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

1896.

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Edinburgh.
In this report all the members of the 
Commission, with the exception of two, 
have expressed their belief in Vaccina-
tion & 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 
ground 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 criticized 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 interest of Vaccination, & have given my own opinion on them. Let us now turn to the Report—

The Commission in the first place set themselves the question to consider—
First Question

The effect of vaccination in reducing the prevalence of, and mortality from Small Pox.

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.

Small Pox seems to have existed in the East during the earlier centuries B.C. Introduced from there it became common in W Europe in the 16th century, increased during the 16th and 17th centuries, and 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 or often much above the rate of 2 per 1000. We learn also from the Bills that the disease was epidemic in character, so 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 9 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
was comparable with the same in
London. The 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
characterized 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
If the greatly increased population, there was also a great decline in the provinces, as 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.

The commencement of the practice of Vaccination dates from the publication of the "Inquiry into the Causes and Effect of the Variola Vaccinae" of Edward Jenner in 1798. In this treatise Jenner recorded just a number of cases in which persons, who had accidentally taken Influenza from the cow, seemed incapable of taking Small Pox, either when exposed to contagion or when actually inoculated with Small Pox.
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 exposure, Jenner describes also some cases which he purposely inoculated with cowpox, in which he showed that those also proved themselves to be insusceptible to Smallpox when tested by the Variolous test. These experiments of Jenner attracted great attention, and 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, and 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 and 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 pusules over the body. Woodville came to the same conclusion as Jenner, that cowpox protects against smallpox. This conclusion speedily found general acceptance in this country, on the continent, and 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 and 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 started from the beginning of vaccination, and 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, but 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, and 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
the evidence only amounts to this—that Jenner in the course of several years
vaccination practice collected 10 instances of insusceptibility to smallpox, in persons
who stated that many years or months previously they had suffered from a disease
which they called cowpox. And in regard to his experimental cases, that they were
only four in number, subsequent inoculation of which within a few weeks or
months, gave results upon which Jenner based his claim that vaccination confers
immunity from smallpox.

Secondly, the value of the "Variolous test" is disputed. It is pointed out that inoculation
when performed even in those who had not
had cowpox, often produced no
erupptive pustules on the body, a yet was
regarded as an effective test. That this
can be well seen in the results obtained
at the end of last century by the
Sutters and by Dinsdale in the modified
form of inoculation which they practiced.
That the results obtained by Jenner when
he applied the Variolous test (ie inoculated)
to those cases to whom he had previously
administered cowpox were hardly less than
those obtained by Guissone & the Suttons
so that Jenner's mild results need not
necessarily have been produced by the
previously inoculated cowpox.

Thirdly, it is said that Woodville's cases
must be rejected as evidence. That those
cases of his in which pustules appeared
on the body are not 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, or that in any case they must
be rejected as evidence of the immunity
conferred by uncontaminated cowpox
against smallpox. That yet it was
mainly in 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
from which in the early years the practice of vaccination was started, so that the bulk of the cases of "vaccination" which during this time were submitted to the Variola test had been associated with this lymph of Worsham's. That there is no evidence on the shape of vaccination pure & simple to establish Jenner's contention.

Fifteenth. It is urged that the decline in Smallpox was too great to have been due to the amount of vaccination which prevailed, so that, if such a small amount was able to cause such a decline, it is strange that its compulsory adoption should have been so unimportant against more recent epidemics.

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?

Firstly. In answer to criticism of Jenner's writing of cases, it is said that such criticisms even if true are of little importance.
If the experience 10 years since has taught me that vaccination is not infallible, that former smallpox will not weigh against smallpox, I will not weigh against smallpox, but the experience of the last century has had great experience in the practice of inoculation. The result of any smallpox is now as clear as that of the 21st century. In regard to smallpox it is now inquired whether 10, 20, or 25 years have elapsed since their appearance. An inquiry of 30 or 35 years ago, that they are therefore entitled to the same protection as smallpox. As evidence that he cases were not denied, if low on at all, that pur to smallpox
All the lymph which he took from the local pustule or rent 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 just as great in one class as the other. Besides, in any case the error was of short duration, then once it was recognized.

Fourthly. It is denied that this lymph of Woodville was the great source of the practice of Vaccination. It seems to us of several other sources, such as the Clark's Farm lymph, Sacco's Lombardy cow pox lymph.

Fifthly. In regard to the decline having been too great for the amount of Vaccination. It is held known 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
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. We 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 re-
presented. 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 if they were 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
a contradictory & I have refrained from
inserting it. The chief point to be noticed
however would seem to be that if Wood-
ville'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
cows 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.

The decrease in Insulation.

The Practice of Insulation consisted in the artificial introduction of the Small pox virus into the system by the insertion of fluid from a various particle 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 smallpox, so that the decline in smallpox was due to the decrease in inoculation, which occurred when vaccination was introduced. Let us just consider shortly the history of inoculation.

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 and in other countries of W. Europe. The attacks produced 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 and 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.
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.

