1897. Session II.

PARLIAMENT OF TASMANIA.

CENTRAL BOARD OF HEALTH:

REPORT FOR THE YEAR 1896.

Presented to both Houses of Parliament by His Excellency's Command.

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(No. 45.)



CENTRAL BOARD OF HEALTH.

REPORT FOR THE YEAR 1896.

TO THE HONOURABLE THE CHIEF SECRETARY.

Sir,

WE have the honour to submit to you the following Report of the work of this Department in administering the Public Health Acts, the Vaccination Act, the Quarantine Act, and the Chinese Immigration Act, during the year 1896.

CENTRAL BOARD.

1. We regret to have to record the loss we have sustained during the year by the death of two of our colleagues, Major-General Tottenham and Mr. J. Wemyss Syme, both of whom—the one by his business capacity, and the other by his energy and zeal in all sanitary matters—had greatly furthered the work of the Board. Their places have been filled by the appointment by the Governor in Council of Mr. R. S. Bright, M.R.C.S.E., and Mr. E. M. Fisher. During the year we felt it desirable to strengthen the representation of the medical profession on the Board, and we obtained in an amendment of the Health Acts a provision that for the future the Government Medical Officer should be *ex officio* a member of the Central Board of Health. Accordingly, Mr. E. J. Crouch, M.R.C.S.E., has taken his seat as one of our colleagues. We have still but one paid officer, the Engineering Inspector and Secretary, who is assisted by a volunteer clerk without salary.

LEGISLATION.

2. During the last session of Parliament an Act was passed containing the majority of the amendments that we have called your attention to in our Reports of several years past. The chief results of these amendments are that infectious and contagious diseases are better defined, and completer provisions are made for their notification; that the wilful exposure of the body of a person who has died of any infectious disease is made penal; that the powers of Local Boards to prevent the spread of infectious disease, and to control the milk supply of their districts, are extended; and that the closing of polluted wells is rendered easier. Sections of the Amendment Bill relative to the sanitary inspection of dwelling-houses before occupation or re-occupation, to making the appointment or removal of the Sanitary Officers and Slaughter-house Inspectors by Local Boards subject to the approval of the Central Board, and to the prevention of the pollution of streams by water-closet sewage, were rejected by Parliament.

HEALTH DEPARTMENTS OF OTHER COLONIES.

3. We have had the usual interchange of Reports with the Health Departments of the other Australasian Colonies, and have received much valuable information. From New South Wales in particular we received some publications connected with the control of the milk supply, and relative to the treatment of snake-bite and other matters of such great general utility that we requested, through you, the Sydney Department to furnish us with copies to be distributed to every Local Board of Health in Tasmania. This request has been complied with with respect to all the documents referred to except the milk regulations. These are being revised, and we have been promised copies on their republication.

(No. 45.)

LOCAL GOVERNMENT BOARD OF ENGLAND.

4. A Royal Commission having been appointed in England to inquire into all matters connected with tuberculosis, we forwarded to it, at its request, all the information we could obtain on the subject in Tasmania.

DEPARTMENTAL WORK.

Districts without Local Boards.

5. Owing to our failure to find qualified persons willing to act as Local Boards of Health in the Health Districts of Mersey, Russell, Rural Scottsdale, Selby, the Straits Islands, and Tasman's Peninsula, the Central Board is still obliged to act as Local Board in them under the provisions of the 6th Section of the Public Health Act, 1887. We regret that this condition of things should so long continue. It would be impossible for us to fulfil our duties in this respect but for the valuable assistance we receive from the Police Department. Both in these Districts, and in others where there are Local Boards without rating powers, the services of the local police, rendered mostly without any additional pay, are of great use, and are highly appreciated by us.

Special Inspections, and resulting Work.

6. During the year our Engineering Inspector made special visits of inspection with regard to health matters to Bellerive, Beltana, Bothwell, Brighton, Clarence, Clyde River, Corinna, Dundas, Evandale, Glenorchy, Gormanston, Hamilton, Hobart, Invermay, Kingston, Launceston, Lefroy, Macquarie, New Town, Queenstown, Rural Queenborough, Selby, Strahan, Ulverstone, Waratah, and Zeehan. Among the more important of these inspections were those connected with the water supply of the towns of Bothwell and Hamilton as derived from the River Clyde. As a result of these the River Clyde Trustees and the Municipalities of the two towns have agreed to request Parliament for an amendment of the River Clyde Act, so as to obtain power to ameliorate the present condition of things.

New Local Boards and Town Boards.

7. In consequence of the rapidly increasing population in the Mount Lyell district, and the consequent aggravation of the insanitary condition of things, a Health District was defined at Queenstown, being part of the still too extensive Health District of Macquarie, and a new Local Board of Health appointed by the Governor in Council. Subsequently the inhabitants of the Town of Queenstown petitioned to be proclaimed a Town under the Town Boards Act, and this petition has been granted since the close of the year. We regret that such towns as Beaconsfield, Burnie, Gormanston, Latrobe, Lefroy, Waratah, and Wellington are still without municipal government under the Town Boards Act. We are glad to understand that during the current year the first-named of these towns will probably be proclaimed.

Public Buildings.

8. During the year we have, after due inspection, approved of the opening of eight public buildings under the provisions of the 114th Section of "The Public Health Act, 1885." Matters were still pending at the end of the year in four other cases.

THE PUBLIC HEALTH.

General Condition.

9. The general health of the Colony during 1896 continued to be good. The death rate from all causes was slightly greater than in 1895, being 11.62 in the thousand living, as compared with 11.38. But when the death rate from causes that are considered preventable—that is, from such diseases as are classed as miasmatic, malarial, and diarrhœal—is alone taken, there was a consider-able decrease from last year. The decrease of mortality that has taken place during the past ten years of the operation of the Health Acts has been very remarkable, for while the deaths from all other causes have diminished during that period by 21 per cent., the deaths from the preventable diseases have diminished 56 per cent. The decreased mortality in 1896 as compared with 1887 means a saving of 789 lives during the year.

Notification of Infectious Diseases.

10. There were 418 cases of infectious diseases notified to us-and dealt with during 1896. The distribution of the cases of typhoid fever, diphtheria, and scarlatina throughout the Colony is given in Appendix 1. to this Report, with the comparative numbers in the five previous years. A plan of Hobart gives the locality of each case marked thereupon.

Typhoid Fever.

11. There were 276 cases of typhoid fever notified, and 45 deaths attributed to it were registered. The number of cases was considerably below that of the preceding year, and the incidence of the disease as regards town and country was greatly changed. In 1895, Hobart and Launceston were answerable for 76 per cent. of all the cases, and the rest of the Colony for only 24 per cent., but in 1896 the two cities were answerable for 46 per cent., and the rest of the Colony

for the other 54 per cent. This change of incidence was chiefly caused by outbreaks of typhoid in the Municipalities and Towns of Campbell Town (13 cases), Glamorgan (12), Hamilton (12), Lefroy (19), Longford (17), and Zeehan (11). This change of incidence most probably accounts for the higher death rate of the disease during 1896, when 15.8 per cent. of the cases were fatal, as compared with 13 per cent. in the preceding year, as hospital treatment and other advantages are more easily obtained in the cities than in the country.

Diphtheria.

12. There were 110 cases of diphtheria notified, and 14 deaths attributed to it registered. These are the lowest numbers recorded by us since 1891. The remarkable outbreak that occurred in Hobart in February has been fully reported upon by Dr. Barnard, one of our colleagues, and by our Engineering Inspector, and their Report has been already presented to Parliament (Parliamentary Paper, No. 21, 1896). It is satisfactory to notice the great diminution that has occurred in the death-rate from this disease, the case-mortality falling from 16.8 per cent. in 1895 to 13 per cent. in 1896. This decrease is most probably due to the more general use of antitoxin serum in the treatment of the disease. In the Report on the Hobart outbreak above referred to particulars are given of 36 cases : of these 18 were treated without serum, and among them there were five deaths, showing a case-mortality of 27.8 per cent, and 18 were treated with serum, and among them there were two deaths, showing a case-mortality of only 11.1 per cent. We have done all in our power to facilitate the procuring of the serum by the medical practitioners of the Colony generally, and are glad to know that the hospital authorities have arranged for proper supplies for their establishments.

Scarlatina.

13. There were 29 cases of scarlatina notified during 1896, and two deaths attributed to it were registered. The Officer of Health of Zeehan, in his Annual Report to the Local Board of that Town, alludes to these two deaths, and states that the disease was very prevalent there, and though only 18 cases were notified many cases occurred in which medical help was not called in. The disease was introduced from Zeehan into Hobart, where four cases were notified, during 1896.

Measles.

14. Only one death from measles was registered in the Colony during 1896.

Whooping-cough.

15. Ten deaths were registered as caused by whooping-cough. The epidemic of the precedingyear in the North-western Division of the Colony, seems to have quite disappeared, as no deaths from it were registered in that part of Tasmania.

Influenza.

16. There was a small increase in the number of deaths registered from influenza in 1896, being 24, in comparison with 21 in 1896. It was most prevalent in the North-western Division, where one-third of the deaths were registered.

Phthisis.

17. There were 113 deaths registered from phthisis during 1896, a slight improvement on the preceding year. The death-rate from it for every 100,000 living was, in-

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Hobart			69
Launceston			84
North-east T	oivisio	on	80
North-west	••	·	62
Midland	,, .		45
South-east	,,		59
South-west	,,	• • • • • • • • • • • • • • • • • • • •	48

The lowness of the rate in the Midland Division is very remarkable, as it includes the West Coast, with its comparatively wet climate.

Cancer.

18. There was a marked increase in the mortality from cancer in 1896, there being 95 deaths' from it registered, being twenty more than in the preceding year, and the death-rate per 100,000 living being 58, as compared with 47 in 1895, and 50 in 1894.

Lead-poisoning.

19. No cases of lead-poisoning were reported during 1896.

LOCAL ADMINISTRATION OF THE PUBLIC HEALTH ACTS.

20. We are glad to note that generally speaking the administration of the Health Acts by the Local Boards of Health is becoming every year more and more efficient. The order referred to in our last Report as having been made on the Local Board of Health of Hobart with reference to

drainage into rivulets, though met with great dilatoriness, is now being carried out. We heard with great regret of the dismissal by the Local Board of Health of Launceston of Mr. Bushman, of whose good work as Sanitary Officer of that city we have had frequent occasion to speak with praise. We asked the Local Board to reconsider its decision with regard to him, but without effect. In other respects the changes made in the sanitary administration of Launceston met our approval.

Officers of Health.

21. During the year we have approved of the appointments by the respective Local Boards of Health of the following gentlemen as Officers of Health :- Dr. Sprott, for Hobart; Dr. Wilson, for Launceston; and Mr. R. Jones, L.R.C.S.I., for Hamilton.

By-Laws.

22. We have confirmed, during 1896, By-laws made by the Local Boards of Health of the City of Hobart and the Town of Invermay. There are still 18 Local Boards of Health that have not enacted By-laws, and that consequently have not as full powers in sanitary matters as they might and ought to have.

Food Supply.

