S 93-110.

The Fatality amongst the Vaccinated & the Unvaccinated respectively.

A. First let us take the evidence to be derived from the six epidemics which were investigated.

In Sheffield - the Fatality amongst the unvaccinated was distinctly in excess of that amongst the vaccinated -

At all ages

Of 4151. vacc. persons attacked 200 or 4·8 % died
" 552 unvacc. " " 274 " 49·6 % "

Under 10 years

Of 353 vacc. persons attacked 6 or 1·7 % died
" 228 unvacc " " 100 or 43·9 % "

Over 10 years

Of 3774 vacc. persons attacked 194 or 5·1 % died
" 322 unvacc " " 174 " 54·2 % "

In London

Under 10

Of 110 vacc. persons attacked 0 or 0 % died
" 228 unvacc " " 61 or 26·7 % "

Over 10

Of 1643 vacc. persons attacked 39 or 2·3 % died
" 181 unvacc " " 38 " 20·9 % "

These figures (for London) include only those who ~~were~~ were undoubtedly either vaccinated or unvaccinated. Even however if we add the "doubtful" cases to the vaccinated we still get figures very favourable to the latter. Under 10, the vaccinated mortality

is, even then, only 4·6 %, while, over 10, it only reaches 4·2 %, as against unvaccinated mortalities of 26·7 % & 20·9 %.

In Dewsbury. Under 10 -

Of 45 vacc. persons attacked 1 or 2·2 % died
" 174 unvacc " " 56 " 32·1 % "

Over 10

Of 601 vacc. persons attacked 17 or 2·8 % died
" 192 unvacc. " " 36 " 18·7 % "

Here, "doubtful" cases have, as before, been added to the vaccinated, while those described as "under vaccination" have been added to the unvaccinated, this addition telling in its favour.

It is hardly necessary to go into the figures from Warrington Leicester & Gloucester, but they all point in the same direction.

Let us take the figures from the six towns all together -

The Unvaccinated.

Under 10. - 1449 attacked 523 died = 36 %
Over 10 - 870 " 299 died = 34·3 %.
Taken together 2319 " 822 " = 35·4 %.

Notice the closeness of the fatality above & below 10 years.

The Vaccinated.

Under 10 –	589 attacked	16 died	= 2·7 ℅
over 10 –	8131 "	445 "	= 5·4 ℅
Taken together	8720 "	461 "	= 5·3 ℅.

These facts afford strong support to the view that Vaccination has a powerful influence on the fatality of Smallpox. If not, then these classed as Vaccinated are a mere arbitrary selection. Why should these thus selected always show so remarkably a different proportion of fatal cases. It cannot be chance as it is the same in all the six towns

B Let us now take the evidence to be derived from three London Hospitals – The Smallpox Hospital. Mr Marson's observations made through 32 years in respect of 19,467 cases, showed a fatality amongst the Unvacc. of 36·5 ℅ whilst the highest death rate amongst those with even only one mark was 12·8 ℅.

The Homerton Hospital (1873-84)

Total cases { vacc. attacked 8234, died 869 = 10·5 %.
unvacc " 2169, " 938 = 43·4 %.

Under 10 { vacc " 1286, " 130 = 10·1 %
unvacc " 1032, " 465 = 45·0 %.

Over 10 { vacc " 6928, " 732 = 10·5 %
unvacc " 982, " 375 = 38·1 %.

Fulham Hospital (1880-5)

Total cases { vacc attacked 2226, died 263 = 11·4 %.
unvacc " 358, " 165 = 46·1 %.

Under 10 { vacc " 202, " 16 = 7·9 %
unvacc " 168, 78 = 46 %.

Over 10 { vacc " 2024, 247 = 12·2 %
unvacc " 190, 87 = 45·7 %.

It is to be noticed that in both the towns & the hospitals the percentage mortality amongst the vaccinated is still less under 10 years than it is over 10 years of age.

Arguments against vaccination having an effect on the Fatality of Small pox.

In the first place the minority make a comparison between the Fatality of Small pox last century & the present. That the Fatality last century was estimated

to be from 12·0 to 15·0 %. To obtain the figures for this century they added together all the cases of Smallpox in the six epidemics in order to make a large aggregate. They thus find that in a total of 68,996 cases the Fatality was 15·8 %. They conclude therefore that the mortality this century with a large number vaccinated is about the same as last century when there was no vaccination.

To the methods of enquiry used by the Majority the Minority make several objections —

Min. Rep 101–110.

Min. Rep S 101–110

I That the class of Unvaccinated includes infants under the age of Vaccination, who would raise the fatality of this class

II That those whose vaccination was postponed on account of ill-health were included in the unvaccinated & would also raise the fatality in this class.

III That the unvaccinated are as a rule drawn a poorer & weaker class than the vaccinated patients

IV That in Confluent Smallpox the distinction made between vaccinated

& unvaccinated is apt to be inaccurate owing to obliteration of the vaccination marks.

V That the division into vaccinated and unvaccinated is also apt to be inaccurate on account of the "doubtful" cases in which the mortality is very high. These include cases where there are no marks even after a successful vaccination & those in which they are hidden by the rash of the Smallpox.

Answers by the Majority to these objections.-

Maj Rep S. 217. I Let all children under the age of one year be excluded from both classes. Then we have the following result in the six epidemics combined. - Maj Rep S 217

Vaccinated

Attacks 570 deaths 16 Fatality 2·8 %

Unvaccinated

Attacks 1235 deaths 375 Fatality 30·3 %

The contrast is very striking.

Maj Rep 230. II The number of these is small & the postponement does not necessarily mean a delicate constitution. It is often due to some ailment, as measles, which affects the strong & weak alike. Also they are generally vaccinated later on. Maj Rep S 230.

Maj Rep S. 229

III This is not always true at any rate. In the Warrington epidemic the report expressly states that the vaccinated and unvaccinated were of the same class & lived in the same houses. Also those admitted into the Hometon Hospital (whether vaccinated or unvaccinated) were mostly of the pauper class or the class immediately above it.

Maj Rep S. 229

Maj Rep S. 224

IV This is very rare

Maj Rep S. 224.

Maj Rep S. 206 & 212

II The "doubtful" cases were, as we have seen, put amongst the vaccinated class, & their high fatality would raise that of this class. Besides if vaccination has no relation to Small pox, accurate division into vaccinated & unvaccinated is not necessary. Those who are selected as vaccinated persons might just as well be so many persons chosen at random out of the total number attacked.

Maj Rep S. 206 & 21

Remarks.

The objections made by the minority would seem to have been adequately answered. The first & last are removed altogether by, in the one case the sub-

tracting from both classes all children under one year, & in the other, by including the "doubtful" cases amongst the vaccinated. The fact is that the margin of advantage to the vaccinated is so large, that even when every possible advantage is given to the unvaccinated, & every objection of the minority allowed the fullest weight, yet it still remains very distinct. The minority's own method of enquiry by comparing last century's Fatality with this one's is open to the objection, (see Maj Rep. S. 227) used in this section against another argument, that the statistics as to last century's Fatality cannot be relied on as establishing a normal Fatality of Small pox at that time, as there was a great difference in the mortality of the epidemics from which the statistics were compiled. There is no doubt I think that it has been proved that the Fatality of Small pox has been less amongst the Vaccinated than the Unvaccinated.

