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FROM THE ANNUAL REPORT OF THE

MEDICAL OFFICER

OF

THE LOCAL GOVERNMENT BOARD

For 1884.

- 1. VACCINATION AND PUBLIC VACCINATION.
 - 2. SMALL-POX AND VACCINATION.



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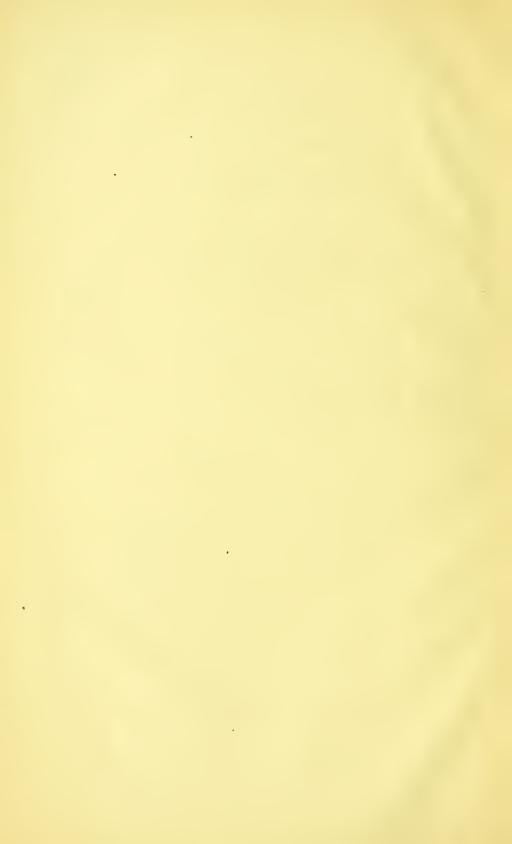
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1886.







EXTRACTS

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MEDICAL OFFICER

OF THE

LOCAL GOVERNMENT BOARD

For 1884.

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EXTRACTS FROM THE ANNUAL REPORT

OF THE

MEDICAL OFFICER OF THE LOCAL GOVERNMENT BOARD (Dr. Buchanan).

For 1884.

I.—VACCINATION AND PUBLIC VACCINATION.

MEDICAL Officer's REPORT.

(a.) The annual returns of vaccination officers under the Act of Vaccination 1871 have been examined for the twelfth time, and the analysis of them is appended (App. No. 1). They show that of the children whose births were registered in England and Wales during the year 1882, 763,525 or 85.9 per cent. had been successfully vaccinated at the date up to which the returns are made.* Allowance being made for the children who had died before that date, the returns give evidence of about 95 per cent. of the infantile population having received the benefits of vaccination within the first year or so after their birth. As this is approximately the usual average, it follows that the younger

officers' returns for 1882. (App. No. 1.)

^{*} Of the children recorded in any return as "successfully vaccinated," some are dead at the date of such return, having died after their vaccination, and these deaths would not appear in the return :- wherefore the actual number, 763,525, of the present return does not profess to be the precise number of children born during 1882 and vaccinated and living at the time the return is made up. Similarly the number of those recorded as "remaining unaccounted for" at the date of any return includes a certain number of children who have died, but of whose death the vaccination officer has no knowledge, and also a certain number of children who have been vaccinated, but of whose vaccination the vaccination officer has no certificate: - wherefore the actual number, 35,423, of the present return does not profess to be the precise number of children born during 1882, and unvaccinated and living at the time the return is made up. But for practical purposes of comparison with each other, the foregoing two figures afford a just estimate of the relative additions of vaccinated and unvaccinated made, at the time of the return, to the infantile community of England and Wales by the births and vaccinations of 1882.

English population is made up of not less than 19 vaccinated to each unvaccinated individual, a fact which should always be kept in mind when the numerical incidence of small-pox upon the one and the other class is under consideration.

The returns of 1882, though giving results almost identical with the average of 1878-82, yet, as compared with the returns of 1881, show a slightly larger proportion of "cases not finally accounted for" in the vaccination officers' books. The increase is principally observable in the metropolitan unions, and it is an increase above 1881 only; with the exception of that year, the return for 1882 is the best that has ever been presented by London.

Metropolitan.