It is said that owing to its being contagious inoculation spread the disease, when introduced into places where smallpox was infrequent. Thus A. Waagehall writing in 1722 instance 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 from 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 inoculation.
persons from spreading contagion. So long as inoculation was not universal, (as such universality was never attained) inoculated persons were centres of contagion to the susceptible. The effect would depend on the proportion 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 a country district which had been exempt from smallpox. And yet the effect of inoculation can be seen even in London where smallpox 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 smallpox were 7.6% of the total deaths, in the last quarter they amounted to 9.27%.

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 or multiply the disease itself". Dr. Heberden, writing in 1801 was of the same opinion.
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 Smallpox 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 Smallpox showed a decline in the last quarter of the 18th century.

Also, the inoculated Smallpox 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 Smallpox.

While therefore inoculation, in account of its contagious nature, may have an unfavorable influence on Smallpox, it would also seem to have a favorable influence on it, and it is probable that between these two influences it had but little effect.
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\%, in the third quarter it rose to 10.3\%, while in the last it fell again to 7.2\%.

This represents a rise of less than 2\% 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 that the death rate from Small pox is proportion to the estimated population, and the total death from Small pox, increased as much in the first quarter, when there was no inoculation, as in the last. When inoculation was widely practiced.
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. What are the arguments in favour of this?

It is claimed that the London Bills of Mortality show in respect to the heading “Fever” 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.

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
Differentiation with regard to Small pox. Also, admitting that insanitary conditions tended 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 were now continue to prevail with regard to the decrease in "Fever." 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 Smallpox in the first quarter of the 19th century. We have seen that the two causes other than Vaccination are decrease in circulation, improved sanitary conditions are inadequate to explain it, so 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 Smallpox 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 smallpox mortality are available. In Scotland a similar system began in 1853, in Ireland in 1864.
The majority therefore now ask themselves the question — does the history of smallpox 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 smallpox mortality at different epochs.
II. The change of the age incidence of smallpox.
III. The fatality, attack-rate & severity of the disease in the vaccinated & the unvaccinated respectively.
IV. Revaccination. VII. Relation between the thoroughness of vaccination & its protective effect.
V. Evidence from foreign countries.

The influence of the spread of — etc.
There exist no figures comparable throughout the period 1838-94 by which we can measure the extent to which at one time as compared with another the practice of vaccination prevailed in England, Wales, etc.
in these 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 and Wales. A similar Act made it compulsory in Scotland and Ireland in 1863. In subsequent years all these Acts were amended and strengthened.

The records kept under the Act of 1871 show the amount of primary Vaccination performed within a certain period of birth of children whose births were registered between 1872 and 1873. These records show that between 1872 and 1883 the proportion primarily vaccinated remained about the same. From 1884 to 1893 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 smallpox mortality in these countries, we find in all a marked though irregular decline, — in England since 1838 and in Scotland and Ireland since 1864. That this diminution should be seen year by year was just to be expected on account of the epidemic character of smallpox. 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 of fatality of the epidemic when it occurs. All that we could expect would be that over a long series of years there should be a diminished mortality from smallpox corresponding with a better vaccinated condition of the people. The occurrence of epidemics therefore does not prove the non-efficiency of vaccination.

This continued decline in smallpox is admitted by the minority, but they attempt to explain it apart from vaccination.
They ascribe it, just as they ascribed the beginning of the decline in the first quarter of the century, to improvement in sanitary conditions, and they bring forward the same argument as before, but brought up to date, i.e., the corresponding decrease in "fevers." They show that this decrease still holds good between 1840 and 1890 as it did between 1830 and 1840, and argue that improved sanitary conditions are the cause of the decrease both in "fevers" as in small pox.

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, i.e., an increased density of population in England and Scotland, and a continually growing proportion of the people living in the large towns in England, Scotland, and 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
ways, that when both are considered, improved san. conditions do not afford
an adequate explanation of the decline in small-pox. Also, it is argued,
why have not these sanitary improvements had a similar effect on other in-
fected diseases as measles, scarlet
fever, & whooping-cough. There has
been no decline in any of these, comp-
parable with that in small-pox.
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 classified as
follows— 1. 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 pure drinking water. V Increased knowledge of contagion & how to avoid its spread.
It is obvious that these sanitary changes do not affect all epidemic diseases to the same extent. The three chief "fevers" are Malarial, Typhus, & Typhoid. How malarial fevers are dependent on swamps & so are abolished by drainage. Typhus is eliminated by the abolition of overcrowding 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 Smallpox. It rather resembles measles in that it is just connected with any particular sanitary fault & therefore improved sanitary conditions form an adequate explanation of its decline.

In reply to this again the Hon.uty say that - as regards the alleged
Varying in the nomenclature of fevers, the Registrar-General has, since 1869, separately distinguished deaths from Typhus Typhoid & Simple Fever, so that the decline has been shared by all. That as regards the alleged analogy between Smallpox, Measles & Whooping-cough, these two latter fevers chiefly affect children, while Smallpox affects all ages, & adults largely.