23. With respect to the control of the milk, bread, and meat supply of the people, the Returns for 1896, though showing an improvement upon those of the preceding year, still point out that the registration and inspection of dairies, bakeries, and butcheries is not so general as it should be. The good results that follow the control that is given by registration and inspection was strikingly shown by the immediate effect that followed upon the exercise of it in connection with the outbreak of diphtheria at Hobart during the early months of 1896, to the special report upon which we have called your attention. The special source of the infection was at once traced, and the dairy dealt with, and the immediate result was that no further cases occurred, and an outbreak of a severe type of diphtheria that had caused six deaths in a few days was completely arrested. The number of dairies registered in 1896 was 614, an increase of 73 on the preceding year; of bakeries, 48, an increase of 22; and of butcheries, 206, an increase of 41. There were 2351 inspections made of registered premises, and all improvements required were carried out without need of enforcement by law. With respect to the adulteration of food, 35 samples of milk were taken and analysed. At Launceston one milk vendor was fined, and several were cautioned. And in the same city the sale of unwholesome fish was prevented.

Prevention of spread of Infectious Diseases.

24. During the year we received 395 reports of special inspections made of houses in which cases of infectious disease had occurred, so that when allowance is made for two or more cases occurring in the same house, on the one hand, and on the other the occasional cases when more than one inspection has to be made, nearly every house in which such cases occurred must have been inspected. That it was needed is shewn by the 313 notices that were given for special sanitary work to be done at these houses. And, furthermore, 114 of them were disinfected. We sent supplies of disinfectants to Beaconsfield, Glamorgan, Hamilton, Longford and St. Helens. Six schools had to be temporarily closed and cleansed and disinfected on account of the occurrence of infectious disease among the teachers or children. In some cases infected bedding and clothing were burnt. Seven public conveyances were disinfected, in addition to the railway carriages in which patients had been conveyed—these carriages being always disinfected by the railway staff.

Offensive Trades.

25. There were 45 noxious Trade Establishments registered during the year. In connexion with a request made for the proclamation of a noxious trade area for the Hobart district, our Engineering Inspector made a full report upon these trades in the district, with information regarding several sites suitable for such an area; but, in consideration of the preliminary expenses that would be involved in removing any of the more considerable existing establishments, we did not think it useful at present to make any recommendation to you on the subject. But should any new establishments be proposed we shall be prepared to make some suggestions as to site. A Noxious Trades Area was proclaimed at Mount Lyell.

Abatement of Nuisances.

26: During the year 1896 there were 998 notices served upon owners and occupiers of premises to abate nuisances, and in 25 cases proceedings had to be taken to enforce them. This is a very small percentage, and shows how with regular inspection there is not often a necessity to have recourse to law for the enforcement of sanitation.

House Sanitation.

27. There were nine houses declared unfit for habitation during the year, of which six were demolished or closed, and three were allowed to be again occupied after repair. Of the 4280 yards of sewers constructed, 3040 yards were laid in Launceston, 550 yards in Longford, 440 in New Town, and 250 in Hobart. There were 196 houses drained, 358 privies rebuilt or repaired, six yards drained and paved, and 30 polluted wells closed.

Miscellaneous Sanitary Work.

28. Under the new street clauses of the Act of 1889, two cases were dealt with; and three cases under the Board's building regulations. In three cases the Local Boards have brought the sanitary condition of schools under notice, with the result of having improvements made. Action is being taken in connexion with a cemetery.

Results of Sanitary Work.

29. In addition to the above recorded principal administrative acts—about 6300 in number much has been done in the way of suggestion and advice during ordinary rounds of inspection that cannot be recorded. It is gratifying to record that the result of all this is shown in the decrease of both cases of, and deaths from, preventable diseases. We again call your attention to the exceedingly small expenditure of public money with which this good work has been done.

LICENSING ACT, 1889.

30. Under the provisions of the 42nd Section of the Licensing Act, inspections were made of 361 inns and public-houses, and certificates were given of satisfactory sanitary condition and accommodation in 358 cases, and refused in three.

VACCINATION ACT.

31. During 1896 only 68 children were presented for vaccination, of whom 67 were successfully vaccinated, and one unsuccessfully.

Report of Royal Commission on Vaccination in Great Britain.

32. The final Report of this Commission was published during 1896; and we give a *précis* of it in the second Appendix to this Report, and we beg to call your special attention to it. During the year 1889 a Bill for amending the Tasmanian Vaccination Act, by rescinding the compulsory clauses, was passed by the House of Assembly, but rejected by the Legislative Council. In 1890 it was again passed in one House and rejectéd in the other; but an arrangement was agreed to that no proceedings should be taken under the compulsory clauses until the Report of the Royal Commission in England should have been issued. This arrangement has been strictly adhered to, with the result that the inhabitants of this Colony are rapidly becoming a community having no protection against small-pox.

The conclusion arrived at by the Royal Commission in England is that it is advisable to amend the law relating to vaccination by altering the compulsory clauses in such wise that the persons who make a statutory declaration that they conscientiously believe that vaccination is injurious to their children shall not be liable to the penalties imposed for non-fulfilment of the law; to improve the practice of vaccination by the provision, at public expense, of calf-lymph, and by postponing the age period for vaccination from three to six or twelve months; and to lighten the burden on parents by providing for the payment from the public funds of all vaccination fees, and for the performance of the operation and subsequent inspection at the child's residence. The object of the Commissioners was to differentiate between those who conscientiously, however ignorantly and mistakenly, think that vaccination might injure their children, and those who are prompted solely by laziness or indifference to neglect taking precaution; and further to make the operation as little burdensome as possible upon parents.

Resumption of Vaccination.

33. We think the time has come for the resumption of work by our Vaccination Department. Not two per cent. of the children born in Tasmania are vaccinated, and so we are rapidly losing the only real safeguard against small-pox, while at the same time the danger of its introduction is constantly increasing. Persons suffering from the disease are frequently being landed at the chief ports of the other colonies; one of the most recent examples being the cases landed at Melbourne from the steamship *Nineveh* from the Cape of Good Hope. As Hobart is the first port of call in Australasia for two lines of steamers that call at the Cape, and land passengers here every fortnight during the year, it is evidently necessary that protective measures should be taken, and vaccination is the only efficient protection.

Amendment of Laws.

34. We therefore suggest that the Vaccination Act; (46 Vict. No. 19), should be amended on the lines indicated above, as recommended by the Royal Commission in England, and that an appropriation should be asked from Parliament for the purpose of carrying out its provisions. The amount voted in 1888, the last year of the full operation of the present Act, was £1230. This would probably be sufficient.

QUARANTINE ACT.

35. There was no special occasion during 1896 to put the provisions of the Quarantine Act into force.

Federal Quarantine.

36. Further correspondence relative to the establishment of Federal Quarantine Stations in Western Australia, South Australia, Queensland, and Tasmania at the joint expenditure of all the Australasian Colonies, was submitted to our consideration by the Hon. the Premier. As the Government of Victoria was disposed to rank Hobart with Albany, Adelaide and Thursday Island as a first port of call, and to provide all with similar establishments, we recommended adhesion to the scheme. We also expressed the opinion that, as much of the New Zealand passenger traffic passes by Hobart, that colony should also be asked to participate.

Chinese Immigration Act.

37. During 1896 there landed in Tasmania 36 Chinese immigrants, of whom 34 landed at Launceston. Of the whole number, 15 were vaccinated before being allowed to land: the other 21 bore good marks of vaccination.

38. In conclusion, we have again to heartily thank the Officers of other Departments, especially those of the Law and Lands Departments, the Commissioner of Police and his Officers, the Analyst, and the Registrar-General, for much valuable assistance.

We have the honour to be,

Sir,

Your obedient Servants,

P. O. FYSH, K.C.M.G., President.

C. E. BARNARD, M.D.

T. BENNISON.

R. S. BRIGHT, M.R.C.S., Eng.

E. J. CROUCH, M.R.C.S., Eng., Government Medical Officer.

E. M. FISHER.

C. HARBOTTLE.

W. W. PERKINS.

A. MAULT, Secretary, Hobart, 31st July, 1897



Appendix I.

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Case Mortality per cent	18.7	17. 2	13.2	12.4	13.0	15.8	27.5	30.5	15.6	19.8	16.8	$11 \cdot 9$	2.8	4.7	3.6	3.0								
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APPENDIX II.

VACCINATION COMMISSION.

THE following is a *précis* of the final Report, dated August, 1896, of the Royal Commission, appointed in May, 1889, to inquire into the subject of Vaccination. Fifteen Commissioners were appointed, of whom Lord Herschell, formerly Lord Chancellor, was Chairman; Sir C. Dalrymple and Sir E. H. Gulsworthy were connected with administrative branches of the Civil Service; Messrs. J. S. Dugdale and F. M. White, Queen's Counsel; Dr. M. Foster, Professor of Physiology at Cambridge; Sir W. G. Hunter and Dr. J. S. Bristowe, Fellows of the Royal College of Physicians; Sir J. Paget, and Mr. (afterwards Sir) W. S. Savory, Dr. W. J. Collins, and Mr. J. Hutchinson, Fellows of the Royal College of Surgeons; and Messrs. C. Bradlaugh, J. A. Picton, and S. Whitbread, Members of Parliament. In 1891, on Mr. Bradlaugh's death, the vacancy was filled by the appointment of Mr. J. A. Bright. Sir W. Savory and Dr. Bristowe died at a later period, and the vacancies thus caused were not filled. It was generally understood that Dr. Collins, and Messrs. Bradlaugh, Picton, and Whitbread, were appointed to represent the "anti-vaccinationists." The final Report is signed by all the surviving Commissioners, except Dr. Collins and Mr. Picton, whose dissentient Report follows the Report of the majority.

The Commissioners were directed to inquire and report as to-

- (1.) The effect of vaccination in reducing the prevalence of, and mortality from, small-pox.
- (2.) What means, other than vaccination, can be used for diminishing the prevalence of small-pox; and how far such means could be relied on in place of vaccination.
- (3.) The objections made to vaccination on the ground of injurious effects alleged to result therefrom; and the nature and extent of any injurious effects which do, in fact, so result.
- (4.) Whether any, and, if so, what means should be adopted for preventing or lessening the ill effects, if any, resulting from vaccination; and whether, and, if so, by what means, vaccination by animal vaccine should be further facilitated as a part of public vaccination.
- (5.) Whether any alterations should be made in the arrangements and proceedings for securing the performance of vaccination, and, in particular, in the provisions of the Vaccination Acts with respect to prosecutions for non-compliance with the law.

The Commissioners from time to time published *interim* reports, with full records of all evidence taken. In one of these reports they unanimously recommended some changes in the law. These changes are set forth in an Appendix to the Report of the Central Board of Health for the year 1891. In all, 187 witnesses were examined. At one of the meetings, two children, who were alleged to have suffered from the effects of vaccination, were examined by some of the Commissioners; but, subsequently, special professional men were employed to examine and report on all such cases, and the reports are given in appendices. Complete and systematic inquiries were made into the circumstances attending local outbreaks of small-pox in the Dewsbury Union in 1891-2; in London, Warrington, and Leicester, in 1892-3; and in Gloucester in 1895-6. More limited inquiries were made with regard to the outbreaks which occurred in 1892-3 in Glasgow, Liverpool, Manchester and Salford, Oldham, Leeds, Sheffield, Halifax, and Bradford. The reports upon all these outbreaks are given in appendices published separately, and they form a most valuable part of the results of the issue of the Royal Commission.