There is instruction in these recent metropolitan returns. Neglect of infantile vaccination, represented by the figure 7.1 in 1877 and 1878, increased in 1879 to 7.8, and in view of this increase fresh endeavours were made to ensure obedience to the law, with the result that the 7.8 of 1879 became materially reduced in the two following years. The year 1881, however, was a period of epidemic small-pox in London, and the endeavours of vaccination authorities and their officers were aided by the solicitude of parents to obtain for their infants the protection which vaccination confers. The "cases not finally accounted for "fell in that year to 5.7 per cent. of registered births. But no sooner is the epidemic over than, among a certain class of people, this solicitude is exchanged for an attitude of indifference and of content to postpone a duty which can, these people suppose, be just as well fulfilled some other time. Among them, accordingly, in 1882, the aid afforded to the law by fear of smallpox has disappeared, and neglect of infantile vaccination is measured by the larger figure 6.6; of which it can only be said that it represents a certain good progress in the operation of the usual agencies for procuring and registering infantile vaccination in the metropolis.

Vaccination census in St. Pancras.

I take leave in this place, with an object that will immediately be apparent, to make a digression for the purpose of quoting a vaccination census recently taken in the parish of St. Pancras. This census was taken by skilled enumerators under the instructions of the guardians acting as vaccination authority for the parish. It took account of 142,788 individuals, being about three-fifths of the total inhabitants, the remaining two-fifths being persons who were away from home at the moment of inquiry. There was no reason for supposing that the facts about vaccination ascertained for the three-fifths did not truly represent the facts for the whole. Information was refused to the enumerators in the case of 1,168 persons only. Now, of 3,278 infants under one year old medically examined for the purpose of this census, closely 60 per cent. were found to have been successfully vaccinated; 11 per cent. had been vaccinated, but had not at the time been officially inspected; and 29 per cent. had not been vaccinated, the

majority of these last being children under three months of age.* Next, of children over one year but below ten years of age, 25,917 were examined, and of these over 98 per cent., or including a few under vaccination, over 99† per cent. had been vaccinated.

What is of present value in these statistics of children actually living in St. Pancras is the fact that they take account, in a way that vaccination officers' returns cannot do, of children whose births may have escaped record, and of those born outside the parish. The vaccination officers' returns respecting the vaccination of children whose births were registered in St. Pancras in 1882 were made up at the beginning of 1884, and they finally accounted for no more than 94.3 per cent. of those children. Hence, if anyone should think of unregistered and immigrant children as adding to any material extent to the actually unvaccinated portion of the juvenile community of St. Pancras, a comparison of the figures with those of the house-to-house census will give him the means of correcting his impression; and this is my principal object in quoting the recent enumeration.

[The account thus far given deserves to be completed by mention of the people over 10 years of age. Of these, 112,425 were examined; nearly 99 per cent. of them were found to have been vaccinated, and about 11/4 per cent. not to have been vaccinated.§ Of the 111,048 persons over 10 who had been vaccinated, 2,042, or about 19 per 1,000, were seen to be scarred by small-pox, while of the 1,377 who had never been vaccinated, no less than 857, or 622 per 1,000, bore scars of small-pox on their faces.

(b.) The vaccination which is gratuitously provided by the State, Public and which is had recourse to by about two-thirds of those English parents who require vaccination for their children, has continued to be administered by the guardians of the various unions, acting under the advice and direction of the Local Government Board. The working of this "public vaccination" has been, during 1884, the subject of examination by the Board's medical inspectors in 1,099 vaccination districts comprised in 245 unions. Awards of money were made from the Parliamentary grant to 729 public vaccinators. who were reported by the Board's inspectors as having performed the whole of their duties in a satisfactory manner.

vaccination.

^{*} These figures would be changed to 56, $10\frac{1}{2}$, and $33\frac{1}{2}$, if we should suppose that all infants respecting whose vaccination information was refused were in reality unvaccinated.

[†] This figure would be changed to 96 or 97, if we should suppose that all children between 1 and 10, about whose vaccination information was refused, were in reality

[‡] A similar census recently taken in West Ham Union just beyond the metropolis, tends to almost identical conclusions. The results, however, are not so exactly recorded as in the case of St. Paneras.—The characters of the vaccination were in a certain proportion of the St. Paneras cases unsatisfactory, but this consideration is not in question here.