To this latter argument however the majority again reply that (i) in former days Smallpox 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 or overcome Smallpox 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 improvement, seems to me rather weak. Surely a thinly populated but well-kept and 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 smallpox, 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 smallpox is more dependent on a particular sanitary fault (viz. diet & overcrowding) than measles is. But not probably to the same extent as typhus, typhoid & malaria are. In the whole I think we must reject sanitary improvement 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. We regard the result of the first line of enquiry as favourable to it.

II

Change of Age Incidence of Small Pox.

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 amongst adults. And also this time of

We notice, that the rate rapid
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 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 six recent local
epidemics, either by men appointed by the Commission or by Medical Inspectors
of the Local Government Board. These epidemics were in Sheffield 1887-8,
During these epidemics the percentage of the total smallpox deaths born 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 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 was much greater as follows:

In London from 6.5% in 1883 to 16.4% in 1891.

Derby 12.6% 1882 37.7% 1892.

Leicester 13.8% 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.

The Minority, whilst admitting that there has been a change in the age incidence of smallpox, say that it is not to be explained by vaccination. They say that the it depends wholly on the
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 Fever, also, similar to or not much less than that of Smallpox. That the following table shows that the percentage of deaths under five to death at all ages has fallen considerably in Typhus & Typhoid.

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<td>6.4</td>
<td>6.1</td>
<td>3.8</td>
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<tr>
<td>Typhoid</td>
<td>17.4</td>
<td>16.0</td>
<td>9.3</td>
<td>7.5</td>
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So also in Influenza, for the epidemic of 1890-1 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 previous influences to which the young are especially sensitive that these improvements
are directed; and in proof of this it is asserted that in "healthy" districts the reduction of smallpox 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 life 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...
were after 1880 transferred to malarial diseases. As regards influenza the comparison which has been made between the two epidemics relates to two years only, a is of little value.

As regards the reduction of smallpox 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, smallpox will be more constantly present there, or also more often epidemic than in the country. Therefore there will be more pussons over the age of five years, susceptible to smallpox, 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 smallpox, 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 explanation
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 or setting else was the cause of the change in the Age Incidence of Smallpox so 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 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

<table>
<thead>
<tr>
<th>Group</th>
<th>Vaccinated</th>
<th>Unvaccinated</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 10 years</td>
<td>4151 vaccinated, 200 attacked, 0.7% died</td>
<td>582 unvaccinated, 274 attacked, 49.6% died</td>
<td></td>
</tr>
<tr>
<td>Over 10 years</td>
<td>353 vaccinated, 6 attacked, 1.7% died</td>
<td>228 unvaccinated, 100 attacked, 43.9% died</td>
<td></td>
</tr>
</tbody>
</table>

In London

<table>
<thead>
<tr>
<th>Group</th>
<th>Vaccinated</th>
<th>Unvaccinated</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 10</td>
<td>110 vaccinated, 0 attacked, 0% died</td>
<td>228 unvaccinated, 61 attacked, 26.7% died</td>
<td></td>
</tr>
<tr>
<td>Over 10</td>
<td>1643 vaccinated, 39 attacked, 2.3% died</td>
<td>181 unvaccinated, 38 attacked, 20.9% died</td>
<td></td>
</tr>
</tbody>
</table>

These figures (for London) include only those who 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
io. even then, only 4.6%. While, over 10,
it only reaches 4.2%, as against un-
vaccinated mortalities of 26.7% & 20.9%.
In Ipswch., under 10 -
of 48 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 Harington, 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 dead = 36.7%
Over 10 - 870 " 299 dead = 34.3%.
Taken together 2319 " 822 " = 35.4%.
Notice the closeness of the fatalities above
of those 10 years.
The Vaccinated.

Under 10 - 879 attacked 16 died = 1.47%

Over 10 - 8131 " 445 " = 5.47%

Taken together 8720 " 461 " = 5.37%

These facts afford strong support to the view that vaccination has a powerful influence on the fatality of smallpox. If not, then these classes 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 years.

B. Let us now take the evidence to be derived from three London Hospitals - The Smallpox Hospital. Mr. Jenner's observations made through 32 years in respect of 19,467 cases, showed a fatality amongst the unvaccinate 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 | Vace. attacked 8234, died 869 = 10.5%  
--- | ---  
Vaccinated | 2169, 938 = 43.6%  
Under 10 | 1286, 130 = 10.1%  
Vaccinated | 1032, 465 = 45.0%  
Over 10 | 6928, 732 = 10.5%  
Vaccinated | 982, 375 = 38.1%

Fulham Hospital (1880-8)

Total cases | Vace. attacked 2226, died 263 = 11.8%  
--- | ---  
Vaccinated | 358, 165 = 46.9%  
Under 10 | 202, 16 = 7.9%  
Vaccinated | 168, 78 = 46.7%  
Over 10 | 2024, 247 = 12.2%  
Vaccinated | 190, 87 = 48.7%

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 Smallpox in the first place, the minority make a comparison between the fatality of Smallpox 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—

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, which would also raise the fatality in this class.