The work done and recorded amply justifies the time that has been taken. The Commissioners say, moreover—"We would gladly have concluded our labours at an earlier date; but we thought "it desirable to give full scope to the evidence of those who were opposed to vaccination as well as "those who favoured the practice, in order that, whatever the value of the opinions we expressed, "they should at least be the fruit of an exhaustive inquiry."

The various branches of the inquiry, as set forth in the Commission, are dealt with separately, both in the Report of the majority and in that of the dissentients. No intelligent reader can fail to be struck with the great difference in the general tone of the two Reports. That of the majority is eminently broad in its appreciations, and judicial in its whole tenor, except when in its manifest desire to state the case put forward by what it evidently thinks the weaker side in as strong a manner as possible, it, after having stated its opinion arrived at after a fair and logical examination of the whole evidence, re-states it in the most favourable manner that it would be possible to state it on the other side if every point on which there could be any doubt were decided in favour of that side. The Report of the two dissentients, on the contrary, though characterised by much ability—especially in making the most of every point upon which there is no disagreement—is narrow in its views, and bears throughout an air of special pleading. In these remarks there is, of course, no intention of questioning the sincerity of the dissentients.

(A.)-THE EFFECT OF VACCINATION UPON SMALL-POX.

Introduction and nature of Vaccination.

The Commissioners therefore begin by a history of vaccination as introduced by Jenner towards the end of the last century, that is, of inoculation with the virus of cow-pox instead of with the virus of small-pox, which constituted the *inoculation* then commonly practised, and which continued to be occasionally practised, but more and more infrequently, until it was declared illegal and the use of it made penal in Great Britain by statute in 1840. The practice of vaccination was rapidly adopted not only in Britain but also abroad, and there can be no doubt but that it was so adopted in the genuine belief that it afforded protection from small-pox. Two questions are asked—upon what was the belief founded? does experience justify the belief?

As to the foundation of the belief, it rested originally on that prevalent among dairy folk that: those who had taken the cow-pox never took the small-pox. Jenner records a number of cases in which he had observed and tested this—some of the tests being the "variolous test" then usually employed to prove the success of inoculation. This "variolous test" was also employed by others, with the result that vaccinated persons stood the test as well as inoculated persons, or persons who had had small-pox. It was, however, alleged that the vaccination had been done with small-pox virus, and the result was due to inoculation after all. The Commissioners and the two dissentients devote much space in the Reports and Appendices to the "variolous test" and the allegation above referred to. As this now can only have an academic interest, seeing that there can be no question as to the source of lymph supply to-day, it seems useless to repeat the reasoning by which the Commissioners arrive at the combusion that it is "impossible to believe that the virus generally used in the early part of this century, whether in this country or elsewhere, was small-pox, and the process the old and well-known one of inoculation."

Small-pox in First Quarter of 19th Century.

As a preliminary to their inquiry as to whether the belief in the efficacy of vaccination hasbeen justified by experience, the Commissioners give their reasons for holding that during the first quarter of the nineteenth century, it may be safely estimated that—at any rate in towns—about half the children born were vaccinated. As to the mortality from small-pox before the introduction of vaccination, the nature of the evidence to be had upon the subject is described and its imperfections noted—the chief source of the information being the celebrated "London Bills of Mortality," which from 1629 give, with one short interruption, the causes of death in certain parishes embracing the greater part of the metropolis. The information thus obtained, collated with other, show that the mortality from small-pox was very high during the 17th century probably 3 per thousand, and that it was still higher during the 18th. And, speaking generally of the prevalence of the disease, it is probable, from the writings of the most observant of their contemporaries, that prior to the introduction of vaccination that at least sixty per cent. of the people living in western Europe had small-pox during their lives. In Chester in 1774 about 93 per cent. had had the disease.

Small-pox in pre-vaccination times.

'The Bills give no information as to the number of cases of small-pox that occurred, and so teach nothing as to the relative fatality of the disease, but the disease, though always present, was then, as now, characterised by epidemic outbursts. And there is ample evidence to show that its fatality varied very much in these epidemics; some being called "mild" when the rate of mortality was low, and others "malignant" when it was high. In face of these variations—ranging from 16 to over 40 per cent. of deaths among those attacked, the Report gives no "normal or natural fatality" rate. But it calls special attention to one character of small-pox in the pre-vaccination time, that is brought out in all the records in which ages are given, namely, the large proportion of deaths from it among the very young. Thus, in Chester, in the epidemic of 1774, all the 202 deaths were of children under 10 years, and a quarter of these were under one year. The year before, in Warrington, all the deaths were those of children under nine. Of 613 deaths from small-pox in Kilmarnock, between 1728 and 1763, all but seven were of those under 10; and in St. Cuthbert's, Edinburgh, from 1764 to 1783, of every 1000 such deaths 993 were of those under 10. This rate of small-pox mortality among children was well known at the time, Haygarth saying of children in Chester from 1772 to 1777—" half as many die of the small-pox as of all other diseases."

Fall of Small-pox Mortality after introduction of Vaccination.

Vaccination was introduced at the end of the last century, and in Britain and every other country into which it was introduced the first quarter of the 19th century was marked by a striking decrease of small-pox, and the proofs of this statement are given in the Report. Was this decrease due to vaccination, or is it to be otherwise explained? Of course the two dissentient members of the Commission disagree with the other eleven members as to the answer to be given. But the answer of the majority is given after fully and patiently weighing and considering all the facts and arguments adduced by the two dissentients.

Was the decreased Mortality caused by decrease of Inoculation?

In the first place the opponents of vaccination allege that the diminution of small-pox that marked the first quarter of the century was caused by the decrease of the practice of inoculation. No doubt the practice did decrease on the introduction of vaccination ; and, as the result of inoculation was the production of small-pox which was, of course, contagious—that is, every inoculated person became a source of infection—the discontinuance of inoculation removed, as far as it went; a source of propagation of small-pox. On the other hand, the small-pox produced by inoculation was as a rule much milder and much less fatal than the "natural" disease, the constitutional disturbance produced by it less and of shorter duration, and the eruption slighter and sometimes altogether Other facts connected with inoculation are, that it was more general among the rich than absent. among the poor; its practice was virtually unknown in the first quarter of the 18th century, very little used in the second quarter, and thenceforward probably more and more used till the end of the century. Had inoculation been a large cause of the increase of small-pox mortality during the century. 18th century, the increase would have coincided with the increased rate of the practice. But it does not; for, whether the severity of the disease be judged by the total deaths recorded, or by the pro-portion of small-pox deaths to deaths from all causes, or to the 1000 living, or by the severity, frequency, and duration of epidemics, the disease was, if anything, severer in the first quarter, when inoculation was not practised, and in the second when it was but little practised, than in the last quarter, when inoculation was most prevalent. "The general conclusion that may be drawn seems "to be that inoculation had a double influence, one favourable, and the other unfavourable as "regards small-pox; and owing to the conflict between these two influences, it produced but little "effect upon the prevalence of, or mortality from, small-pox. There is no adequate evidence that "inoculation did increase the mortality from small-pox." Nor is there sufficient even to show that the discontinuance of the practice was a distinct subsidiary cause of the diminution of small-pox that took place in the first quarter of the 19th century.

Some opponents of vaccination, while contending that this discontinuance was a potent cause of the diminution, also contend that what was supposed to be vaccination during that period was in reality inoculation with small-pox virus. It is obvious that these two arguments are mutually destructive.

Was the decreased Mortality caused by Sanitary Improvements or Cosmic Influences?

Another view of the decline of the small-pox mortality in the period in question is that it was caused by the improvement in sanitary conditions. This view is steadily held by the two dissentients. But the Report shows that though there is evidence that the improved comfort and condition of the people of London during the 18th century certainly lowered the general death-rate, there is no evidence to show that it in like manner lowered the small-pox death-rate. Neither is there evidence to show such difference in the sanitary condition of London between the last quarter of the 18th and first quarter of the 19th century as to account for the immense difference of the small-pox death-rates of the two quarters. And certainly no allegation can be made that all over Western Europe there were superior sanitary conditions, and yet wherever vaccination was practised there were the like results of greatly reduced mortality from small-pox.

Again, it has been urged that the decline of small-pox in the period under review was due to some general unknown conditions spoken of as "cosmic" or "secular." Speaking generally, "cosmic" influences can, with our present knowledge, be neither proved nor disproved. But speaking only in relation to small-pox, it may be confidently asserted that they have no effect upon the decline referred to; for it is not pretended that such influences differentiate between vaccinated and unvaccinated countries. But something else does differentiate. During the period mentioned, in all vaccinated countries, however much they differed in climate, condition and character of people, and state of sanitary arrangements, the small-pox death-rate declined exceedingly, while in all unvaccinated countries of which we have any records the death-rate did not decline at all, and in some increased.

The Commissioners therefore declare that, as far as the first quarter of the nineteenth century is concerned, the marked decline of small-pox mortality affords substantial evidence in favour of the protective influence of vaccination.

Small-pox since 1838 (Registration Act) and 1840 (Vaccination Act).

Legislation.

They considered the preceding period separately, because it constituted a convenient epoch for enquiring whether small-pox mortality was immediately diminished by vaccination. Moreover, the Moreover, the evidence adducible for this period was similar in character to that of the preceding period. Subsequently more exact statistics are available. In 1837 the present system of registration began in England, in 1855 in Scotland, and in 1864 in Ireland. Though Parliamentary grants in aid of vaccination had been made since 1807, no Vaccination Act was passed till 1840. This empowered vaccination had been made since 1807, no Vaccination Act was passed till 1840. This empowered the Poor Law authorities in every parish and union in England, Wales, and Ireland, and directed them to make arrangements with medical practitioners to vaccinate, conformably to regulations to be made by the Poer Law Commissioners, every person in their parish or union. Next year an Act was passed charging the expenses of carrying out the Act of the preceding year on the poor rates, and declaring that "the vaccination or surgical or medical assistance incident to the vaccination of any person" should not be considered parochial relief, and should not subject him to any disqualification whatever. As already mentioned, inoculation was made penal by the Act of 1840; but that Act was not a compulsory one. . The first compulsory law was introduced into Parliament on the suggestion of the Epidemiological Society of London, and was passed through both Houses without opposition or division in 1853. Generally speaking the compulsory clauses were similar to those in existing Acts. The penalty was a sum not exceeding 20s. Under this Act arose the celebrated case of *Pilcher v. Stafford*. Stafford had been fined 2s. 6d. by magistrates on the 18th February, 1863, for neglecting to take his child to a vaccinator. Subsequently, the child being still unvaccinated, the Registrar brought a fresh information and complaint for the same cause. The Justices dismissed the information on the ground that it was contrary to law to convict and fine the defendant a second time for the same offence, and on appeal the Court of Queen's Bench confirmed his decision. In 1858 one of the Public Health Acts transferred the duty of supervising the methods and practice of Vaccination from the Poor Law Commissioners to the Privy Council, and also the control of the National Vaccine Establishment, and there were other provisions regarding vaccination. The Privy Council continued the supervision till the Local Government Board was appointed in 1871, when the Council's powers were transferred to the Board.