[§] This figure would be raised to $1\frac{1}{2}$, if the persons over 10 years of age who refused the information were to be reckoned as unvaccinated persons.

Public vaccinators are, as a body, found to operate efficiently and with proper care and judgment; and their stations are frequented, not by the poor only, but by other people who have learnt the importance of having vaccination performed under the most advantageous conditions. I have shown in a recent Report (1881) that in London the vaccination given by public vaccinators afforded a greater protection against epidemic small-pox than the average vaccination of the town, and I now reprint that evidence in Appendix No. 4.

National Vaccine Establishment.

(c.) The National Vaccine Establishment of the Board, for the supply of lymph to vaccinators, public and private, who are proposing to establish local series of vaccinations, has continued its operations in the customary way, and since July 1884 has added to its business the function of supplying lymph (in a preserved state) for the use of the Army Medical Service. The Establishment has received from certain approved operators in various parts of the kingdom supplies of selected humanized lymph; it has made careful examination of this lymph, and has rejected all to which objection might be taken; and has distributed 2,614 points and 13,090 tubes to 9,677 applicants. It has also received from the Board's Animal Vaccine Station 13,139 points and 114 tubes charged with calf-lymph, and has distributed the tubes and 7,578 points to 1,770 applicants. Further, the Establishment has supplied to the Army Medical Department 1,452 tubes of humanized lymph, and 5,432 points of calf-lymph.

Animal vaccine.

At the Board's Animal Vaccine Station situated at 95, Lamb's Conduit Street, the primary vaccinations, which had numbered 1,294 in the previous twelvementh, increased to 2,915 in the year ended March 31st, 1885; the increase being doubtless largely due to the incentive furnished by a small-pox epidemic. Owing to the same cause, there was an unusual demand for re-vaccination; and for some months a supplementary station was at work to meet this requirement.

The supply of calves has been on the whole satisfactory. A valuable improvement in the practice of the station has been made by keeping each animal for a week before its transfer to Lamb's Conduit Street under observation and fed upon appropriate food, at premises in Somers Town. Through this precaution, originally adopted for the sake of avoiding foot-and-mouth infection, the ailments that used often to trouble the calves while under operation are now seldom met with, and the course of the

vaccine disease is rendered more regular.

The success of calf vaccination on children has been all that could be desired; and has been practically identical with that of vaccination with humanized lymph in the hands of the same operators. Dr. Cory tells me that he has produced 985 vesicles, and that the Assistant Director has produced 991 vesicles for every thousand insertions of calf-lymph which they have respectively made on infants. This experience is of course with lymph used

in a perfectly fresh state. The "keeping" qualities of the lymph are at present matter of observation by Dr. Cory.*

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(d.) I wish again to note the extent of the danger that accompanies vaccination under the circumstances of English vaccination practice. There is little that man, woman, or child has to do, or to have done for them, that does not contain an element of danger; but reasonable people, while endeavouring to remove all preventable risk, do not regard this risk as a reason for not doing what is proper to be done. For example, I find from the last published annual report of the Registrar-General that 974 children under one year old were suffocated in a twelvemonth by bed-clothes; the fact gives a reason for care in the use of bedclothes, but gives no reason for going without them. So, 55 deaths (51 being of infants under one) were recorded in that report as

clothes; the fact gives a reason for care in the use of bedclothes, but gives no reason for going without them. So, 55 deaths (51 being of infants under one) were recorded in that report as from vaccination and the results of vaccination; they doubtless were for the most part cases of erysipelas, and their occurrence gives reason for cleanliness of lancets, for avoidance of filthy "vaccination shields," and generally for care in vaccination; but it assuredly gives no reason for going without vaccination. When we learn from the same report that five infants died in the same year from "circumcision," the dimensions of the danger implied in the 55 deaths by "vaccination" may be understood.—As for any remoter injury to the health of the community, attri-