Maj Rep
231-251
Min. Rep
78-92

IV. The Attack-rate of Smallpox amongst the vaccinated & unvaccinated respectively.

A Evidence from the six epidemics.

Maj Rep
S 231-251
Min. Rep
S 78-92

It must first be noticed that in the case of the attack-rate the risk differs greatly in the case of those living in already-invaded houses & in those whose houses are not already invaded. Therefore in making enquiries the two classes are to be treated seperately, i.e those living in invaded houses, & the total enumerated population. In the case of the Sheffield outbreak both these have been considered, but only the former in the case of the outbreaks in the other towns.

In Sheffield

The figures given in regard to this town were subjected to criticism by the Minority on the ground that many of the persons classed as vaccinated, were vaccinated only in the course of the epidemic, & really belonged to the unvaccinated class for a considerable period of the epidemic. That owing to this large transfer the number of the unvaccinated was so

greatly reduced as to make the attack rate amongst them seem higher than it really was. To meet this objection the figures given originally by the Majority were changed. Dr Barry who was responsible for them was of opinion that if the persons vaccinated during the epidemic were added to the Unvaccinated class, it would be increased by about 28 %. Therefore this number was added to the unvaccinated class & subtracted from the vaccinated class The amended figures are given below -

<u>All ages</u>.	vacc.	266,797 -	attacked 4151	= 1·55 %
	unvacc.	7315 -	" 582	= 7·5 %
<u>Under 10</u>.	vacc.	67,603 -	" 353	= 0·5 %
	unvacc.	2,892 -	" 228	= 7·8 %
<u>Over 10</u>	vacc	195,945 -	" 3,774	= 1·9 %
	unvacc	4,389 -	" 322	= 7·3 %

The contrast is still very striking The above figures are for the total enumerated population. Let us now take those in the houses invaded by Smallpox, which figures are of course also amended in the same way.

Ages. vacc. 17814 - attacked 4151 = 23·3 %
unvacc. 942 - " 552 = 58·6 %
Under 10. vacc 4419 - " 353 = 7·9 %
unvacc. 337 - " 228 = 67·6 %
Over 10. vacc. 13,304 - " 3774 = 28·3 %
unvacc. 600 - " 322 = 53·6 %

It will be seen that, as was to be expected, the attack-rate is much higher amongst these than amongst the total population. Yet the contrast between the vaccinated & unvaccinated is not less remarkable. It is hardly necessary to give the figures for the other towns, as they all point in the same way. It is however worth noticing that in all these towns the contrast between the vaccinated & the unvaccinated is much more striking in those under 10 years than in those above.

B In the London Hospitals.

Homerton Hospital - Out of 10,403 persons treated 2169 or 20·8 % were unvaccinated.

Fulham Hospital -

Treated 2584 - unvacc. 358 = 13·8 %
Children under 10 treated 370, - unvacc 168 = 45·4 %.

These figures show a proportion of unvaccinated persons, & especially children, admitted to the hospitals, which could not possibly correspond with the proportion of unvaccinated persons living in any part of London.
All this evidence proves that there is less liability to attack amongst the Vaccinated especially in children under 10 years of age.

Min Rep S 84 & 85.

<u>Arguments against</u> Vaccination having had an effect on the Attack Rate.

Min. Rep S 84 & 85

The objection of the Minority to the Sheffield Report has been already considered. They are of opinion however that 28% is not enough to allow for the number vaccinated during the epidemic.

Min Rep S 86-91

They hold that the proportion of vaccinated to unvaccinated should be ascertained by means of the Vaccination Registers. That these show that, in regard to Sheffield, of the children born in the years 1878-87, 84% were successfully vaccinated. That, if we take into consideration that the proportion of the

Min Rep S 86-91.

vaccinated amongst those born before the Vaccination Acts of 1853 1871 & 1876 was probably very much less than 84%, it is not likely that the proportion of the vaccinated in the <u>whole population</u> of Sheffield at the beginning of the epidemic much exceeded 90%.
Now of the cases of Smallpox in this epidemic, according to Dr Barry 88% were vaccinated. It would therefore appear that, for the population at all ages, the proportion of Smallpox attacks on the vaccinated & the unvaccinated closely approached the proportion between the two classes in the population generally. That the same thing holds good in the other towns & also in the London Smallpox hospital where the percentage of vaccinated persons admitted has been over 90 since 1878. There are no grounds for thinking that at any time more than 90% of Londoners have been vaccinated.

min Rep ; 78-82

min Rep s 78-82

To this argument about the London Smallpox Hospital, the Majority reply

Maj Rep S 250.

that the experience of that Hospital differed greatly from that of the Homerton & Fulham Hospitals where the test was a larger one in point of numbers. Also that the patients of the Small pox Hospital were a more prosperous class in which cases of non vaccination would be very rare. Also that some of them came from outside London, & so prevent the proportion of vaccinated in this hospital being compared with the same proportion in the population of London.

Maj Rep S 250.

Remarks. I think it is probable that in relation to the amending of the figures at Sheffield, Dr Barry's estimate of 28% is right. The Minority have no evidence in support of their assertion that it is too little. Such an objection could hardly be entertained with regard to the badly vaccinated amongst the six towns, such as Leicester. And yet we find that Leicester as well as Sheffield gives results favourable to vaccination. The argument of the Minority as to the close approximation between the

proportion of vaccinated in the population & the proportion of vaccinated attacked, does not explain the difference in the attack rate between the vaccinated & unvaccinated under 10 years which is greater than the difference above 10 years. What is the cause of this? Why should it be so much more marked under 10? No explanation is forthcoming except that of vaccination. The experience of the London Small pox Hospital is at least counterbalanced by that of the Homerton & Fulham Hospitals. There is no attempt to criticise the results of these latter Hospitals, whilst there is at least some criticism levelled against those of the Small pox Hospital.

To sum up I think it has been easily proved that Vaccination has had a favourable influence on the Attack-Rate of Small pox.

V The Severity of type of Small pox amongst the Vaccinated & Unvaccinated respectively

Maj Rep. S. 252-268.

The results shown by the six epidemics will be seen more clearly if we divide the cases

Maj. Rep S 252-268

into two classes - mild & severe, the former including the variolroid & discrete, the latter the coherent & confluent. We now get the following results -

		Milder	Severer
Sheffield.	vacc	82·8	17·2
	unvacc	18·5	81·5
Dewsbury	vacc	82·0	18·0
	unvacc	23·1	76·9
Leicester	vacc	81·4	18·6
	unvacc	27·2	72·8
Warrington	vacc	78·2	21·8
	unvacc	29·4	70·6
London	vacc	89·0	11·0
	unvacc	35·2	64·8

It will be seen that in all the towns the advantage is very decidedly in favour of the vaccinated, there being a noteworthy correspondence in the percentages in the different towns. In the case of those under 10 years the difference is still more striking, the proportion of severer cases amongst the vaccinated being quite insignificant

Two objections are brought by the minority against these results, one in sect. 93

of their Report, which seems hardly worth discussing, the other in section 109, to the effect that the method of classification is erroneous as no two men could, independently, classify the same series of cases in the same way. This refers to the division into variloid discrete etc. I do not think however that this objection will apply to the broader division into mild & severe. I think that vaccination has been proved to have a favourable influence on the Severity of type of Small pox.