In 1867 a consolidation Act was passed which also introduced some new provisions, especially in facilitating the administration of the law, the encouragement of re-vaccination, and the enforcement of the law. Under the last-mentioned provisions a case taken on appeal to the Court of Queen's Bench led to a reversal of the decision in the case before cited. Thereafter many magistrates made repeated orders with respect to the same child, and to such an extent that a Committee of the House of Commons, in 1871, recommended that not more than two penalties or one full penalty should be imposed in respect of the same child, and that persons committed to prison for disobedience to orders should be treated as debtors and not as criminals. The first part of this recommendation was introduced in the Amendment Bill passed by the Commons in 1874; but the clause was rejected by the Lords, and as this was in a late period of the Session, the amendment was accepted by the Commons. In 1871 an Amendment Act had also been passed rendering it obligatory on all Boards of Guardians to appoint a prosecuting officer. But under the 1874 Act such officers were not to take proceedings twice with respect to the same child until he shall have brought the circumstances of the case to the notice of the Guardians and received their special directions therein.

It is not necessary to trace the special legislation that has been had on the subject in Ireland and Scotland. It may be mentioned that the limit of age is six months in Scotland, instead of three months as in England, and that there the vaccinator goes to the child instead of having the child brought to him, and the period of imprisonment for disobedience of an order is limited to two months.

Administration.

In the evidence details are given of the manner in which the Acts are carried out by the Government Authorities in the three Kingdoms. As some parts of the Scottish practice are recommended for adoption in England, the following details are given :—"An Official Vaccinator "is appointed by each Parish Council. Beyond the vaccination of paupers and their children, his

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"duty is confined to vaccinating defaulters. The great majority of vaccinations in Scotland are-"performed by private medical practitioners, at the expense of the parent or guardian. In all cases "in which Certificates are not received by the Registrar of compliance with the requirements of the "Act, the names are inserted in a list of defaulters sent every six months to the Parish Council. "It then becomes the duty of that Council to see that these defaulters are vaccinated. They go "through the list transmitted to them, and notify to the parent or guardian of each child that its "name is contained in the list, and that if not privately vaccinated, it will be vaccinated by the "Official Vaccinator. The Parish Council issue an order to the vaccinator to vaccinate the persons "named in the list not less than 10 days nor more than 20 after the date of the notice to the "parent or guardian. A large number of the defaulters are privately vaccinated in consequence of "these notices, before the visit of the Official Vaccinator. If this has not been done, he calls on "each of the defaulters and offers to vaccinate. If the parent's consent is obtained, the child is "vaccinated; if consent is refused, a Certificate is given stating the fact and the ground of refusal. "Any other reason for not vaccinating a child, such as insusceptibility, previous vaccination, or "condition of health, is also embodied in a Certificate. The power conferred upon local authorities "under the Public Health Act to afford gratuitous vaccination appears to be exercised chiefly when "epidemics are present within the district. A house-to-house visitation is often made by medical "men appointed for the purpose, and a large number of re-vaccinations are thus effected. The "distinguishing feature of the Scotch system which deserves special attention is, that the operation "is carried out in almost all cases at the house where the vaccinated person is residing. The Official "Vaccinator visits the case there after an interval of eight days, to see whether the operation has." been successful. Although he pays no visit in the interval, he would often be sent for if any "untoward symptoms presented themselves, inasmuch as the Official Vaccinator is, in ninety-nine "cases out of a hundred, the Officer whose duty it is to afford medical assistance to the poor."

Small-pox Mortality during this period.

The records of Small-pox mortality in the United Kingdom can now be considered since the beginning of accurate registration. In England this was in 1838. Subsequent to this three important events in the history of vaccination have occurred : in 1841, the coming into force of the Vaccination Act, and discontinuance of inoculation ; in 1854, the coming into force of compulsory vaccination ; and in 1872, the coming into force of compulsory appointment of vaccinators. The division of the period since 1838 by these epochs gives unequal divisions, but all, except the first, of sufficient length to establish fair means of judging results. The mean of the short period 1838-1840 is greatly affected by the small-pox epidemic of 1838,—an epidemic severer than any that has subsequently occurred. The next severest epidemic was that of 1871, which affected the mean rate for the period 1854-1871, in which it occurred ; but, allowing for all this, the following table shows the influence of vaccination legislation on small-pox :—

eriod,	1838-1840-1	Deaths	from small-p	oox to 100,000 liv	ving, 77
, ,	1841-1853		,	>>	30
· ? ?	1854-1871		, 321 ·	,,,	$25 \cdot 6$
"	1872 - 1894			"	8.9

Compare this with a table referring to London, prepared by Dr. Farr, and quoted by the two dissentients in their report :---

Pre-vaccination	Period,	1629-1635-	-Deaths fro	m small-r	oox to 100,000	living, 180
,,	17	1660-1679		,,	,,	417
ý7	,,	1728 - 1757	• • •	"	3 7	426
17	,,	1771-1780		"	13	502
Post-vaccination	1 Period	1800-1810		"	>>	204
, ,,	"	1831-1835	•	,, .	"	83

Prevalence of Vaccination during this period.

As to the prevalence of vaccination, the returns published by the Local Government Board since the passing of the Act of 1871 show that from 1872 to 1883, inclusive, the children not brought to the vaccinators amounted to from 5.1 per cent. to 4.3 per cent. of those born during the year and surviving. In 1884 they were 5.5 per cent., and thenceforward the numbers rose year by year till in 1893 they amounted to 16.1 per cent. These rates show the effect of the opposition to vaccination that has prevailed in some parts of England. There is no corresponding opposition in Scotland, where the children in question never amounted in any year of the whole beried to more than 4.8 per cent., and in 1893 to only 4.3 per cent.

The statistics given do not afford any means of exactly determining at any given time what proportion of the whole population had, at some time or other, been vaccinated; but there can be no doubt but that in recent years this proportion would be 90 per cent. or more.

. Greatly diminished Mortality from Small-pox during this period.

Having regard to the figures given, the majority report—" It seems to us scarcely possible to "deny that, speaking generally of the British Isles, a more vaccinated population has exhibited a.

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"diminished mortality from small-pox." They point out how the tendency of the disease to become epidemic at times makes it impossible that the diminution should be constantly regular. "The only result of wide-spread vaccination, in a case where small-pox became epidemic, could be "to render the extent of the epidemic more limited, and its fatality less than it would otherwise be. "All that we should anticipate then would be a general correspondence over a long series of years "between a vaccinated condition of the people and a diminished mortality from small-pox." And this the figures before given strikingly show.

Cause of Decrease of Mortality.

Has any other cause for diminution, except vaccination, been suggested that will satisfactorily account for it? The Commissioners proceed to discuss each suggested cause in detail.

The first cause that is said to satisfactorily account for the lessened mortality from small-pox is the improved sanitary condition of the people. This has already been partially considered; it is now more fully discussed. Other things being equal, small-pox is more likely to spread in thickly peopled than in thinly peopled places. So far as, during the period in question, over-crowding has been checked, it has certainly tended to diminish small-pox. On the other hand, the greatly increased population, and the greatly increased tendency of it to leave the country for the towns especially the larger towns—has been a condition tending to increase the prevalence of small-pox. Another feature of this period, also tending to its increase, is the enormous and continued extension of movement among the population and of communication with other countries, following the increased means of communication. Again, improved sanitation might reasonably be expected to have some effect upon the rate of mortality from small-pox. No doubt during the period the continual series of Public Health and such like Acts, general and local, provided better drainage and water supply, and produced more wholesome general conditions. Of the changes that have occurred, some have tended, as shown, to diminish the mortality from the disease, and some have had a contrary tendency; but when all are considered, it is impossible to assert that they afford an adequate explanation of the diminution that has taken place. If they did, why was not a similar diminution effected in other contagious or infectious diseases, such as measles, scarlet fever, diphtheria, and whooping cough? These all are infantile diseases, just as small-pox was before vaccination was introduced, and it is among children that the diminution of small-pox mortality has been greatest. Notice the following table, giving the comparative mortality side by side with that previously given.—(It must be noted that up to 1854 deaths from scarlet fever and diphtheria were registered togeth

Period.	Deaths to every 100,000 living.							
	Small-pox.	Measles.	Scarlet Fever.	Diphtheria.				
1838 to 1840	77	5 7 ·7	77.	4 .				
1841 to 1853	30	41.2	88.	7				
1854 to 1871	25.6	49.1	90·5	19.2				
1872 to 1894	. 8.9	42.8	49.3	15.7				
				Charles and				

The experience with relation to these diseases in Scotland and Ireland, and with relation to whooping-cough in all three countries is similar, and so not worth while repeating. But in all these diseases it is very evident that neither in regularity nor in extent of diminution has there been anything comparable to that of small-pox. A great diminution has taken place since 1884 in scarlet fever, but this is distinctly traceable to the practice that then began of removing scarlet fever cases to hospitals for treatment.

No comparable decrease in mortality from "Fevers."

Great stress has been laid, especially by the two dissentients, on the fact that the records show a large decrease in the deaths under the heading "fevers," but it is notorious that in comparatively recent years the nomenclature and classification of diseases where fever is present have undergone great changes. In many such diseases where the cause of death was returned as "fever" it is now attributed to some disease specifically named. The apparent decrease is therefore not a real one; but apart from this, there has evidently been a large diminution. In considering the relation of this decrease to sanitary improvements, it is obvious that these improvements are not calculated to affect all Zymotic diseases in the same manner and to the same extent. Instances of this are given, such as the following :—" Typhoid fever is directly dependent on the contagia "furnished by the excreta in one case being introduced into the alimentary canal. Where by " means of adequate drainage and personal cleanliness this is prevented, the disease is also prevented." And the report goes on—" In the case of each of these fevers, then, there are special circumstances " developing the disease which sanitary improvements tend directly to remove. There is no like " feature in the case of small-pox. It resembles measles in this, that the spread of it is not connected " with any particular sanitary fault, as distinguished from those general conditions which tend to the " spread of infectious disease. There is no evidence in the history of small-pox, either before or " during the 19th century, to connect outbreaks of that disease in a special way either with imperfect " removal of excreta or with lack of air and light, or with deficient food, or with lack of personal "cleanliness. Moreover, the general tendency of sanitation to lower the prevalence and the fatality "of the disease is largely neutralised both in the case of small-pox and measles by the greater facility "of intercourse. Whilst, then, there is ample reason to regard the disease in the case of typhus and "typhoid fever (and it may perhaps be said of fever generally) as the result of improved sanitary "conditions, since each of these is specially dependent on conditions which sanitary improvements "have removed, there is no adequate reason to attribute the decrease of small-pox in the 19th "century to a similar cause, though we fully recognise that sanitary improvements have had an "effect in reducing the mortality from small-pox as from the other diseases to which we have just "been referring. This view is strongly confirmed by the fact that in spite of sanitary improvements "the mortality from measles and whooping-cough has remained undiminished, and the diminution "in the mortality from scarlet-fever has only been apparent in comparatively recent years."

The contention that the decline in small-pox mortality is largely due to the more general isolation of patients, is answered by the fact that, though proper isolation is of the utmost importance, as is shown further on, it is only in quite recent years that there has been any systematic practice of isolating small-pox patients, and this only in a very limited number of localities.

Age Incidence of Small-pox.