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

IV. That in confirming smallpox the distinction made between vaccinated
A unvaccinated is apt to be inaccurate owing to obliteration of the vaccination mark. 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 Small-pox. 

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:

Vaccinated

Attacks: 870  Death: 16  Fatality: 2.8 %

Unvaccinated

Attacks: 1235  Death: 375  Fatality: 30.3 %

The contrast is very striking.

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

IV. This is very rare.

V. The "doubtful" cases were, as we have been put amongst the vaccinated class, and their high fatality would raise that of the class. Besides, if vaccination has no relation to small pox, accurate division into vaccinated and 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.

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 pub-
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 vaccination 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. 8227) 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.
IV. The Attack-rate of Smallpox amongst
the Vaccinated & Unvaccinated respectively.

A. Evidence from the six epidemics.

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 separately, 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 Majors 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 and subtracted from the vaccinated class. The amended figures are given below—

<table>
<thead>
<tr>
<th>Age</th>
<th>Vaccinated</th>
<th>Attack Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ages</td>
<td>266,797</td>
<td>4151 / 1.58%</td>
</tr>
<tr>
<td></td>
<td>7315</td>
<td>882 / 7.5%</td>
</tr>
<tr>
<td>Under 10</td>
<td>67,603</td>
<td>353 / 0.5%</td>
</tr>
<tr>
<td></td>
<td>2,892</td>
<td>228 / 7.8%</td>
</tr>
<tr>
<td>Over 10</td>
<td>195,945</td>
<td>3,774 / 1.9%</td>
</tr>
<tr>
<td></td>
<td>4,389</td>
<td>322 / 7.3%</td>
</tr>
</tbody>
</table>

The contrast is still very striking.

The above figures are for the total enumerated population. Let us now take them in the houses invaded by Smallpox. Which figures are of course also amended in the same way.
All ages. Vacci. 17814 - attacked 4151 = 23.3 %
        Vacce. 942 -        522 = 58.6 %
Under 10. Vacci 4419 -        353 = 7.9 %
        Vacce. 337 -        228 = 67.6 %
Over 10. Vacci 13304 -        3774 = 28.3 %
        Vacce. 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 and unvaccinated is just as striking.

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 and 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.

Arguments against Vaccination having had an effect in the Attack Rate.

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. 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
Vaccinated amongst those born before the Vaccination Acts of 1853, 1871, and 1876 was probably very much less than 84%, it is not likely that the proportion of the vaccinated in the whole population of Sheffield at the beginning of the epidemic much exceeded 90%.

One 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 and the unvaccinated closely approached the proportion between the two classes in the population generally. That the same thing holds good in the other towns and 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 smallpox have been vaccinated.

To this argument about the London smallpox Hospital, the Majority reply...
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 present the proportion of vaccinated in this hospital being compared with the same proportion in the population of London.

Remarks: I think it is probable that in relation to the amending of the figures at Sheffield, Dr. Barry's estimate of 28 per cent 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 poor 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 to 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? An explanation is forthcoming except that of vaccination. The experience of the London Smallpox 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 Smallpox Hospital.

To sum up, I think it has been easily proved that vaccination has had a favourable influence on the Attack Rate of Smallpox.

The Severity of type of Smallpox amongst the Vaccinated & Unvaccinated respectively. The results shown by the six epidemics will be seen more clearly if we divide the cases.
into two classes—mild & severe, the former including the varioloid &�variola, the latter the coherent & convulsant. We now get the following results—

<table>
<thead>
<tr>
<th></th>
<th>Milder</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheffield</td>
<td>82.8</td>
<td>17.2</td>
</tr>
<tr>
<td></td>
<td>18.5</td>
<td>81.5</td>
</tr>
<tr>
<td>Lewisham</td>
<td>82.0</td>
<td>18.0</td>
</tr>
<tr>
<td></td>
<td>23.1</td>
<td>76.9</td>
</tr>
<tr>
<td>Leicester</td>
<td>81.4</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>27.2</td>
<td>72.8</td>
</tr>
<tr>
<td>Warrington</td>
<td>78.2</td>
<td>21.8</td>
</tr>
<tr>
<td></td>
<td>29.4</td>
<td>70.6</td>
</tr>
<tr>
<td>London</td>
<td>89.0</td>
<td>11.0</td>
</tr>
<tr>
<td></td>
<td>38.2</td>
<td>61.8</td>
</tr>
</tbody>
</table>

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 severe cases amongst the vaccinated being quite insignificant.

Two objections are brought by the minority against these results, one in part 93...
...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 varioloid orivate, etc. I do not think however that this objection will apply to the broader division into mild and severe.

I think that vaccination has been proved to have a favourable influence on the severity of type of smallpox.

Thoroughness of Vaccination and the Fatality and Severity of Smallpox.

By thoroughness is meant the number of the marks, their size and formation. So 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 and the severity.