VI Thoroughness of Vaccination & the Fatality & Severity of Small pox.

Maj Rep S 272-298 Min Rep S 126-130

By Thoroughness is meant the number of the marks, their size & location. Do these have an influence on the protection afforded by vaccination. Let us examine the Statistics of the epidemics as before - Sheffield. The influence of the number of marks on the Fatality & the Severity as regards Fatality

Maj Rep S 272-298 Min Rep S 126-130.

No cicatrice or one only - cases 95, died 13 = 13·7 %
Two cicatrices " 259, " 24 = 9·3 %
Three " " 372, " 21 = 5·7 %
Four " " 99, " 2 = 2·0 %

As regards Severity	Mild	Severe
No cicatrix or one only	70 %	30 %
Two cicatrices	79	21
Three "	92	8
Four "	94	6.

It will be seen that there was a distinct diminution both in the Fatality & the Severity of the disease in proportion to the number of marks.

Newsbury. As regards size of marks.

Dr Copland divided the marks into three groups as to size - Marks whose total area measured ½ or more of a sq. inch, marks whose total area was ⅓ but less than ½ sq inch, & marks whose total area was less than ⅓ sq inch. Results -

1st group.	cases 246	deaths 3	Fatality 1.2 %
2nd "	27	" 1	" 3.7
3rd "	17	" 1	" 5.8

We see therefore that the larger the marks the less the Fatality.

As regards Foveation. Here Dr Copland divides the marks into - 1 Plainly foveate 2 partly or faintly foveate 3 having smooth faint or thick scars. His results were as follows -

1st group	cases	294	died 4	Fatality	1·3 %
2nd "	"	32	" 0	"	0
3rd "	"	90	" 2	"	2·2

The figures are small & the result somewhat inconclusive.

London As regards Treatment. St. Luff divides the marks simply into "Treated" & "non treated." His results gave a fatality of 1·2 % in the treated class, & 3·2 % in the non-treated. The treated therefore had a distinct advantage.

As regards Area or size of marks St. Luff divided them according as they were under ·25 sq. inch, from ·25 to ·5 sq. inch, or over ·5 sq. inch Results.

	Percentage of severe attacks.	Percentage Fatality
Area under ·25 sq inch	12·6	2·3
" ·25–·5 "	4·6	1·8
" over ·5 "	3·9	1·4

It is not necessary to go into the reports from the other towns & from the London Hospitals. Although the methods employed were in many cases different yet the results obtained pointed much in the same direction.

The conclusions to which these results point are as follows – As regards the number of marks, the greater their number, the less the Fatality & Severity of the disease. The contrast is more striking between those with 3 or 4 marks as compared with those with 1 or 2, than it is between those with one mark & those with two. As regards Inoculation there is no evidence of the same importance. The same holds with regard to the Area of the marks.

Objections by the Minority – Min Rep S. 126-130.

They hold that Revaccination is as successful or more so in those with many & well marked cicatrices as in those with few & faint ones. That even with the same lymph & that of the best quality the marks vary immensely in character, showing that differences of constitution, extent of local inflammation etc have much to do with the quality of the scars. Also that the Fatality was often greater in those with two marks than in those with one. Min. Rep S 126-130.

Remarks. The question does not seem to be of much importance, except

with respect to the influence of the number of marks. Although nothing is definitely proved as regards area & Inoculation, yet it would seem fairly certain that those with 3 or more scars are better protected than those with less than 3. There is not much difference between those with 2 scars & those with one.

VII

Revaccination.

Maj Rep. S 299-342
Min Rep. S 149-153.

This is important in two ways. First as regards the question whether the protective effect of Vaccination can be restored again after it has diminished, & secondly, if this is proved, it would tend to show that Vaccination has an influence over Small pox. We have to distinguish between cases of Revaccination where no result follows, & cases of "successful" revaccination. The former are not always cases of Insusceptibility as in many of them a repetition of the process may produce a successful Revaccination

Maj Rep S 299-342
Min Rep S 149-153

What can we learn from the epidemics in the six towns -

Sheffield.

Number of successful revacc. 64,431, attacked 27 died 1. attack-rate 0·04 % fatality 3·7 %.

If we compare this with the attack rate & fatality amongst the once vaccinated & the unvaccinated we get the following—

Revaccinated	attack rate ·04 %	fatality 3·7 %
Once vacc. (over 10)	1·9	5·1
Unvacc (over 10)	9·4	84·2.

Leicester

In one group of infected houses the attack rate was 1·1 % amongst the revaccinated & 16·6 % amongst the once vaccinated, in another group, it was 16·1 % amongst the revaccinated, 35·3 % amongst the once vaccinated, & 59·6 % amongst the unvaccinated.

London.

Revaccinated	fatality	3·7 %
Once vacc. (over 10)	"	4·2
Unvacc. (over 10)	"	20·9.

Warrington

Revaccinated	attack rate	12·5 %
Once vacc (over 10)	"	29·9
Unvacc (over 10)	"	56·0.

There is a great deal of other evidence to be derived from the epidemics in the six towns, in respect of the police & postal services of these towns, the troops stationed there etc. As it all points in the same direction I need only give some of it.—

Troops stationed at Sheffield

Total number 830 - all revaccinated. Of these 12 or 1·4 % were attacked & one died. None of these attacked had been successfully revaccinated

The Police Force of Sheffield

Total number 372. None of these revaccinated were attacked.

The Post Office Staff at Sheffield

Total number 290. all revaccinated, none attacked.

Troops stationed at Warrington

Regular troops 300. all revacc. 0. attacked

Police Force & Postal Staff at Warrington

Revaccination extensive, none attacked.

Postal Service in London

all revaccinated. In 10 years (1870-80) with an average number of employed of 10,504 there have been only 10 cases (all mild)

Attendants in Small pox Hospitals in Sheffield

Revaccinated 81. attacked 1. (very mild)

Not vacc. 62 " 6 (one died)

Staff of Aiken St. Hospital in Warrington

The only two attacked were the only two not ~~to~~ revaccinated.

Staff of the Highgate Small pox Hospital

Only one case in the last 60 years, & this was the only case not revaccinated.

The British Army. (Wherever stationed)

Since 1858 all recruits have been re-vaccinated except those with distinct marks of Small pox: In about 10 years time after this therefore, almost all the men in the army would have been vaccinated since enlistment, the earlier recruits having nearly all left the army. From 1847-58 there was no decline in the death rate from Small pox amongst the troops. Since then however the death rate has diminished, & continued doing so up to the present.