Attention is next called to the instruction to be derived from a study of the age incidence of small-pox. It is well known that the full effects of vaccination are not permanent. Its power to prevent an attack of small-pox rapidly diminishes after 9 or 10 years, though its power to modify the severity and fatality of the disease continues. This is not surprising, as an attack of small-pox itself is not an absolute guarantee against another attack. Now, it has already been noted that in pre-vaccination times small-pox was chiefly fatal to children; and the reason for this was that adults were then mostly protected against the disease by having already had it. Children were then the only class for the most part unprotected. During the present century this protection derived from a previous attack is only possessed by a very small section of the adult community, while the vast majority of the children have been vaccinated. If, then, vaccination be most potent in its effect during the first few years after the operation, we should expect to find the formerly existing conditions reversed—children would be the best, adults the worst protected class.

The following table shows how this expectation is verified. It gives the deaths from small-pox at the age periods under 10 and over 10 in each 1000 deaths from small-pox at all ages :---

From	1848	to	1869—Deaths	under	ten ye	ars, 704;	over ter	n years,	296
"	1870	to	1889—	,,	•	346.5	;	,,	653
,,	1890	to	1894—	,,		333;	•	"	667

As to the absolute mortality, the deaths from small-pox per million living, in the case of children under ten, in the seven years 1848 to 1854, was 1837, and decreased in the ten years from 1885 to 1894 to 65, while in the case of persons over ten it only diminished from 294 in the former period to 85 in the latter; that is, a decrease of 29-fold in the case of children, and not four-fold in the case of adults. And this is in spite of the fact that, in the case of children, those under six months are nearly all unvaccinated, and that, in the case of adults, no effect can be allowed for re-vaccinations, as their number is not recorded, though it must be considerable.

Change of Age Incidence due to Vaccination.

The fact of the protective effect of vaccination upon the age incidence of small-pox is almost more strikingly shown by the special scientific investigations made, chiefly by experts employed by the Commissioners, on the recent epidemics at Sheffield in 1887-8, Dewsbury in 1891-2, Leicester, London, and Warrington in 1892-3, and Gloucester in 1895-6. In all these places the prevalence of the practice of vaccination varied considerably, and the age incidence of the small-pox fatality also differed. The following table shows the relative percentage of children vaccinated in each of the places for the ten years preceding the epidemic which visited it, and the percentage of deaths of children under 10 to the whole of the small-pox deaths during the epidemic :—

	Town.	Percentage of vaccinations during 10 preceding years.	Percentage of deaths of children during epidemic.
· ·	Warrington	95.2	22.5
	$\mathbf{Sheffield}$	95.5	25.6
	London	90.1	36.8
· ·	Dewsbury	6 7 ·7	51.8
	Gloucester	32.4	64.5
	Leicester	32.0	66.6

The Commissioners say: "We cannot but lay stress upon the facts thus revealed by the investi-"gation of recent epidemics in these six towns. These facts are not open to the same chance of "error as is involved in a comparison of the mortality among persons said to be vaccinated or "unvaccinated. The age at which deaths occur may be said to be practically a matter of "certainty. . . . We have said that the phenomena are accounted for on the supposition that "vaccination has the protective influence alleged. Is there any other satisfactory explanation?" Sanitary improvement has not affected the age incidence of measles, whooping-cough, or scarlet fever. But it is alleged that these diseases are not so amenable to sanitary conditions as small-pox, and this allegation is supported by reference to the supplement to the 35th Annual Report of the Registrar-General, based on the experience of the years 1861–1870. In it some tables were given stating that whilst in Liverpool the mortality from small-pox of children under 5 years of age might be expected to be 63.5 per cent., in "healthy districts" it was only 25.5. But to determine whether this difference, supposing it to actually exist, is due to the superior sanitary conditions, and to see called "healthy districts," it is necessary to define what is meant by sanitary conditions, and to see how the case stands with regard to other diseases. The report proceeds to do this, and effectually disposes of the allegation, by shewing that sanitary conditions do not affect the matter as much as the essential difference between town and country. "In a town where large numbers are gathered "in close proximity the chances of contracting an epidemic disease are necessarily greater than in a "rural district where the population is distributed over a wide area in which no large numbers are "anywhere living in close proximity. If a difference such as this is to be included among sanitary "conditions, a few badly drained, ill-ventilated houses remote from other habitations would have to "be regarded as in some respects in a superior sanitary condition to the best drained and ventilated "houses in a large town. A use of the expression "sanitary conditions" which involves such a "consequence appears to us to be an abuse of it."

No comparable change of Age Incidence in the case of "Fevers" and other diseases.

It has been suggested that the change in the age incidence of small-pox is deprived of importance by the fact that a like change may be observed in the case of mortality from "fevers." Attention has already been called to the fact that the deaths that have occurred from "fevers" at different times do not admit of comparison with deaths from small-pox because the change of nomenclature and diagnosis in the Registrar's records. For example, before 1869 the heading "fevers" included typhus, infantile and remittent fevers. Enteric fever (typhoid) was not recognised statistically. A new departure was then made; infantile fever disappeared from the record, and remittent fever in children under five years of age was classed with enteric fever. Since 1880, however, these remittent fever deaths have been transferred to malarial diseases, and a better diagnosis has caused other changes. For instance, causes of deaths are now certified as tuberculous which would formerly have been returned as typhoid. Bearing all this mind it will be found that there is no such change in age incidence caused by sanitary improvements in fever death rates like the change caused by vaccination in small-pox death rates. The following are the deaths of children under five as compared with deaths at all ages from typhus and typhoid fever for the four quinquennia embraced in the period above referred to—

· · ·	1871-75.	1876-80.	1881-85.	1886-90.
Typhus	6.4	$6 \cdot 1$	3.5	$3 \cdot 4$
1 ypnora	17.4	10.0	9.2	1.0

It will be seen in the first ten years a slight improvement took place—due, no doubt, to improved sanitary conditions. Then suddenly a great improvement takes place. It was accompanied by no sudden change in sanitary conditions, but was coincident with the change in nomenclature and diagnosis above described. So there can be no doubt that it was chiefly caused by this change. And this is made indisputable by the fact that, the sudden drop accounted for, the normal rate of diminution attributable to sanitary improvements resumes its march exactly as before.

Equally complete is the answer given to other suggested claims that the change of age incidence in small-pox cases is equalled by that in other diseases, and even in small-pox cases by that of unvaccinated children as compared with vaccinated. All these are shewn to be based on utterly valueless comparisons. And this part of the inquiry is thus summed up :—" Apart from the " difference in the extent of vaccination, no cause has been suggested at all adequate to account for " the variations in the age incidence of fatal small-pox."

Comparative Mortality of vaccinated and unvaccinated.

The Commissioners next proceed to consider the evidence derived from a comparison of the fatality of small-pox among vaccinated and unvaccinated persons, especially as shown by the reports upon the recent epidemics. They begin by pointing out the valuelessness of percentages based upon small numbers. Thus, if two persons were attacked and one died it would be folly to assume that the rate of mortality of the disease was 50 per cent. In face of this, the illustration given by the twodissentients of their argument that the majority had not made sufficient allowance in their correction of figures relative to the mortality at Sheffield, is, to say the least, not in good taste. They quote the figures of a district in that town where only one unvaccinated person was found in the invaded houses and who took the disease, and thus gave a case rate of 100 per cent. as an example of the fallacy of the methods of the majority. The methods of the majority shew no such fallacy, and are all the more strikingly clear and fair when compared with those of the two dissentients. The majority, in face of the fact that vaccination loses some of its effect after a lapse of time, compare the effects of its presence or absence both during its period of full power and diminished power. The two dissentients shirk this, and really argue as if the statement that it should from time to time berenewed to have its full effect were a reason for abandoning vaccination altogether. Again, the majority take large groups of persons in the direct presence of smill-pox and compare its effect both as regards case rates and death rates upon the vaccinated and unvaccinated : the two dissentients avoid this by limiting the consideration to the case rate in the invaded houses as compared with the probable number of vaccinated persons in the whole town altogether irrespective of the fact whether they had been exposed to any infection or not. Similarly specially treated statistics are used by the dissentients to combat the conclusions arrived at by the majority after much fuller and fairer estatements of the whole facts.

Proofs of effect of Vaccination in decreasing Mortality.

The following is the evidence afforded by the enquiries made into the recent epidemics in the six towns already referred to. It is to be noted that in all fatal cases where the evidence of vaccination or non-vaccination was doubtful, the deaths have been debited to the vaccinated class, adding sometimes very greatly to the rate of mortality :---

	• .	VACCIN	NATED.	: 1	UNVACCINATED.				
`	UNDER 1	0 YEARS.	Over 10) YEARS.	UNDER 1	O YEARS.	OVER 10 YEARS.		
1	Cases.	Deaths, per cent.	Cases.	Deaths, per. cent.	Cases.	Deaths, per cont.	Cases.	Deaths, per cent.	t
Sheffield London Dewsbury Warrington Leicester Gloucester	353 130 44 33 2 26	1-7 4.6 .2:2 6:0 3.8	3774 1814 577 560 197 1185	$5 \cdot 1 \\ 4 \cdot 2 \\ 2 \cdot 6 \\ 6 \cdot 4 \\ 1 \cdot 0 \\ 10 \cdot 0$	228 228 1174 32 107 680	43.9 26.7 32:1 37.5 14.0 41.0	- 322 181 192 36 51 88	54-2 20-9 18-7 .33-3 7-8 39.7	
.Total	.588	2:7	7957	5.4	(1449	36.0	870	34 3	

These figures show, and the whole history of small-pox shows, that small-pox epidemics vary in fatality quite apart from the question of vaccination. Thus, in the epidemics of Gloucester and Warrington, the disease was certainly of a severer type than in the other towns; and in Leicester and Dewsbury of a milder type than in the others. But in both types of disease there can be no doubt of the enormous influence of vaccination on the fatality of the disease. Taken altogether, the figures are large, dealing with about 11,000 cases, and therefore the percentages are of a character to be relied upon. They strikingly bring out the value of vaccination upon the age incidence of small-pox mortality. While in the case of the vaccinated the rate of mortality during the period in which the efficacy of vaccination is most marked was only one-half that of later periods of life (2.7 as compared with 5.4), among the unvaccinated there was hardly any difference in the rate during these two periods of life (36.0 and 34.3), and what little difference there was was in favour of the older people. This was to be expected, as older people are better able to resist disease than infants and children. This fact is well known, and has been used as an argument against the importance of considering the age incidence of small pox fatality, as it is alleged that as among the uvaccinated there is always a number of children too young to be vaccinated, the mortality among these when attacked by small-pox unduly adds to the percentage of deaths in the class under ten years of age. The reporters, to show that this contention does not much affect the question, eliminate from the above returns the whole of the deaths of children under one year of age both among the vaccinated and unvaccinated. The effect of this elimination is only to raise the percentage of deaths of vaccinated children from 2.7 to 2.8, and to lower the death rate among unvaccinated children from 36 per cent. to 30.3, still leaving the mortality 11 times greater among the unva

After referring to the general confirmation given to the protective value of vaccination by the records of London Hospitals, the Commissioners proceed to consider the evidence brought against its value. The truth of the statistics given of the epidemics in the towns is denied on the ground that they show a mortality among the unvaccinated greater than the average mortality from the disease before vaccination was known. The authority for this statement is a French practitioner, Dr. Jurin, who about a century ago, in treating of inoculation, reported the average mortality from small-pox to be only 16.5 per cent of the cases. He based this on information he had received from England and America about certain epidemics. The mortality in these epidemics varied from 10 to 36 per cent. There is no means of checking the figures given, to say nothing that other statistics exist shewing a greater range of epidemic mortality during last century, or of the allegation that Jurin's tables exclude all deaths of children under two years of age. They cannot therefore be said to affect the credibility of statistics carefully prepared within the last five years, and prepared and checked with all the superior methods of to-day.