As regards fatality:

<table>
<thead>
<tr>
<th>Number of Vaccinations</th>
<th>Cases</th>
<th>Died</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cicatrices or one only</td>
<td>95</td>
<td>13</td>
</tr>
<tr>
<td>Two cicatrices</td>
<td>289</td>
<td>24</td>
</tr>
<tr>
<td>Three</td>
<td>372</td>
<td>21</td>
</tr>
<tr>
<td>Four</td>
<td>99</td>
<td>2</td>
</tr>
</tbody>
</table>
As regards Severity

<table>
<thead>
<tr>
<th>No. cerebri or one only</th>
<th>Mild</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td>2</td>
<td>79%</td>
<td>21%</td>
</tr>
<tr>
<td>3</td>
<td>92%</td>
<td>8%</td>
</tr>
<tr>
<td>4</td>
<td>94%</td>
<td>6%</td>
</tr>
</tbody>
</table>

It will be seen that there was a distinct diminution both in the fatality and the severity of the disease in proportion to the number of marks. Lewesbury.

As regards size of marks.

Lindon divided the marks into three groups as to size - marks whose total area measured 1/2 or more of a sq. inch, marks whose total area was 1/3 but less than 1/2 sq. inch, 4 marks whose total area was less than 1/3 sq. inch. Results:

1st group cases 266 deaths 3 fatality 1.29%
2nd group 27 1 37
3rd group 17 1 58

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

As regards Texture. Here Lindon 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 Fatalities 1.37%  
2nd . . . . 32 . . . . 0 . . . . 0  
3rd . . . . 90 . . . . 2 . . . . 2.2  

The figures are small and the result somewhat inconclusive.

London As regards treatment S. Luff divides the marks simply into "treated" & "untreated." 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 S. Luff divided them according as they were under .25 square, from .25 to .5 square, or over .5 square. Results.

<table>
<thead>
<tr>
<th>Percentage of seen attacks</th>
<th>Percentage Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>All under .25 square</td>
<td>12.6</td>
</tr>
<tr>
<td>&quot; .25-5 &quot;</td>
<td>4.6</td>
</tr>
<tr>
<td>&quot; over .5 &quot;</td>
<td>3.9</td>
</tr>
</tbody>
</table>

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 treatment there is no evidence of the same importance. The same holds with regard to the area of the marks.

Objections by the Minority — 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.

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 of toxination, 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.

Revaccination.

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.

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

Number of successful cases: 64,431, attacks 27

1. Attack rate 0.047, fatality 3.7%.

If we compare this with the attack rate
2. Fatality amongst the once vaccinated,
3. The unvaccinated we get the following:

- Vaccinated: Attack rate 0.047, Fatality 3.7%
- Unvaccinated: Attack rate 0.26, Fatality 54.2%

Leicester

In one group of infected houses, the attack rate was 11%, amongst the unvaccinated;
2. Amongst the once vaccinated, 14.6%, amongst the once vaccinated.

In another group, it was 16.1%, amongst the unvaccinated; 38.3%, amongst the once vaccinated, 89.6%, amongst the unvaccinated.

London

- Vaccinated: Attack rate 0.047, Fatality 3.7%
- Once vacc. (Over 10): 4.2
- Unvacc. (Over 10): 20.9

Warrington

- Vaccinated: 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 at 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. Nine 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 revaccinated. None 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 Smallpox Hospitals in Sheffield
Revaccinated 81. Attacked 1. (Very mild)
Since vac. 67 6 (One died)
Staff of Aikin St. Hospital in Warrington
The only two attacked were the only two
not revaccinated.
Staff of the Highgate Smallpox 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 Smallpox. In about 10 years
time after this therefore, almost all the
men in the army would have been vac-
cinated since enlistment, the earlier
recruits having nearly all left the army.
From 1847-58 there was no decline in
the death rate from Smallpox amongst
the troops. Since then however the death
rate has diminished & continued
dropping up to the present.

Similar evidence can be derived from
the experience of the British Navy.
Objections raised against the efficiency of Revaccination.

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 4.97% (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:

<table>
<thead>
<tr>
<th>Country</th>
<th>Attack Rate</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>1.0</td>
<td>0.1</td>
</tr>
<tr>
<td>The Colonies</td>
<td>3.0</td>
<td>0.0</td>
</tr>
<tr>
<td>India</td>
<td>15.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Egypt</td>
<td>42.0</td>
<td>11.9</td>
</tr>
</tbody>
</table>

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 siege of Paris, 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 in the theory that a certain tolerance is acquired by repeated exposure to contagion, so that in those who are not at once attacked the receptivity to the disease becomes exhausted.

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 policy of withdrawing the vaccine matter to prevent vaccinia.

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
Successfully revaccinated, is not stated. Further 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, and 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 typhoid in a year was 19. In regards the medical officers in this hospital, in the five years from 1862-66 none of the medical officers took the disease & one died. The majority of section 329 also make a similar comparison between small-pox and scarlet fever, typhoid & diphtheria as regards their attacks on
the Medical Staff, but as this seems open to the objection urged by the Minority in section 151 that "these 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, and 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 Ministry chose for exemplifying this variation is the one in which Smallpox was very acute in Egypt. The explanation of the immunity of the immunity engendered by Smallpox 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 Smallpox.