Similar evidence can be derived from the experience of the British Navy.

Min Rep S. 149-153

Objections raised against the efficacy of Revacc. In the first place it is urged that Revaccination is by no means an absolute protection, & evidence is brought forward to prove this. It is also urged that in the Army, which has been as thoroughly revaccinated as possible, yet there has been from 1860 to 1888 a case-mortality of 9·9 ℔s (391 deaths in 3953 cases) while the attack rate & general death rate have varied greatly according to where the troops have been stationed. Thus in the year 1888,

Min Rep S. 149-153

	Attack rate per 10,000.	Death rate per 10,000
United Kingdom	1	·1
The Colonies	3	0
India	15	1·4
Egypt	42	11·9

This variation is said to be due to the different degrees of exposure to contagion in different places.

As regards the immunity enjoyed by revaccinated attendants in Smallpox hospitals, it is said that there are instances in which non-revaccinated attendants have also enjoyed a re-

markable immunity, as at the hospital at Bicêtre during the seige of Paris, where while 15 of the revaccinated hospital orderlies took the disease, not one of the 80 who composed the Medical & ~~Nursing~~ Nursing Staff, many of whom had neglected revaccination, took the disease. It is suggested that this is to be explained on the theory that "a certain tolerance is acquired by repeated exposure to contagion, & that in those who are not at once attacked the receptivity to the disease becomes exhausted".

Min Rep S 153.

Min. Rep. S. 153

Answers to these objections –

With respect to the high fatality in the Army in Egypt in 1888-9, the majority are not aware of the cause. It must however be noticed that the percentage of unsuccessful revaccinations is often as high as 20-30 in the army, owing to the soldiers withdrawing the vaccine matter to prevent vaccinia.

Maj Rep S 336.

Maj Rep S 336.

As regards the experience of the Bicêtre Hospital there is no exact statement of the facts. The number of the Hospital orderlies who were not revaccinated or who were not

Maj Rep S 327.

Maj Rep S 327

successfully revaccinated, is not stated. Neither is there any definite statement as to the number of the nursing staff who were not revaccinated. As regards the explanation that the immunity of Small pox hospital attendants is due to long & gradual exposure, the Majority reply that the exposure is not gradual, & also that this theory does not explain the greater immunity of the revaccinated. Also that there is no parallel immunity in the case of other contagious diseases So in regard to Typhus, which resembles Small pox in its contagiousness & its attacking adults, from 1862-71 at the London Fever Hospital with an average number of 100 attendants, the average number of cases of Typhus in a year was 19.2 As regards the Medical Officers in this hospital, in the five years from 1862-66 nine of the Medical Officers took the disease & one died. The majority in section 329 also make a similar comparison between Small pox and Scarlet fever, typhoid & diphtheria as regards their attacks on

Maj Rep S. 329.

Maj Rep S 329.

the Medical Staff, but as this seems open to the objection urged by the Minority in section 151 that "~~three injections~~ the liability of taking three injections is compared with the liability of taking one." I have therefore not included it.

Remarks on Revaccination

Against all the mass of evidence in favour of the efficacy of Revaccination, obtainable from records of the six epidemics the Minority has nothing to urge. The only opposing evidence that they have is that of the experience of the Bicêtre hospital, & even this is of an extremely indefinite character. It is not comparable with the former evidence either in point of accuracy or of importance. As regards the large case-mortality from Small pox in the army, the fact remains that the attack rate & mortality have steadily diminished since the introduction of compulsory vaccination. The argument that these two have varied in different countries, & that this is due to differences in Sanitation

in these countries may be true without proving much against Revaccination. Granting that the latter does not confer an absolutely perfect immunity, then different degrees of Sanitation will possibly produce different amounts of Smallpox. It is to be noticed that the year the Minority chose for for exemplifying this variation is the one in which Small pox was very rife in Egypt. The explanation by the Minority of the immunity enjoyed by Small pox hospital attendants, is merely a theory. It is curious that this same immunity does not show itself in other contagious diseases, if this theory be true. Revaccination has, I think, been proved without doubt to be efficacious against Small pox

VIII

Maj. Rep. S. 345-350

Foreign Evidence

Some facts are worthy of note - Maj Rep S 345-350.

1. The same change of Age Incidence has occurred in Germany since Vaccination was introduced there.
2. At the time of the Franco-Prussian

war, the Prussian army was, owing to the introduction of compulsory vaccination in 1834, well vaccinated. The French army was very much less satisfactorily vaccinated. The number of Small-pox deaths in the Prussian army in 1870-1 was only 316. In the French army during this time it was stated by the French Minister of War to have been 23,400, though this is probably exaggerated. It was, at any rate, much greater than in the German army. It was also much greater before the war, as is shown below,- French army (1866-69. = 4 years) - total Smallpox deaths 380.

German army. (1835-69 - 35 years - total Smallpox deaths 77.

3. Before the Prussian compulsory vaccination law in 1874, the number of Small pox deaths was sometimes higher in Prussia, sometimes in Austria. Since then however, while in Austria there has been no diminution at all (they still range from 40-80 per 100 000 of the population annually), in Prussia they have fallen

from the same to from 0·3 to 3·0 per 100 000 of the population annually.

The minority offer no criticism of this evidence from abroad. In section 31. they mention the Franco German war but so hardly in reply to the Majority's argument.

The First Question, ~~has~~ i e as to the efficacy of Vaccination, has now been fully answered. In whatever way the question has been considered, the results have been uniformly favourable to the opinion that vaccination exerts an influence antagonistic to Small pox. Before, however, the evidence on this question is summed up there is still one objection, made by the Minority, which requires perhaps some notice, though it is a very theoretical one— It is said that, as Vaccination is not Small pox, it ought not to confer protection from Small pox, as an attack of one disease does not give immunity against another disease. It is a question however whether Cow pox & Small pox are

Min Rep 154-162

Min Rep S 154-162

Maj Rep 352-360

Maj Rep S 352-360

identical with each other or not. In one sense they certainly are not convertible, Small pox cannot be caused in the cow identical with Small pox in man, & Cow-pox given to man cannot cause in him Small pox. It is probable however that under certain circumstances the tissues of the cow are able to transform Small pox into vaccine, as shown in some experiments in which lymph, taken from vesicles produced in the cow by the introduction into it of the Small pox virus, produced, when introduced into man, results which were indistinguishable from those of vaccination. The evidence is at least sufficient to remove the force of this objection.

Maj Rep. 377.

Summing up of the majority of the evidence on the first question - the efficacy of Vaccination.

Maj Rep S 377.

1. Vaccination diminishes the liability to be attacked by Small pox, lessens its fatality, & diminishes the ~~fff~~ severity of the attack if it occurs

2. The protection is greatest during the 5 or 10 years succeeding the operation, but never altogether ceases.

3. after this period the power to protect against attack, & to modify the severity diminishes, especially as regards the former.