But the main argument used in the endeavour to prove the uselessness of vaccination is that the unvaccinated are mostly to be found in the poorer and more neglected classes of the population, who would on that account be constitutionally weaker and less able to resist an attack of small-poxand to escape a fatal result. This is to some extent true (when staken generally with regard to the) whole mass of the unvaccinated as compared with the vaccinated. But it is not true as explaining the great difference of mortality in the specific statistics given of the epidemics in the six towns mentioned, and facts are mentioned in the reports upon them that show this; and in the report on the Warrington epidemic it is expressly stated that the vaccinated and unvaccinated were of the same class and lived in the same houses and in the same manner:

Other arguments are shown to be just as weak... "It must always be borne in mind that the "difference is not a narrow one, it is not measured by a small perscentage. A broad margin might "be allowed for error without the force of the argument derived from the contrast being seriously" "diminished."

VACCINATION AS A PROTECTION AGAINST SMALL-POX.

Thus far the influence of vaccination upon the fatality of small-pox has been considered. The question has now to be answered—Does it give protection against being attacked by the disease? The consideration of this question obviously presents greater difficulties, as so much depends upon degree of exposure to infection, which cannot be accurately determined in the case of each one of a whole population. The only accurate information possessed based upon large numbers is in connexion with Sheffield where, at the time of the epidemic, of 266,797 vaccinated persons; 1:55 per cent; were attacked: and of 7315 unvaccinated persons, 7:5 per cent; were attacked i of 67,603 vaccinated is children (under 10), 0:5 per cent; were attacked : and of 2892 unvaccinated children, 7:8 per cent; were attacked.

But, when we come to the inhabitants of the houses in which during an epidemic of small-poxone or more attacks occur, the question does not present such great difficulty, for in their case we have to deal with persons in like conditions between themselves as to exposure to infection, for, as Dr. Savill, who reported upon the Warrington epidemic; says—"Being, members of the same families, they "lived in the same houses.....ate the same food, often did the same work," and 'were exposed to the same hereditary and external influences." Figures are available with respect to 30,340 of this class of people in five of the towns that have been mentioned, the figures for London." were not obtained—and the following is the result—

	Attack rat	etunder 10.13		Attack rate over 10.0			
	Vaccinated.	Unvaccinated.		Vaccinated:	Unvaceinated: ···		
Sheffield	7.9	67·6 ($28\cdot3$ \circ	53.6		
Warrington	4.4	54.5		29.9	5 7:6 0		
Dewsbury	10.2	50.8	•	27.7	53.4		
Leicester	2.5 .	35:3 -		22.2	47.6		
Gloucester	8.8	46 3	· , ,	32.2	50×0 🖯		

The evidence thus afforded of the protective influence of vaccination against the liability to catch small-pox is by far the most direct and indisputable. Evidence derived from hospital practice is not to be compared to it in value, for nothing is known of the condition as regards vaccination, or of what becomes of the other inmates of the houses whence the small-pox patients come. All that can be done in hospital cases is to note whether the patients themselves have been vaccinated or not, and then compare the numbers of the vaccinated and unvaccinated respectively with the probable numbers of each class in the whole community—altogether irrespective of whether or not they have been exposed to infection. But it is satisfactory to know that hospital experience, such as it is, points to the same protective value of vaccination against attacks of small-pox.

Effect of vaccination on character or type of Small-pox.

That vaccination not only diminishes the risk of attack by small-pox but also renders the typeof the disease milder, if it be taken, is next shown. This is a matter of greatimportance, as not only making the chances of a fafal termination smaller, but also as making it less painful and preventing such consequences as blindness and disfigurement by pitting. In the reports on the epidemics the cases are usually divided into four types—very mild or varioloid, discrete; coherent and confluent, the two former being classed together as "milder" and the two latter as "severer" forms of the disease. Details are given from all the reports on the epidemics; but the evidence they afford 'may be thus summed up.

* '	Vace	inated.	Unvaccinated.		
	Milder.	Severer.	Milder.	Severer.	
Sheffield	82.8	17.2	18·5 🗇	81.5	
Dewsbury	82.0	18.0	23.1	76.9	
Leicester	81.4	18.6	27.2	72.8	
Warrington	78.2	21.8	29.4 $^{\circ}$	70.6	
London	89.0	11.0	35.2	64.8	

If only children under 10 are dealt with the difference is still greater. But, taking the vaccinated of all ages, it may be said, speaking generally, that if any one of them takes small-pox.

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the odds are four to one that his case is a mild one; but if an unvaccinated person takes the disease the odds are three to one that his case will be a severe one.

Influence on Small-pox of the character of the Vaccination performed.

In most of the cases of small-pox reported as having occurred among the vaccinated, the character of the vaccination as evidenced by the cicatrices left by the operation is recorded, and its effect upon the case. The evidence thus obtained points to the conclusion that the greater the number of marks the greater is the protection afforded, both as regards attack, and mortality if attacked. The general conclusion, after eliminating as far as possible all room for error, and based upon the consideration of 4754 cases, is that the mortality among persons showing

]	mark ·	is	7.6	per cent
	2	marks	\mathbf{is}	7.0	,,
'	3	marks	\mathbf{is}	$4\cdot 2$,,
		1	-	04	

4 marks is 2·4 "

REVACCINATION.

If vaccination loses some of its effect after the lapse of some years, it is of importance to know whether a repetition of the operation will restore its protective influence. Unfortunately it is impossible to obtain any statistics showing the amount of re-vaccination in the country generally. But, in the towns in which epidemics occurred, the professional experts who conducted the inquiries made such observations upon it as were possible, and the result of all these observations. Again, there are certain classes of persons among whom re-vaccination is regularly practised. For example, under the Army Regulations all recruits are re-vaccinated on joining, and this has been done since the year 1858, with the result of greatly decreasing the small-pox mortality of the troops since that year when compared with the previous period. The staff employed at small-pox hospitals are usually re-vaccinated, and a like result obtained, and that this result is not obtained simply on account of the sanitary precautions observed in such institutions is shown by the fact that though similar precautions are taken in fever hospitals similar results are not obtained. Thus, during the six years 1890-95, for which the figures are obtainable for the metropolitan fever hospitals and small-pox hospitals, 5'4 per cent. per annum of the staff of the fever hospitals contracted fever, while only 0.55 per cent. per annum of the staff of the sinall-pox sinall-pox. Thus, re-vaccinated small-pox nurses are ten times safer than fever nurses. When typhus flever, which is more fairly to be compared with small-pox for contagiousness and for attacking adults, was treated in the London Fever Hospital the risk to the nurses was far greater—during the ten years 1862-1871 the average yearly attack-rate of the staff being 19'2 per cent. In the Postal Service the permanent staff are required to be re-vaccinated on admission, unless they have been vaccinated within seven years; the following figures speak for themselves, especially when it is remembered t

Year.	Officers employed.	Cases of Small-pox.	Deaths from Small-pox.	
1891	47,264	none	none	
1892	54,198	2	none	
1893	58,311	4	none	
1894	60,490	11	1	

The Commissioners sum up by holding that the beneficial effect of re-vaccination is established.

CONCLUSION ON THE WHOLE QUESTION.

After a discussion on the irrelevancy of the long arguments used to show the reasoning of Jenner was sometimes unsound, and that therefore vaccination is useless, when the experience of a century shows that the practice is eminently useful, whatever Jenner's reasoning may have been; and another on the suggested identity of cow-pox and small-pox, the majority proceed to sum up the evidence given in relation to the first question put in their Commission as to "the effect of vaccination in reducing the prevalence of, and mortality from, small-pox," and answer the question thus, after giving full weight to the arguments adduced by those who oppose vaccination—

"We think-

- "1. That it diminishes the liability to be attacked by the disease.
- "2. That it modifies the character of the disease, and renders it (a) less fatal, and (b) of a "milder or less severe type.
- "3. That the protection it affords against attacks of the disease is greatest during the years "immediately succeeding the operation of vaccination. It is impossible to fix with "precision the length of this period of highest protection. Though not in all cases the "same, if a period is to be fixed, it might, we think, fairly be said to cover in general "a veried of nine on ten were".
 - "a period of nine or ten years."
- "4. That after the lapse of the period of highest protective potency, the efficacy of vaccination "to protect against attack rapidly diminishes, but that it is still considerable in the next quinquennium, and possibly never altogether ceases.

"5. That its power to modify the character of the disease is also greatest in the period in "which its power to protect from attack is greatest, but that its power thus to modify "disease does not diminish as rapidly as its protective influence against attacks, and "its efficacy during the later periods of life to modify the disease is still very considerable.

- "6. That re-vaccination restores the protection which lapse of time has diminished; but the "evidence shows that this protection again diminishes; and that, to ensure the highest "degree of protection which vaccination can give, the operation should be at intervals "repeated.
- "7. That the beneficial effects of vaccination are most experienced by those in whose case it "has been most thorough. We think it may fairly be concluded that where the vaccine "matter is inserted in three or four places it is more effectual than when introduced into "one or two places only; and that if the vaccination marks are of an area of half a "square inch, they indicate a better state of protection than if their area be at all

" considerably below this."

(B.) OBJECTIONS MADE TO VACCINATION ON THE GROUND OF ALLEGED INJURIOUS EFFECTS.

The admission that some risk attaches to the operation of vaccination, as it does more or less to every operation of life, does not necessarily afford an argument of any cogency against the practice. If its consequences be on the whole beneficial and important, the risk may be so small that it is reasonable to disregard it. Everything depends, then, upon the extent and character of the risk. The opponents of vaccination have alleged that the danger of the operation is proved, first, by the increased mortality from certain specified diseases corresponding to the increased practice of vaccination, which is, they say, the real cause of the increased mortality; and secondly, by the examination of certain cases in which they assert that injury or death has resulted from the practice.

Alleged connexion of increased Mortality in certain Diseases with Vaccination.

The diseases which have been selected to show that increased mortality has accompanied and been produced by vaccination have varied from time to time. In 1887 a Parliamentary Return was obtained of the mortality from 14 specified diseases during three periods selected as showing comparatively little, comparatively general, and very general vaccination. Six of the diseases showed an increasing, four a decreasing, and four an irregular rate of mortality. But in none for small-pox was not one of the specified diseases—was there anything to show any connexion whatever between vaccination and the increase, or decrease, or irregularity of the death-rate. But in more recent times the following diseases have usually been mentioned as proving the increased mortality resulting from vaccination; and they are considered separately.

Syphilis.