Foreign Evidence

Some facts are worthy of note:
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 Smallpox
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, (1838-69 = 35 years - total Smallpox
deaths: 77.

3. Before the Prussian compulsory vaccination
law in 1874, the number of Smallpox
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 60-80 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 no hardly in
reply to the majority's argument.

The first question, that is as to the
efficacy of vaccination, has now been
fully answered. In whatever way the
question has been considered, the results
have been uniformly favorable to the
opinion that vaccination exerts an influence
antagonistic to Smallpox. 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
Smallpox, it ought not to confer protec-
tion from Smallpox, as an attack of one
disease does not give immunity against
another disease. It is a question

however whether Cattle Vaccination & Smallpox are
identical with each other or not. In
one sense they certainly are not convertible.
Smallpox cannot be caused in the cow
identical with smallpox in man, or cow-
pox given to man cannot cause small
smallpox. 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 smallpox virus, produced,
was introduced into man, results which
were indistinguishable from those of vac-
cination. The evidence is at least suffi-
cient to remove the force of this objection.

Summing up of the Majority of the Evidence
on the first question - the efficacy of vaccination.

1. Vaccination diminishes the liability to be
attacked by smallpox, lessens its fatality,
and diminishes the severity of the
attack if it occurs.

2. The protection is greatest during the 9 or
10 years succeeding the operation, but
soon altogether ceases.
3. After this period the power to protect against attack, or 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 vaccine matter be introduced in three or more places, or if the marks cover an area of at least ½ square.

**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 certain diseases can be caused by it.

I. *Encephalitis* & various forms of septic poisoning. This class includes about half the cases of vaccinal injury. They arise from causes which cannot be screened & prevented, & they are more frequent & severe after the use of calf than of humanised lymph.
Post-vaccinal erysipelas may vary from little more than an inflamed arm to great severity resulting even in death. From 1879 to 1880 there were 370 deaths certified in England and Wales as due to this disease, and 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 Wrexham in 1882 and at Harrogate 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, as they quote Sir Barlow's report in one period of such cases, in which he says "it appeared to the Inquiry that some septic material had been introduced at the time of vaccination, so that this was mainly responsible for the untoward result obtained." The minority also urge that there is evidence that vaccination...
is often approximately related to erysipelas 
so that this is not always due to merely
accidental contamination. That vaccine
lymph is believed by high authorities to
contain the germ of erysipelas.

II. Vaccino-Syphilis.

According to both Mr. Hutchinson &
Mr. J. Lyon, syphilitis in vaccine
is not always to be detected, the vaccine 
lymph may contain the syphilitic
contagium in full vigour without the
Syphilitic infant itself showing any
outward trace of Syphilis. This being
so the implanting of Syphilis in
vaccination need not always be due
to carelessness. It is impossible to avoid
an adventure with blood, as, according
to Dr. Husband all lymph contains
blood cells. Dr. Brighton 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, a child at the Leeds Dispensary on
the 1st July 1889. Four members of the
Informally, 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 Ballard, 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 Leigh, vaccination can
cause a certain train of symptoms in-
distinguishable from those of Syphilis, apart
from contamination with Syphilis.

III. Leprosy & Vaccination.

It would seem that leprosy can be conveyed
to healthy persons by leprous discharges on
gaining access to raw surfaces, 9 some
believe that in leprous countries native
lymph may transmit leprosy. The Bacillus
of Leprosy has been found in vaccinal lymph.

IV. Skin Eruptions & Vaccination.

These are frequent after vaccination. They
may be trivial in character or may be
serious & even fatal.
Tubercle & Vaccination

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

Questions to these alleged injurious effects of vaccination.

It is admitted in the first place that there is some risk in vaccination. Everything depends on the character & extent of the risk. Those who attack vaccination on this ground adopt two lines of attack & an alleged increase in the number of deaths from certain diseases corresponding with a spread of the practice of vaccination. Particular cases in which injury or death is alleged to have been caused by vaccination. Let us take a first.

a. During the period 1847-75, when the amount of vaccination was steadily increasing, if 14 diseases often ascribed as due to vaccination were showed an increasing
four a decreasing, as the past 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 1838-42 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 and Wales) during the first three months of life, a period practically unaffected by vaccination in Scotland. The age of compulsory vaccination is six months, so here the increase in infantile Syphilis has been in the first 6 months, thus being no increase in the second half of the first year of life.