4. Revaccination restores the protective power for another term

5. The protection is greater if the the vaccine matter be introduced in three or more places & if the marks cover an area of at least ½ sq inch.

Second Question - The alleged injurious effects resulting from vaccination.- Let us first see what the Minority have to say on this point, as it is they that urge the importance of these injurious effects. They state that it is now admitted that risk always attaches to the operation of vaccination, & they bring forward evidence to show that various diseases can be caused by it. -

Min. Rep. S. 177 - 220

Min Rep S 177 - 220

I Erysipelas & various forms of septic poisoning This class includes about half the cases of vaccinal injury. They arise from causes which cannot be foreseen & prevented, & they are more frequent & severe after the use of calf than of humanised lymph.

Min Rep. S. 186 - 200

Min Rep S 186 - 200.

Post vaccinal erysipelas may vary from little more than an inflamed arm to great severity resulting even in death. From 1859 to 1880 there were 390 deaths certified in England & Wales as due to this disease, & there is no doubt that many other cases occurred without any mention of vaccination as a cause being made. Thus in enquiries made by the Local Government Board into ~~epidemics~~ at Norwich in 1882 & at Gainsboro' in 1876, it appeared that 10 cases were really cases of post vaccinal erysipelas, though in only one of these 10 was any mention made of vaccination on the certificate. In sections 192-4 the Minority give a list of septic cases due to vaccination, & they quote Mr Barlow's report on one series of such cases, in which he says "it appeared to me obvious that some septic material had been introduced at the time of vaccination, & that this was mainly responsible for the untoward results obtained" The Minority also urge that there is evidence that vaccinia

Min Rep S 194

Min Rep S 194.

is often "proximately related to erysipelas" & that this is not always due to merely accidental contamination. That vaccine lymph is believed by high authorities to contain the germs of erysipelas.

Min Rep S 201-216

II Vaccino-Syphilis.

Min Rep S. 201-216

According to both Mr Hutchinson & Sir J. Simon inherited Syphilis is not always to be detected, & the vaccinal lymph may contain the Syphilitic contagium in full vigour without the Syphilitic infant itself showing any outward traces of Syphilis. This being so the implanting of Syphilis in vaccination need not always be due to carelessness. It is impossible to avoid an admixture with blood, as, according to Dr Husband all lymph contains blood cells. Dr Creighton holds that there is a close analogy between Cow pox & Syphilis. The "Leeds case" of vaccino-Syphilis bears on this question. Here a child was vaccinated in March 1889 & died at the Leeds Infirmary on the 1st July 1889. Four members of the

Infirmary Staff, after holding an inquest, stated the cause of death to be vaccino-Syphilis. In July Dr Ballard, a Medical Inspector of the Local Government Board, came to the conclusion, after an enquiry, that the child died of hereditary Syphilis. Next Dr Barlow, after making an enquiry on behalf of this Commission, reported that there was no evidence of hereditary Syphilis. What then did the child die of? According to Dr Creighton vaccination can cause a certain train of symptoms indistinguishable from those of Syphilis, apart from contamination with Syphilis.

III Leprosy & vaccination.

Min Rep. 217. It would seem that leprosy can be conveyed to healthy persons by leprous discharges ~~gaining~~ gaining access to raw surfaces, & some believe that in leprous countries native lymph may transmit leprosy. The Bacillus of Leprosy has been found in vaccinal lymph. Min Rep S 217

IV Skin Eruptions & Vaccination.

Min. Rep S. 218. These are frequent after vaccination. They may be trivial in character or may be serious & even fatal. Min Rep S 218.

Min. Rep S. 219.

Tubercle & vaccination

Min Rep S. 219

The organism of this disease can be conveyed to healthy persons by the medium of infected animal products such as milk. In some cases lupus has developed at the site of vaccination. In these the disturbed health produced by vaccination would seem to have caused constitutional tubercular infection.

Answers to these alleged injurious effects of vaccination.-

Maj. Rep. S. 378 - 434.

Maj Rep S. 378-434

It is admitted in the first place that there is some risk in vaccination. Everything however depends on the character & extent of the risk. Those who attack vaccination on this ground adopt two lines of attack -

a an alleged increase in the number of deaths from certain diseases corresponding with a spread of the practice of vaccination.

b Particular cases in which injury or death is alleged to have been caused by vaccination. Let us take a first.-

Maj Rep S 381-398.

a. During the period 1847-75, when the amount of vaccination was steadily increasing, of 14 diseases often ascribed as due to vaccination six showed an increasing,

Maj Rep S 381-398

four a decreasing, & the rest an irregular mortality. Now there is no more reason for ascribing the increase in some diseases to vaccination, than the decrease in others. Also during the time when infantile vaccination has been increasing the mortality in the first year of life, as measured by the proportion of deaths to births, has not increased but decreased. From 838-42 the annual infantile death rate to 1000 births was 152, from 1881-90 it was down to 142.

Vaccino Syphilis Deaths from Syphilis have largely increased in the last 20 years among infants under one year of age, but chiefly (in England & Wales) during the first three months of life, a period practically unaffected by vaccination. In Scotland the age of compulsory vaccination is six months, & here the increase in infantile Syphilis has been in the first 6 months, there being no increase in the second half of the first year of life —

	Proportion of deaths from Syphilis to every 1000 deaths	
	0-6 months	6-12 months
1855-63	575	109
1865-75	612	118
1875-87	647	109.

In Ireland infantile Syphilis has largely decreased recently (despite compulsory vaccination). Also if we compare the infantile mortality from Syphilis in Leicester with that in England & Wales, we find that while in the latter there was in the period 1883-7 an increase of 24·7 % over that in the period 1863-7, in the former the increase between the two periods was 69·3 %. So that badly-vaccinated Leicester compares unfavourably with England & Wales when vaccination was much more practised. If it is objected that Leicester is urban, while England & Wales includes a rural population, it may be answered that it was the same for both periods alike.

In relation to Erysipelas. - This also largely affects children in the first three months of life - the pre-vaccination period. The infantile mortality from Erysipelas has been decreasing on the whole, while in Scotland where there has been a slight increase in the period 1864-87 as compared with the period 1855-63, the increase has been even less in the second six months than

in the first, i.e. .33% as compared with .52%. Again while in Leicester there was an increase of 41.5% in the period 1883-7 as compared with the period 1863-7, in England & Wales there was a decrease between the same periods of 16.7%.

In relation to Cancer - The mortality from this disease has considerably increased recently, but has chiefly affected adults & the old. In the first 15 years of life there has been an actual decrease. Also the increase is to a large extent apparent only & due to improved diagnosis. This is shown by the deaths from inaccurately stated diseases as "tumours" etc becoming smaller, & by the increase of mortality from cancer being much greater amongst males than females, in the latter of whom the disease is more commonly difficult of diagnosis through being inaccessible.