Deaths from syphilis have increased during the last 20 years among infants under one year of age; but there is not only no evidence to connect vaccination with this increase, but, on the contrary, much that is unanswerable, to show that it has nothing to do with it. In England and Wales the legal age for vaccination is from three months; and, generally speaking, no vaccination is performed during the first three months of life; and it is during these three months when vaccination could have nothing to do with it that the disease is most fatal. In Scotland the vaccination age is six months; and in the period 1855-63 of each 1000 deaths from syphilis the number of deaths of infants under six months was 575, and of infants from 6 to 12 months, 109; in the period 1864-75 the numbers were respectively 612 and 118; and in the period 1876-87, 647 and 109. So that during the six months when vaccination could have nothing to do with the matter from five to six times more children died from the disease than during the six months after vaccination had supervened. And not only so, but during these several periods in which vaccination was becoming more and more prevalent, the infant mortality was steadily increasing in the class that was unvaccinated, and about stationary in the vaccinated class. In Ireland, although the practice of vaccination is increasing, the number of deaths of infants is largely decreasing. It is curious to note how the condition of things in Leicester, the stronghold of the anti-vaccinationists, still more conclusively rebuts the allegation of the connexion between vaccination and the increased infantile mortality from syphilis. The following are the increased death-rates of infants under one year from this disease in England and Wales on the one hand, and Leicester on the other, when the period 1863-67 is compared with the period 1883-87. In the former period over 90 per cent. of the children born, both in the whole Country and in Leicester, were accounted for by the vaccinators; in the latter period, while in the whole Country but little change had taken place, in Leicester not one-third of the children born were vaccinated. The increase of the death-rate between these two periods was-

"Even if it can be shown that in some instances syphilis has been inoculated by vaccination, the conclusion would still remain that this cannot have been so to any substantial extent."

Cancer.

The mortality from cancer has considerably increased in recent years. A great part of the increase is probably due to improved diagnosis, as the increase is accompanied by a decrease of deaths from tumours, abdominal diseases, and other obscure causes. However that may be, the increase cannot be due to vaccination, as there has been an actual decrease in the death-rate from cancer in young people up to fifteen years of age; and the greater part of the increase is among old people.

Erysipelas.

This is a disease largely affecting children; but about two-thirds of the infants who fall victims to it die in the first three months of life, that is before they are vaccinated, and only one-third in the next nine months. The Parliamentary Return already referred to showed that among infants the mortality from erysipelas was decreasing. And with regard to this disease another curious illustration comes from Leicester. Comparing the period 1883-87, when vaccination was general in England and anti-vaccination general in Leicester, with the period 1863-67, when vaccination was general in both the whole Country and Leicester, it is found that in England there had been a *decrease* of infant mortality from erysipelas of 16.7 per cent., and in Leicester an *increase* of 41.5 per cent.

Scrofula and other diseases.

With regard to all other diseases in which the rate of mortality has been said to have been increased by vaccination, the Commissioners unhesitatingly declare that there is no evidence to justify the statement, and they support their declaration in most cases by considerations taken from the experience of Leicester as compared with that of the rest of England.

General conclusions with respect to all the specified diseases.

The Commissioners hold that the evidence is overwhelming to show that in some of the diseases vaccination cannot have had any effect upon the mortality from them, and that not in any one of them did it have an appreciable effect.

PERSONAL INJURY OR DEATH RESULTING FROM VACCINATION.

The next portion of the Report is devoted to an examination of the question connected with the allegations of specific injury or death resulting from vaccination. Since 1880 the registers have given a separate heading for deaths from "cow-pox and other effects of vaccination :" there were 283 such cases registered from 1881 to 1885, and 279 from 1886 to 1891. Subsequently to 1891 all cases reported of either fatal or non-fatal injuries arising from vaccination were at once communicated to the Commissioners. After 1886 many of the cases were subjects of special inquiry by the Local Government Board, and since the opening of the Commission inquiries have been made into all reported cases except those which after preliminary consideration were evidently not worth further attention. The conclusion arrived at in the case of non-fatal injuries is that serious injury cannot have arisen in any considerable number of cases.

Fatal injuries.

Erysipelas is accountable for about half the mortality attributed to vaccination. It may be produced in the few cases that are rightly connected with vaccination, either by the presence in the lymph used of the actual germ or virus of enysipelas, and its introduction with the lymph into the puncture made for the operation, or by the subsequent introduction of the virus into the wound. In the former case it may be almost entirely prevented by only using lymph from healthy children whose arms present no signs of inflammation, and may be altogether prevented by using only calf-lymph. In the latter case, as erysipelas can follow the slightest possible wound, such as the scratch of a pin, it is clearly impossible to say that there is no risk whatever of its following the puncture made by the operation of vaccination but the cases investigated nearly always showed that when it occurred either erysipelas was prevalent in the neighbourhood, or that there was lack of care and cleanliness. With regard to the precautions to be taken with respect to these matters recommendations are made further on in the report.

With regard to septic diseases, scrofula and skin diseases, their occurrence is often attributed to vaccination, and the attribution makes the operation more unpopular; but an examination of the whole evidence produced, often vague and inconclusive, leads the Commissioners to the decision that there is no reason to believe that vaccination tends in any material degree to increase the prevalence of these disorders.

Nothing has produced so deep an impression hostile to vaccination as the apprehension that syphilis may be communicated by it. It was formerly held that this communication is impossible, but the absolute impossibility is no longer held, but it is certain that this communication is extremely rare. Only two clear cases appear to be recorded, and they occurred at Leeds 25 years ago. The celebrated "Leeds case" of 1889 is shewn not to have been one, though it is dwelt upon at length by the two dissentients, as, though it was a case of syphilis, it could not have been produced by There is no evidence to show that leprosy has ever been produced by vaccination, and if there was any risk it would be quite avoided by the use of calf lymph.

point out that its communication is impossible when calf lymph is used.

The Commissioners, while acknowledging that there are the dangers that they have alluded to attending vaccination, declare that they are insignificant in relation to the extent of vaccination, and are diminishing under present regulations, and will do so still more in the future under the further precautions that they suggest.

(C.) THE MEANS TO BE ADOPTED TO LESSEN ILL EFFECTS OF VACCINATION.

In considering these means the Commissioners say—"we put the use of calf-lymph in the "forefront because this would afford an absolute security against the communication of syphilis. "Though we believe the risk of such communication to be extremely small where humanized lymph "is employed, we cannot but recognise the fact that however slight the risk, the idea of encountering "even such a risk is naturally regarded by a parent with abhorrence. We think therefore that "parents should not be required to submit their children to vaccination by means of 'any but calf-"lymph, but this should not preclude the use of humanized lymph in case they so desire." And they further think that the state is under obligation to put the obtaining of calf-lymph within reach of all.

In the next place the Commissioners recommend that in England and Ireland the obligatory age for vaccination should be extended from three months to six months, as in Scotland, or even to twelve months, if provision were made that if small-pox occurred in a district the vaccination of all children in it of the present obligatory age of three months should be compulsory.

They next propose, that in view of the carelessness that sometimes induces erysipelas, the Local Government Board should issue clear and simple rules for guidance in the care of the vaccinated arm.

They also recommend that the vaccination should be performed in the child's home instead of at a public vaccination station. The medical man attending at the house would be better able to judge whether circumstances made it expedient to postpone vaccination for a time, and such circumstance should include, not only the health of the child at the moment, but also the state of its surroundings and the prevalence of erysipelas, scarlet fever, measles, or chicken-pox in the neighbourhood.

They discourage the opening of the vaccination vesicles, except for adequate reason.

They think lymph should be preserved in tubes, and not on "dry points," but each tube should only contain lymph sufficient for one operation. Every instrument used should be boiled or otherwise sterilised before each operation. The insertions should not be placed too near together so as to injure the vitality of the tissues between them.

And finally, they think that at present the time fixed for the inspection after the operation is too early, and that sometime during the second week should be substituted for the eighth day; and that another inspection should be obligatory during the third week after the operation. In ease the child needs medical assistance in consequence of the vaccination it should be the duty of the vaccinator to render it.

(D.) AS TO OTHER MEANS THAN VACCINATION FOR PREVENTING SMALL-POX: COULD THEY BE RELIED ON IN ITS PLACE?

After giving an account of what has been done in Great Britain in the way of providing means of isolation in the shape of hospitals for small-pox patients, of the mistakes at first made in connection therewith, and the ultimate good that has now resulted therefrom, the 'report proceeds to thus answer the first part of the above question—" We think that a complete system of "notification of the disease, accompanied by an immediate hospital isolation of the persons attacked, "together with a careful supervision or, if possible, isolation for sixteen days of those who had been "in immediate contact with them could not but be of very high value in diminishing the prevalence "of small-pox," conditionally that no large number of patients should be kept in a hospital in a populous neighbourhood, and that perfect ambulance arrangements should be made.

As to the second part of the question, after reference to the Australian system when small-pox is introduced into any of the colonies, the Commissioners say : "We can see nothing, then, to war(No. 45.)

"rant the conclusion that in this country vaccination might safely be abandoned and replaced by a "system of isolation. If such a change were made in our method of dealing with small-pox, and "that which had been substituted for vaccination proved ineffectual to prevent the spread of the "disease (it is not suggested that it could diminish its severity in those attacked), it is impossible to "contemplate the consequences without dismay. . . We are very far from under-rating the "value of a system of isolation. . . But what it can accomplish as an auxiliary to vaccination "is one thing; whether it can be relied on in its stead is quite another thing."

(E.) AS TO ALTERATIONS IN THE MEANS FOR SECURING THE PERFORMANCE OF VACCINATION.

Compulsory vaccination is now enforced by a pecuniary penalty. The Commissioners, in their Fifth Report, had already recommended that repeated penalties should no longer be enforced. The law can only be put into force by the guardians of the poor, and these are usually elected from a class of people who are not eminently fitted to have such a duty entrusted to them. And much of the opposition to vaccination is due to the manner in which the law is enforced. The opposition is very local in England and is unknown in Scotland and Ireland. In considering the alterations that should be made in the means of enforcement, the main object to be kept in view is to secure that vaccination should be as widespread as possible. The Report goes on,—"that it would con-"duce to increased vaccination if a scheme could be devised which would preclude the attempt (so "often a vain one) to compel those who are honestly opposed to the practice to submit their children "to vaccination, and, at the same time, leave the law to operate, as at present, to prevent children "remaining unvaccinated owing to the neglect or indifference of the parent. . We may "give the following as examples of the methods which might be adopted. It might be provided "that if a parent attended before the local authorities and satisfied them that he entertained such an "objection no proceedings should be taken against him. . . . We do not think it would be any "real gain to parents who had no conviction that the vaccination of their children was calculated to "do mischief to take these steps rather than submit them to the operation. At the same "time we think that it would be well to make the change a temporory one in the first instance, say "for a period of five years, and that in the meantime its effects should be carefully watched."

To render vaccination as little burdensome as possible to the parents, it is proposed not only that all fees for the operation should be paid for by the authorities, but also that a modification of the Scotch system should be adopted. "We think that where a certificate of successful vaccination "is not received within the prescribed time a notice should be served upon the parent that a public "vaccinator will attend" [at the child's residence] "on a day named, for the purpose of vaccinating "the child, unless the operation has been already performed, and that the only offence rendering the "parent liable to prosecution should be the refusal to permit the child to be vaccinated by the public "vaccinator when he attends for that purpose. The adoption of such a scheme would render the "burden much less than it is where the child has to be taken to a public station, not only for the "purpose of vaccination, but again at the end of a week for inspection. The vaccination "and inspection would both take place at home. . . . The public vaccinator ought . . . "to afford medical attendance without cost to the parent in all cases in which the vaccination does "not run an ordinary course, and owing to supervening illness such attendance becomes necessary."