<table>
<thead>
<tr>
<th>Year</th>
<th>0-6 Months</th>
<th>6-12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1835-63</td>
<td>875</td>
<td>109</td>
</tr>
<tr>
<td>1865-75</td>
<td>612</td>
<td>118</td>
</tr>
<tr>
<td>1875-87</td>
<td>647</td>
<td>109</td>
</tr>
</tbody>
</table>
In Ireland infantile Syphilis has largely decreased recently (despite compulsory vaccination). Also if we compare the infantile mortality from Syphilis in Leicestershire with that in England and Wales, we find that while in the latter there was in the period 1863-7 an increase of 24.7% over that in the period 1853-7, in the former the increase between the two periods was only 6.3%. So that badly vaccinated Leicestershire compares unfavourably with England & Wales. While vaccination was much more practised. If it is objected that Leicestershire 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 Puerpelas - This also largely affects children in the first three months of life - the pre-vaccination period. The infantile mortality from Puerpelas has been decreasing in the whole of the United Kingdom while there has been a slight increase in the period 1864-87 as compared with the period 1855-63. This increase has been even less in the second six months than
in the first, i.e. 33.7% as compared with 52% again while in Sicca there was an increase of 41.5% in the period 1863-7 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 a due to improved diagnosis. This is shown by the deaths from inaccurately stated disease as "tumour" etc becoming smaller, or by the increase of mortality of cancer being much greater amongst males than females in the latter of whom the disease is more commonly diagnosed through being inaccessible.

In relation to Tabes Mesentérica a Scrofula. — Although there has been an increase recently in the mortality from these diseases, yet the mortality from allied disease, such as Phthisis has decreased. Also the increase
has been as great in Leicester as in England and Wales.

In regard to Pneumonia, Bronchitis, Diarrhoea, and Skin diseases, there is no evidence that they have increased owing to vaccination. Compare again Leicester and England and you will find:

<table>
<thead>
<tr>
<th>Disease</th>
<th>Leicester</th>
<th>England and Wales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhoea</td>
<td>14.2%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Tubercular</td>
<td>12.8%</td>
<td>73.3%</td>
</tr>
</tbody>
</table>

Finally, the general infantile mortality has decreased in Leicester 2.8% and in England and Wales 7.5%.

Let us now take the second line of attack, which consists in the tracing of particular cases of injury or death following vaccination. From 1859-80 the deaths returned as due to encephalitis were recorded. After 1880, deaths from post-vaccinal encephalitis were recorded under the heading of "causes of other effects of vaccination." From 1881-85 there were 283 of these cases. From 1886-91 there were
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 death 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 inquiries 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, Puerperal is credited with ⅓ of the deaths. If cases of Pyaemia & Septicaemia be added they form ⅔ of the deaths. What circumstances will cause these diseases in vaccinated children? The lymph contains organisms, & some contagious material may be conveyed by it at the time of vaccination, or by the vaccinator.
himself. In some cases when it was conveyed by the lymph the arm of the vaccinator was only slightly inflamed. If the contagion 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, Ergotism was present in the vicinity, in other the home of the child was insanitary, in other lack of care on the part of the child's attendant, 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.

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 expansion of the opinion that Syphilis could not be com-
communicated by vaccination. On account of the fact that the symptoms of Syphilis may be closely approached by those of other diseases, all evidence unprejudiced in regard to dates, account of the vaccination 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. Creech'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. As regards actual particular cases - the case of Mrs. Ward of Leeds was no doubt Syphilis, but it was doubtful whether the Syphilis was acquired at Vaccination. Of the six cases of Mr. Holme 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 as 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. Of the cases in which there was a suspicion of Syphilis were reported on by the L.C.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 cause of death was most unusual. It is very doubtful whether the case was one of Syphilis at all. There was no Syphilis in the vaccinizer or in his family history; there was no trace of it in the co-vaccinators from the same lymph. Further credited the vaccinator have communicated it. The case was probably one of scarlatina or blood poisoning, the direct result of vaccination, but not syphilitic at all. As regards the Second 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 38 non-fatal cases investigated on our behalf, 36 were not cases of syphilis at all. I was a case of inherited syphilis, of 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.

As regards syphula

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.

As regards skin diseases

The same may be said of these as was said of syphula. 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 Lepra — but only, in there, is 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 Re-vaccination — In respect to Syphilis, Re-vaccination stands in the same position as primary vaccination. In respect to other risks they are even less in Re-vaccination.

As regards the respective advantage of human and calf lymph — In respect to Syphilis and Lepra calf lymph wholly excludes all danger; in respect to other diseases, they stand on the same level.

To sum up, we think that “the dangers are insignificant when considered in relation to the extent of vaccination work done”.

The Inquiry Committee suggest the following means as likely to prevent or lessen these ill-effects — the use of calf lymph, the same to be part within the reach of all, the extension of the age period for vaccination.
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 Sebphiles and
Septic diseases including Erysipelas, Pyrexia
& 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 as a hole.
taken as a whole, although in unvaccinated
districts 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 some 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 Diphtheria, 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 Vaccinator. The risk is however entirely done away with by the use of calf lymph. The argument of the Minority that the latter can, 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; or how far can these measures be relied on in place of Vaccination?
In this question the majority agree with the minority to this extent, that they think that there are measures which should be employed in conjunction with vaccination against smallpox. They deny however that the evidence is strong enough to justify us in trusting to these measures alone, 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, or in places where they were most thoroughly carried out. Let us see therefore what they say. The means which they would use are, broadly speaking, sanitation and isolation. Smallpox is closely related to neglect of sanitation, & 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 Mr Farr constructed in 1875 in order to ascertain
the effect of healthy surroundings on 
epidemic diseases we find the following —
for every million born alive there would
die by Smallpox —
In healthy districts 23.59
In England 68.21
In Liverpool 81.41.