In relation to Tabes Mesenterica & Scrofula. — Although there has been an increase recently in the mortality from these diseases, yet the mortality from allied diseases such as Phthisis has decreased. Also the increase

has been as great in Leicester as in England & Wales

In regard to Pyaemia Bronchitis Diarrhoea & Skin diseases, there is no evidence that they have increased owing to vaccination. Compare again Leicester & England as before—

Increase of deaths under one year

	Leicester	England & Wales
Diarrhoea & Dysentery	4·2 ‰	0·5 ‰
Bronchitis	112·8 ‰	73·3 ‰

Finally the General Infantile Mortality has decreased in Leicester 2·8 ‰ & in England & Wales 7·5 ‰.

Maj. Rep 399-434.

b Let us now take the second line of attack which consists in the quoting of particular cases of injury or death following vaccination. From 1859-80 the deaths returned as due to Erysipelas after vaccination increased, but so also did the population & the number of vaccinated children. After 1880, deaths from post vaccinal erysipelas were recorded under the heading of "coupon & other effects of vaccination" From 1881-5 there were 283 of these cases. From 1886-91 there were

Maj Rep S 399-434

279 deaths put down as connected with vaccination. If the years 1881-9 inclusive be taken, in this time there were 476 deaths certified as connected with vaccination, and there were 6,739,902 primary vaccinations, giving a proportion of one deaths to 14,159 primary vaccinations. In Scotland it was still less. From 1883-90 it was at the rate of one in 38,872.
From 1889-96 by means of strict enquiries 452 cases of death or non-fatal injury connected with vaccination have been brought to our notice. We are of opinion that "as regards the non-fatal cases serious injury has not resulted in any considerable number of them."
Of the fatal maladies connected with vaccination, Erysipelas is credited with 1/2 the deaths. If cases of Pyaemia & Septicaemia be added they form 2/3 of the deaths.
What circumstances will cause these diseases in vaccinated children? The lymph contains organisms & so some contagious material may be conveyed by it at the time of vaccination, or by the vaccinator

Maj Rep S. 407

Maj Rep S. 407

Maj Rep 408-416

Maj Rep S. 408-416

himself. In some cases when it was conveyed by the lymph the arm of the vaccinifer was only slightly inflamed. If the contagium was introduced subsequently to vaccination it may not have been caused by the vaccination at all. It is a common mistake to call an antecedent a cause. In many of the cases enquired into, Erysipelas was present in the vicinity, in others the home of the child was insanitary, in others lack of care on the part of the child's attendants, who were themselves sometimes suffering from running sores. Although care would further diminish the already small risk of these dangers, yet there will always be some risk in a vaccination wound, as in any other wound. The use of calf lymph makes no difference in regard to inflamed arms.

Maj Rep. S. 420-430.

In regard to Syphilis - The possibility of post-vaccinal Syphilis is now acknowledged. The rarity of it however is shown by the fact that in 1856 an investigation by the Board of Health resulted in the expression of the opinion that Syphilis could not be com-

Maj Rep S. 420-430

municated by vaccination. On account of the fact that the symptoms of Syphilis may be closely approached by those of other diseases, all evidence in respect to dates, account of the vaccinifer etc or not founded on notes taken at the time, must be received with caution. There has been much of this kind of evidence before the Commission. With regard to Dr Creighton's theory of the essential relationship between vaccinia & syphilis, it may be said that for all practical purposes the two are distinct & except in rare cases, easily distinguished. Now as regards actual particular cases — The case of Mr Ward of Leeds was no doubt Syphilis, ~~but~~ but it was doubtful whether the Syphilis was acquired at Vaccination. Of the six cases of Mr Holmes of Leeds, two were doubtless cases of vaccinal Syphilis but they occurred 25 years ago (in 1871) From 1888 to 1891 five cases of alleged vaccinal syphilis occurred & were reported on by Medical Inspectors of the Local Government Board. In none of these was

there sufficient evidence that death resulted from Syphilis due to vaccination. During this time also, 8 other cases in which there was a suspicion of Syphilis were reported on by the L.G.B. There was no evidence that the Syphilis was caused by vaccination. As regards the "Leeds Case". The members of the Leeds Hospital Staff allow that the course of events was most unusual. It is very doubtful whether the case was one of Syphilis at all. There was no Syphilis in the vaccinifer or in its family history; there was no trace of it in the co-vaccinees from the same lymph. Neither could the vaccinator have communicated it. The case was probably one of gangrene & blood poisoning, the direct result of vaccination, but not syphilitic at all. As regards the Edmond St. Hospital case, it was not proved to have been Syphilis. In any case it was the only example of supposed transmission of Syphilis, out of a total of 30 000 children in a hospital where congenital Syphilis was abundant.

Of 12 fatal cases of alleged vaccino-Syphilis investigated on our behalf, in none of them was there evidence that the Syphilis had been communicated by vaccination, five of them were not cases of Syphilis at all. Of ~~39~~ 38 non-fatal cases investigated on our behalf 36 were not cases of Syphilis at all.; 1 was a case of inherited Syphilis, & the other may possibly have been one of vaccino-Syphilis.

Finally it may be stated that the only way of absolute security against the risk of Syphilis is the use of calf lymph.

Maj Rep S 417

As regards Scrofula.

Maj. Rep S 417

This is a very common disease of childhood. It is probable that, though vaccination may possibly have been in some cases the exciting cause, yet that a latent disposition to it was already present.

Maj Rep 418 & 419

As regards Skin diseases.

Maj. Rep S 418 & 419

The same may be said of these as was said of Scrofula. Cases of severe eruption with fever are now very rare. They can only be explained on the theory of exceptional susceptibility to the virus of vaccination.

As regards Leprosy – Not only is there no adequate evidence that vaccination has increased the prevalence of this disease, but there is much evidence that it has not. Any risk may be eliminated by using English lymph or calf lymph.

As regards all these alleged risks of Revaccination – In respect to Syphilis, Revaccination stands in the same position as primary vaccination. In respect to other risks they are even less in Revaccination.

As regards the respective advantages of human & calf lymph – In respect to Syphilis & Leprosy calf lymph wholly excludes all dangers; in respect to other diseases, they stand on the same level.

Maj Rep S 434. — To sum up, we think that "the dangers are insignificant when considered in relation to the extent of vaccination work done" Maj Rep. S. 434.

Maj Rep S. 435-450 — The ~~Majo~~ Commission suggest the following means as likely to prevent or lessen these ill-effects. – the use of calf lymph, the same to be put within the reach of all; the extension of the age period for vaccination Maj Rep S. 435-450

to six months; settling of rules for guidance in the care of the vaccinated arm; children to be vaccinated & inspected at their own homes; postponement of the vaccination if necessary; proper storing of lymph & sterilising of instruments; etc.

Remarks on Vaccinal Injuries.