As regards general re-vaccination, the Commissioners, though fully alive to its great protective value, do not think it practicable to make it compulsory, but recommend that the fee for the operation should be paid by the authorities.

This final Report, as already mentioned, is signed by eleven of the thirteen surviving Commissioners, two of them, Sir Guyer Hunter and Mr. Hutchinson,—probably the two most experienced, the one administratively and the other professionally, of the members in the matter of vaccination, append a note that they are of opinion that the only change made in the law should be to permit a magistrate to accept a sworn deposition of conscientious objection, and to abstain from the infliction of a fine : and also that, notwithstanding the difficulties in the way, a second vaccination at the age of 12 years ought to be made compulsory. Two other members, Mr. Whitbread and Mr. Bright, think too much of the compulsory element is still retained, and the two dissentients, Dr. Collins and Mr. Picton, joined in signing this note of reservation though they did not sign the report.

THE REPORT OF THE TWO DISSENTIENTS.

The difference between the character of the report of the majority and that of the two dissentients, has already been alluded to. It is very marked, especially in regard to breadth of view and logical deduction from premises. The dissentients' argument against vaccination may be said to be virtually based upon the fact that the operation is not an exception to all other human operations, by being perfect and faultless. It is to be opposed because, though it has saved 10,000 lives when properly done, it has taken one when carelessly done. The endeavour to be made is not to save the one life by greater care, but to get rid of the operation altogether without considering the saving of 10,000 lives. The effect of reasoning on lines like this is to induce the condition that strains at a gnat and swallows a camel. Thus, when referring to the two or three cases where the connexion of death and vaccination has not been disproved, the two dissentients say—" We are Again, while the majority Report invariably gives comparative figures, the two dissentients seldom do. Arguments based on such figures are valueless. For instance, what is the use of reporting that "at Sheffield, in 1887-8, there were, according to the census, 353 cases of small-pox "in vaccinated children under 10," unless we know the number of cases in unvaccinated children? Of course some impression is produced among the unthinking by this recital of a large number of cases among vaccinated children. But the majority of the Commission depend upon no such factitious effects: and turning to their Report we find that this number represents 7.9 per cent. of the vaccinated children who were exposed to infection, while of the unvaccinated in that condition 67.6 per cent. were attacked.

The use the dissentients make of the statistics they give is often strangely illogical and unreasonable. For instance, they give the following table of the mean annual deaths from small-pox in England at different ages per million living at each life period :---

А	ge-0 to 5	5 to 10	10 to 15	15 to 25	25 to 45	45 and upwards.
1847-53-Voluntary Vaccination	. 1617	337	94	109	62	22
1872-80-Compulsory "	. 323	186	98	173	141	58

The dissentients use these figures as affording an argument for the repeal of the compulsory law. They virtually say that although it is shewn that every year during the compulsory period 1445 lives in every million of the population were saved in the first ten years of life, yet because it is shewn that 179 adult lives were lost, vaccination must be mischievous. The argument that the majority would base upon the table would be that it proves what they invariably assert, that vaccination is most protective during the ten years after the operation, and it saved in those ten years these 1445 lives lives per million. The 179 lives were lost because the operation had not been repeated. So that the table, instead of furnishing an argument against compulsory primary vaccination, furnishes in reality a strong argument in favour of it and of re-vaccination.

The dissentients suggest that the means "other than vaccination" which should be employed to protect a community from small-pox should be isolation and provision of adequate hospitals in isolated positions, and quarantine stations separate from hospitals. They do not clearly say that such means could be relied on in place of vaccination. They propose that these adequate hospitals should be in permanent readiness, capable of extension if required, with a vigilant sanitary staff ready to deal promptly with first cases, and if necessary make a house-to-house inspection ; the Medical Officer to receive sufficient remuneration to make him independent of private practice ; special ambulance service ; daily observation of all who have been in close contact with the patients to be carried out at the quarantine station away from the hospital or at their own homes : the hospitals and quarantine stations to be made attractive and comfortable, with free treatment and accommodation for all classes and compensation for detention, and medical examination of all tramps. The majority Report agrees with all these precautions when carried out on the practicable scale necessary when taken in connexion with a vaccinated community ; but point out the utter impracticability of carrying it out as a substitute for vaccination. Wherever it has been tried in a vaccinated community in times of epidemic that is, in a community not one-tenth part as liable to catch the disease as an unvaccinated one—it been found to be impossible to provide adequate accommodation : what, then, would be the possibility of providing it, to say nothing of the cost of constantly maintaining it, in an altogether unvaccinated community ?

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VACCINATION IN THE AUSTRALASIAN COLONIES.

In answer to requests, information on the above subject has been received from New South Wales, New Zealand, South Australia, and Victoria, but none has been received from Queensland or Western Australia.

LEGISLATION.

Whether compulsory.—In the colonies of New Zealand, South Australia and Victoria vaccination is made compulsory by Statute, but there is no such compulsory Act in force in New South Wales.

Nature of compulsion.—In New Zealand parents and guardians of an unvaccinated child are liable to a penalty not exceeding 40 shillings. The penalty for not bringing into Court a child for inspection is any sum not exceeding 20 shillings. In South Australia and Victoria the penalty for non-vaccination is a sum not less than ten shillings and not exceeding 40 shillings for the first offence, and for any subsequent conviction in respect of the same child twice the amount of the penalty imposed in the preceding conviction, provided that the penalties in any conviction in respect of the same child shall not exceed five pounds.

Age limit.—In all three colonies every child must be vaccinated within six months of its birth—provision being made for postponement by medical certificate where necessary. In New Zealand the liability to vaccination ceases at 14 years of age.

Lymph used.—In all three colonies the public vaccinators may, if they think fit, at the statutory inspection of the child's arm on the eighth day after vaccination, take from it lymph for other vaccinations. In South Australia the parent may require calf-lymph to be provided and used for the operation; and if it be not provided he is not punishable for refusing vaccination. In the other colonies and in New South Wales calf-lymph provided by Government is much used, though there is no statutory obligation on the part of the vaccination authorities to provide it.

Payment by parents.—In none of the three colonies are public vaccinators allowed to receive any fees from parents for vaccination or certificates.

Recovery of penalties.—In New Zealand information may be laid by Registrars, Public Vaccinators, and Vaccination Inspectors. In South Australia the Registrar-General is from time to time every year to send to the Commissioner of Police a list of the children of due age with respect to whom he has not received certificates of vaccination, and the Commissioner, after enquiry, is to take action. In Victoria the Deputy-Registrars are to send such lists to the Police authorities of their districts, who are to take like action.

Re-vaccination.—In all three colonies re-vaccination is encouraged by making provision for the gratuitous performance of it.

Other compulsory arrangements.—In New Zealand all inmates of reformatories, industrial schools, asylums, public hospitals, and prisons are to be vaccinated on admission, and so is every child in every school maintained in whole or in part by public grants or by endowments; and no person is to be appointed to any public office who has not been vaccinated.

When Small-pox is present.—In South Australia and Victoria, when it is officially notified that small-pox is present, all occupiers of houses are required to, immediately notify all cases occurring therein, or cases of eruptive diseases, under a penalty, in South Australia, not exceeding £50 nor less than £20, and in Victoria, not exceeding £20 nor less than Two pounds.

Vessels arriving with Small-pox.—In South Australia and Victoria, should any vessel arrive with small-pox, or having had small-pox on board within 40 days of arrival, the health officer may vaccinate every person on board or landed therefrom, and all persons refusing to be vaccinated or to allow their children to be vaccinated are liable to a penalty not exceeding ten shillings and not less than five shillings a day for every day of remaining unvaccinated.

Inoculation.—This is made illegal in all three colonies under varying penalties, being, in New Zealand, one not exceeding Ten pounds or a month's imprisonment, and, in South Australia and Victoria, one not exceeding $\pounds 100$ or twelve months.

ADMINISTRATION.

Vaccination Districts.—In the three colonies in which there is compulsory vaccination, there is power to form convenient vaccination districts to afford greater facilities for carrying out the Acts, with suitable places for performing the operation, and due notice is to be given of the time when the Public Vaccinator will attend.

Public Vaccinators.—In the three colonies one or more Public Vaccinators may be appointed for each district. In New South Wales there are about 110 Government Vaccinators appointed, but the majority of them do no vaccination. In general, the Public Vaccinators are legally qualified medical practitioners, but in New Zealand persons holding certificates of competency procured after examination from duly appointed certifying officers, are also employed.

Regulations and Instructions.—The statutory duties of Public Vaccinators are to gratuitously vaccinate all persons fit for vaccination coming or brought to them; to give such persons notice to return for inspection to the same place on the same day of the following week, and then to re-vaccinate such as need re-vaccination (with subsequent inspection as before), and to give (usually in duplicate) certificates of successful vaccination with respect to the successful cases; and, after three unsuccessful vaccinations, certificates of insusceptibility. With respect to those who are unfit for the operation at the time of being brought to the vaccinator, certificates of postponement for a defined time are to be given, renewable when necessary. In South Australia and Victoria the operation is to be performed by making four punctures, and certified as successful if three perfect normal vesicles are formed. In Victoria each Public Vaccination is supplied with full instructions as to the giving of certificates; the method of vaccination: instruments and their sterilisation; the taking of lymph from children; the postponement of vaccination on account of prevalent scarlatina, measles, or diphtheria, or on account of the condition of the child; the record of the Vaccinator's work, and all such like matters bearing on the due fulfilment of his duty. In New South Wales instructions to the Government Vaccinators also deal with many of these matters, but as vaccination is not compulsory the instructions are naturally not so complete.

Registrars.—The statutory duties of Registrars are to notify the parents of each child whose birth is registered as to the law of vaccination, to keep records of all vaccination certificates received, and to furnish lists of all defaulters as respects vaccination. In New Zealand they are also usually appointed Vaccination Inspectors, so as to give them a direct interest in furthering vaccination.

Vaccination Fees.—The following are the fees paid by the Governments of the respective colonies :—

In New South Wales the Government Vaccinator is paid 2s. 6d. for each successful case of vaccination or re-vaccination performed within five miles of his residence, and 3s. 6d. for each case beyond that distance.

In New Zealand the Public Vaccinators are paid 2s. 6d. for each case of successful vaccination, and the Vaccination Inspector 1s., if a civil servant, and 1s. 6d. if not.

In South Australia the Public Vaccinators are paid 2s. 6d. for each case of successful vaccination, and 1s. for the certificate of it sent to the Registrar-General.

And in Victoria the Public Vaccinators are paid 2s. 6d. for each case of successful vaccination, and are allowed mileage (usually 2s. a mile one way) when required to visit outlying districts. The Registrars receive 6d. for registering each successful case.

RESULTS.

It is impossible to give the exact results of the action of the systems by which vaccination is sought to be made general in the colonies, without knowing the numbers of the children who die each year in the several colonies before they have reached the age of compulsory vaccination; but the following figures may be regarded as substantially accurate for the last year of which the records are available :—

Without compulsory Vaccination.—In New South Wales the proportion of the number of Vaccinations performed relatively to the number of survivors of children born in the year is about 7 per cent.

With compulsory Vaccination, the proportions are-

In New Zealand, about 66 per cent. In South Australia , 69 ,, In Victoria , 75 ,,

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