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 Smallpox during this century.
In the beginning of the century the con-
tagiousness of Smallpox was just dis-
 tinctly stated by Boerhaave. In 1763
Rast of Lyons, & in 1777 Hanjarta 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 Smallpox
in 1870-72 again caused attention to be
directed to them. Owing however to vac-
cination having been relied on as a pre-
ventative, the disease in this epidemic
had got too firm a hold on the population, for the hurriedly built Isolation Hospitals to be able to do much to prevent the diffusion of the disease. In 1879 & in 1889 arrangements were made for the removal of Small-pox patients into the hospitals of the Metropolitan Asylum 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 1889 notification became compulsory in London, & in 1885 the Metropolitan Asylum 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 partly 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 8.5% in 1892. The experience of Glasgow gives the same result. In 1867 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 smallpox deaths.
In the 10 years 1865-75 there were 971 smallpox deaths.
In the 20 years 1875-95 there were 89 smallpox deaths.

In Warrington, Leicester, Sheffield, Halifax, Bradford & Leeds similar results have been obtained, so we are therefore led to the conclusion that the best way of stamping out smallpox is to prevent...
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 does 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, i.e. 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...
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 accommodation. But there are no means of estimating the amount of accommodation likely to be required, as epidemics vary greatly in their attack rate and 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, and 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, vaccination, isolation is just to be relied on in its stead. At the same time they think that isolation should be carried out as far as possible, and to this end make certain suggestions in sections 504-6 as to the providing and 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 Small-pox, 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, or attendants in Small-pox hospitals. If they were unvaccinated what protection would they have? Isolation would not help them much. Small-pox patient 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 i.e. the Thames 26 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 Blackheath, smallpox 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 forfeiting vaccination by trusting to it alone.

Fourth Question—As to alterations in the Vaccination Laws.

As 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, a two favour the abolition of any form of compulsion. Let us first see what are the reasons for this modified form of compulsion and what it consists in. Those who advocate it say that the compulsion at present employed which simply consists of fines, repeated if necessary, and possibly of imprisonment, does not always compel vaccination. To be really effective the child would have to be seized and 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-
- 4.  These Guardians can only be com-
pelled by a "mandamus" issued by the  
Court of Queen's Bench resulting in their  
imprisonment on refusal. This has been  
found useless to procure vaccination.  
We learn that in 122 out of 648 Unions  
in England & Wales the Guardians are  
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 noticed that it  
is only in a limited area in England &  
Wales that vaccination has fallen into  
disuse. As a rule the necessity for penal  
laws arises from an objection to vaccina-
tion, not from mere indifference or neglect.  
Acute opposition usually spreads from a  
local centre, which centre is often caused  
by some parent objecting from conscienti-
ous reasons, being punished, & then being  
regarded by the neighbours as a martyr.
He expresses 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 regard 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 first for five years.

This then is the modified form of compulsion
Suggested. Two members (Sir Henry Bute and W. Hutchinson) however think that the only change made should be to permit the magistrate before whom the person refusing is summoned "to accept a personal deposition of circumstances objective to substantiate the infliction of a fine." Two other members (Mr. Whitbread and Mr. J. A. Bright) are in favour of the abolition of compulsion. They think that more negligence would be removed by offering vaccination at the child's home or providing for medical treatment if any untoward results. They think it would be best to leave the parent free to accept or reject the offer.

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.

In regard to Infanctinisation
As in regard to Primary Vaccination, the Majority is divided also on this question.
Three members think that the difficulties in the way of making Re-vaccination 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 informed of the importance of re-vaccination not later than the age of 12 years, and that in the event of an epidemic special facilities should be afforded for re-vaccination.

Two members are of opinion that "in spite of these difficulties vaccination at the age of 12 ought to be made compulsory."

The minority are of course against compulsory Re-vaccination.

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 arc in favour of 'consentious objection' to vaccination.
being respected. I can understand this when
alone 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 un-
willing to subject his child to the
risk of vaccination, if preferred letting
it run the risk of catching or 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 must 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 the rather mildly 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 & vaccinates the child unless consent to do so is refused. The majority indeed suggest this in section 529. It renders vaccination both less burdensome to the parent & less dangerous to the child. If the parent refuses I think he ought still to 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 from all penalties patients parent with "conscientious objections."

With regard to Re-vaccination the only logical position seems to be that of the two premiers 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 pop-
ulation would hardly, I think, be
sufficient to prevent a simple
re-vaccination 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 if not impossible to secure.
The second difficulty suggested, i.e.
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 vac-
cination at the age of 12 ought to
be made compulsory.