The conclusion which the majority come to on this question seems to be the only possible one on the evidence. The only diseases which are really proved to have been sometimes caused by Vaccination are Syphilis and Septic diseases including Erysipelas, Pyaemia & Septicaemia. Of these the latter is by far the larger class, & consists chiefly of cases of Erysipelas. Increase in the extent of vaccination has not caused an increase in the prevalence of this latter disease, as it has been decreasing in England & Wales taken as a whole, although in unvaccinated Leicester it has been increasing. It has however been proved that occasionally vaccination has been the cause of Erysipelas, & that, even if proper care is taken, there is always <u>some</u> risk

of this occurring. The risk is however so slight as to be entirely inadequate to justify the abolition even of compulsion in Vaccination. As regards Syphilis there is no proof at all that the increase in its prevalence, which has of recent years occurred amongst infants, has been due to vaccination. As in the case of Erysipelas however there is no doubt that cases of Syphilis caused by Vaccination have occurred. Also that it is possible to inoculate a child with Syphilis, even though proper care be taken as to the vaccinifer. The risk is however entirely done away with by the use of calf lymph. The argument of the Minority that the latter even, may cause symptoms indistinguishable from those of Syphilis is based on cases so rare, as to be hardly a practical objection.

Third Question. - Measures against Small-pox, other than Vaccination; & ~~how~~ far can these measures be relied on in place of Vaccination.?

On this question the Majority agree with the Minority to this extent, that they think that there are measures which should be employed <u>in conjunction with</u> vaccination against Small pox. They deny however that the evidence is strong enough to justify us in trusting to these measures <u>alone</u>, apart from vaccination. The Minority however believe that these measures would prove adequate by themselves, but as the experiment has never actually been made, they simply base their belief on the results of these methods when tried in places where least vaccination existed, & in places where they were most thoroughly carried out. Let us see therefore what they say -. The means which ~~they~~ we would use are, broadly speaking, <u>Sanitation</u> and <u>Isolation</u>. Small pox is closely related to <u>neglect of Sanitation</u>, & if this be neglected vaccination will not prevent epidemics, as is well shown in various Reports on Sanitary measures in India. So also in the Life Tables which Dr Farr constructed in 1875 in order to ascertain

Min Rep S. 221 - 273

Min. Rep S. 221 - 273

Min. Rep S. 227.

Min. Rep S 227

the effect of healthy surroundings on Zymotic diseases we find the following - For every million born alive there would die by Small pox. —

In Healthy districts	2359
In England	6521
In Liverpool	8141.

So we see that the mortality is less the more healthy & sanitary the district. Let us consider shortly the growth of our knowledge as regards the propagation & control of Small pox during this century. — In the beginning of the 18th century the contagiousness of Small pox was just distinctly stated by Boerhaave. In 1763 Rast of Lyons, & in 1777 Haygarth of Chester proposed plans for dealing with Small pox on the principle of its being contagious. Isolation methods however remained for long in abeyance after the introduction of Vaccination, but the outbreak of Small pox in 1870-2 again caused attention to be directed to them. Owing however to Vaccination having been relied on as a preventative, the disease in this epidemic

had got too firm a hold on the popul-
ation, for the hurriedly built Isolation
Hospitals to be able to do much to prevent
the diffusion of the disease. In 1879 & in
889 arrangements were made for the
removal of Small pox patients into the
hospitals of the Metropolitan Asylums Board,
the effect of which was that, while in
1871-2 only 31% of the Small pox deaths
took place in hospitals, in 1893 87%
took place therein. In 1881 a Royal
Commission was appointed to enquire
into the working of these hospitals. It
recommended compulsory notification of
Small pox, & the removal of Small pox
patients out of London. In 889 notification
became compulsory in London, & in 1885
the Metropolitan Asylums Board removed
their Small pox patients to their floating
hospitals on the Thames at Long Reach
The result of this has been that London,
in which from 1860-1881 Small pox was
increasing, & which compared unfavourably
with provincial towns, now has come
to show better results than they. From

1887-91 the deaths were less than 10 per annum & in 1889 there was not a single death. This was not due to vaccination because the proportion of births in London not accounted for as regards Vaccination had steadily increased from 4·3 % in 1881 to 18·4 % in 1892. The experience of Glasgow gives the same result. In 1862 the first municipal fever hospital was opened; in 1876 the hospital treatment of infectious diseases passed wholly into the hands of the Municipal authorities & since then great Sanitary improvements have been carried out. Result—

In the 10 years 1855-65 there were
2197 Small pox deaths.
In the 10 years 1865-75 there were
971 Small pox deaths.
In the 20 years 1875-95 there were
89 Small pox deaths.

In Warrington, Leicester, Sheffield Halifax Bradford & Leeds similar results have been obtained, & we are therefore led to the conclusion that "the best way of stamping out Small pox is to seperate

Min Rep S. 263

Min. Rep S. 263

the diseased from the healthy & to disinfect infected places things & persons".
(In section 273 the Minority give a list of the measures which they would adopt other than vaccination).
What reply do the Majority make to these arguments & views? As has been already said they agree as to the great benefit conferred by Isolation & Sanitation but are unwilling to regard them as to be trusted to in place of Vaccination.
They say that there is no experience on which to go. Even in Australia where there has been the nearest approach to a trial of Isolation without Vaccination, the people have not been entirely un-vaccinated. We must also remember several important conditions in which Australia differs from England, ie - Small pox has only appeared from time to time, the colonies are of great extent & with few large centres of population, the number of ports is not great, the vessels comparatively few, & from a long distance. Also in Australia there is compulsory

Maj Rep 451-499

Maj Rep 500-508.

Maj. Rep S. 451-499

Maj Rep S. 500-508

removal to quarantine for 21 days of all persons who have been exposed to infection, the difficulties in the way of which in this country would be insuperable. For the proper carrying out of Isolation there must always be a hospital ready with sufficient accomn.odation. But there are no means of estimating the amount of accommodation likely to be required, as epidemics vary greatly in their attack rate & fatality. Even in Leicester where the system of Isolation was best, the preparations were inadequate in 1892-3. And Leicester itself was not an altogether unvaccinated town. If a town were completely unvaccinated, there is no saying how an epidemic might spread, & what calls might be made on hospital accommodation if all the cases were isolated. Another point is that the massing of large numbers of patients together is in itself a means of spreading the disease. It was in consequence of this that the Metropolitan Asylums Board had to move the Smallpox patients in their London

hospitals to hospital ships moored in the Thames 20 miles below London. In conclusion the Majority state that, though extremely valuable as an ally to vaccination, isolation is not to be relied on in its stead. At the same time they think that Isolation should be carried out as far as possible, & to this end make certain suggestions in Sections 504-6 as to the providing & building of Isolation Hospitals, & the giving of compensation to those Isolated. They would also favour the making of the vaccination & sanitary authorities identical if this be possible.

Remarks. - Vaccination having been proved to be a preventative against Smallpox, the proposal to replace it entirely, by even a much surer method than Isolation has yet been proved to be, seems rather foolish. There is no proof that Isolation methods would be sufficient of themselves. Isolation, to be complete, would have to include quarantine. If this could be managed I think it is very probable that these methods

would prove efficient. If you could isolate not only every actual case of Smallpox, but also every possibly developing case, then it is obvious that the disease would soon be stamped out. But is it possible? I hardly think so. Would it be possible to discover all the persons who had been exposed to infection even from a single case; if this were done would it be possible to compulsorily remove them to quarantine for three weeks or so: Again would it be possible to provide isolation accommodation for them all. I think that it would probably be found difficult enough to provide accommodation for the actual cases, apart altogether from the possible ones. Also how about doctors, nurses & attendants in Smallpox hospitals. If they were unvaccinated what protection would they have? Isolation would not help them much. Smallpox patients must be attended by somebody, & therefore isolation can never be quite perfect.

The experience of London is no doubt strongly in favour of the value of isolation, but only as an ally to vaccination, for London is not at all an unvaccinated town. Also London enjoys exceptional advantages in the possession of an ideal position for an Isolation hospital ie the Thames 20 miles below London. I fear it would be difficult to find equally suitable positions in many other towns as in those of populous counties like Lancashire. So long as the London cases were treated even in hospital camps in the country, (as at Darenth) Small pox was spread about round these camps. Although, as an ally to vaccination, Isolation is of the greatest value, I do not think the evidence is in the least degree adequate to justify us in running the terrible risk of forsaking vaccination & trusting to it alone.

Fourth Question - As to alterations in the Vaccination Laws.

a In regard to Primary Vaccination - The majority is divided on this question.

Seven members are in favour of a certain modified form of compulsion, to be described immediately, two do not go so far in recommending relaxation of the law, & two favour the abolition of any form of compulsion. Let us first see what are the reasons for this modified form of compulsion & what it consists in. - Those who advocate it say that the compulsion at present employed which simply consists of fines, repeated if necessary, & possibly of imprisonment, does not always compel vaccination. To be really effectual the child would have to be seized & vaccinated against the parent's will. They do not believe that either this measure or the substitution of imprisonment for fines would ever be accepted. The question then comes to be - what form of law based on pecuniary punishment would best secure that vaccination should be as widespread as possible? — At present, Guardians, whose duty it is to put the vaccination laws in motion, are sometimes elected solely because they have promised not to pro-

Maj Report S. 509 - 527.

Maj Rep S. 509 - 527.

-secute those who do not conform to these laws. These Guardians can only be compelled by a "mandamus" issued by the Court of Queen's Bench resulting in their imprisonment on refusal. This has been tried & found useless to procure vaccination. We learn that in 122 out of 648 Unions in England & Wales the Guardians are at present not putting the law in force. We do not think that it would be advisable to transfer the duty of carrying out the Vaccination laws from the Guardians to either the County Councils or the Local Government Board - the only two possible alternatives. It must be noted that it is only in a limited area in England & Wales that Vaccination has fallen into disuse. As a rule the necessity for penalties arises from an objection to vaccination, & not from mere indifference or neglect. Acute opposition usually spreads from a local centre, which centre is often caused by some parent objecting from conscientious reasons, being punished, & then being regarded by the neighbours as a martyr.

He excites at the same time their sympathy with him & their opposition to the practice. We think repeated penalties undesirable, as tending to increase the opposition more & more by the irritation induced. A less stringent law would probably in the end secure more vaccination. To abolish compulsory vaccination altogether however would lead to many children being left unvaccinated owing to the neglect of their parents. We think a scheme should be devised by which compulsion would no longer be applied to those with conscientious objections, while as regards all others the law should stand as at present. To prevent an objection being urged as an excuse for neglect, the objecting parent should have to attend before the local authorities & satisfy them as to his objection, or in some other way take some considerable amount of trouble. We think this scheme should be tried temporarily just for five years.

This then is the modified form of compulsion

suggested. Two members (Sir Guyer Hunter, & Mr Hutchinson) however think "that the only change made should be to permit the magistrate", before whom the person refusing is summoned, "to accept a sworn deposition of conscientious objection & to abstain from the infliction of a fine." Two other members (Mr Whitbread & Mr J.A. Bright) are in favour of the abolition of compulsion. They think that mere negligence would be removed by offering vaccination at the child's home & providing for medical treatment of any untoward results. They think it would be best to leave the parent free to accept or reject this offer.

Maj Rep S 537

Maj Rep S. 537

Maj Rep S 537.

Maj Rep S. 537

The Minority are of course against compulsory vaccination, though not with the object of having vaccination made more widespread as in the case of the Majority. Their arguments therefore need not be gone into.

Min. Rep. 274-303

Min. Rep S. 274-303

b. In regard to Revaccination

As in regard to Primary Vaccination, the Majority is divided also on this question.

Maj Rep S 533-4

Nine members think that the difficulties in the way of making Revaccination compulsory are too great. These difficulties are the constant movement of the population, & the risk of increasing the hostility to vaccination. They think however that parents should have enforced on them the importance of revaccination not later than the age of 12 years, & that in the event of an epidemic special facilities should be afforded for revaccination. Two members are of opinion that "in spite of these difficulties revaccination at the age of 12 ought to be made compulsory."

Maj Rep S. 533 & 534.

Maj Rep S 537.

Maj Rep S 537

The Minority are of course against compulsory Revaccination.

Remarks -

It is impossible to say what would be the effect of the modified form of compulsion described above. Even if only tried for five years, the results might be serious if it failed. All the members of the Commission are in favour of "conscientious objections" to vaccination

being respected. I can understand this when done with the object of increasing the amount of vaccination by diminishing irritation, but, apart from this, I cannot see why these conscientious objections should be respected. In the case of a non-medical parent they would mean, I suppose, that he was unwilling to subject his child to the risks of vaccination, & preferred letting it run the risk of catching & perhaps of spreading Smallpox. But should such an objection be allowed to prevail against the decision of the State that vaccination should be compulsory, — a decision only come to after a careful calculation of both the risks & benefits, by the men most able to judge.? Even if the parent were a medical man & really capable of forming an opinion on the subject, I do not think he should be allowed to avoid vaccination on account of his opinion. I think myself that before this rather risky modified compulsion scheme is tried, the method

in vogue in Scotland should be first tried in England & Wales. By this method the official vaccinator attends at the defaulting parent's home and vaccinates the child unless consent to do so is refused. The majority indeed suggest this in section 5-29. It renders Vaccination both less burdensome to the parent & less dangerous to the child. If the parent refuses I think he might still be liable to prosecution. This method has answered well in Scotland where the opposition to vaccination is uncommon & I think it would be advisable to try it first in England before relieving even all penalties patient parent with "conscientious objections."

With regard to Revaccination the only logical position seems to be that of the two members who advocate a second vaccination at the age of 12. The benefits of this, as shown in the Report, are great & I do not think the difficulties are at all insuperable. The difficulty

produced by the movement of the population would hardly, I think, be sufficient to prevent a single revaccination at the age of 12. Children up to that age ought not to be very difficult to trace. Beyond that age however it is probable that further revaccinations would be difficult of not impossible to secure. The second difficulty suggested, ie that it would increase the opposition to vaccination, seems hardly likely. A parent who might object to a weakly infant being vaccinated would not probably object much to the same child being vaccinated when grown into a healthy boy or girl.
I think therefore that a second vaccination at the age of 12 ought to be made compulsory.

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