* It deserves notice that the rate of success in vaccination obtained at the Board's stations, where vaccination is done with perfectly fresh lymph, human or animal, is not less than 99 per cent. of the individuals operated on. This rate of success is nowise to be had when the lymph is used in any preserved condition. Thus I find from the Report of the Army Medical Department of 1882 (pp. 17-18), that of 641 attempts at vaccination of recruits who had never before been vaccinated, no less than 166, or 26 per cent., "failed" altogether, and another 219, or 34 per cent., had "modified vaccine pustules" only. There remain only 40 per cent. of completely satisfactory primary vaccinations; and, among the reasons for the great difference between this figure and the 99 per cent. of the Board's stations, the condition of the lymph—whether taken direct from a vesicle or preserved in any manner—

butable to vaccination as practised in England, I can find no

unquestionably is one of the most important.

evidence of it, statistical or other.

f I note in this connexion, valeat quantum, that erysipelas generally is contributing to the English death-rate to a smaller extent than 30 years ago.—Referring to two diseases which have been supposed to have become more fatal during the time that vaccination has been compulsory, and to have been increased by the practice of vaccination, I do not think it necessary to speak at length of tubercular diseases of children. The small increase of deaths registered as "tabes mesenterica" has been balanced by a decrease in the deaths of children under five registered as from "phthisis," the death-rate from the two together having kept very closely uniform, and the changes in registered mortality of the one and the other being obviously a question of which of certain synonyms is used in medical certificates. As well might an increase of "intemperance" be ascribed to vaccination, because x deaths per million living certified as due to this cause in 1850-54 had increased to y deaths in 1875-9, while y deaths per million living certified as due to "delirium tremens" in 1850-54 had decreased to x deaths in 1875-9. But as this consideration of changed nomenclature is not so immediately seen in the case of syphilitic disease, I may usefully say a few words as to an apparent increase of mortality registered from that cause. The appearance of increase dates from 30 years ago, since which time the rate of mortality registered as from syphilis has been practically stationary. Now, it is just about 30 years ago that the English medical profession began to understand the syphilitic nature of a

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Alleged injuries by vaccination during 1884.

Investigation has been made by inspectors of the Board's Medical Department into fourteen cases where vaccination was believed to have produced some injurious effect. The allegations of injury came from a variety of sources and were usually of very indefinite character. One of them proved to be an example of careless vaccination by a private practitioner, resulting in undue irritation of the arms of several children. The rest of the complaints referred to single children, and in two of these instances only did there appear reason for connecting the child's complaint with its vaccination; one was the case of a child whose arm had been dressed by its mother with brown paper and cobbler's wax, and who got an axillary abscess in consequence: another case was a slight eruption of the skin following vaccination. There was a third case where the healing of vesicles had been delayed, and it was thought possible that one of the reputed syphilitic vaccinations had been detected; but the child had been vaccinated with calf-lymph, and calves are not known to be syphilitic. The above fourteen were all the allegations of injury from vaccination that reached the Board during a period in which some 750,000 children were vaccinated.

number of obscure diseases, and to record syphilis as the primary cause of death in such cases. Many a death that would formerly have been certified as due to "atrophy" or "debility" in infancy, or to "brain disease" in adult life, has during the last 30 years been registered as having syphilis for its "primary" cause, the former vague term appearing (if at all) as the "secondary" cause. Accordingly, the numerical abstracts, which take account of one, and that the more essential cause of death, contain record of more deaths from syphilis than they formerly did. But there is no reason for believing that, in point of fact, syphilis has become more common or a more frequent cause of death in the English community. Nor, if we should believe it to be so, would there be any reason for connecting the increase with the increased practice of vaccination in England.

As matter of English practice, with all the opportunities for knowledge that come to me, and with an eagerness of search after the facts, I cannot learn of communication of syphilis in vaccination being actually effected once in a million of

vaccinations.

II .- SMALL-POX AND VACCINATION.

Small-pox was prevalent during 1884 in a good many towns small-pox in its and districts of England, showing, as usual, a higher death-rate vaccination. in London than in the rest of the kingdom; and I propose to take this occasion to consider at some length the recently observed relations between small-pox and vaccination, more

particularly in the experience of London.

The actual mortality from small-pox in London in the 53 weeks In London in of 1884 was 913 deaths registered as occurring in houses and 1884 and other recent years. hospitals within the metropolis, and 338 registered as occurring among London residents removed for treatment to hospitals beyond the metropolitan boundaries. Together, these amount to 1,251 deaths, or 313 per million inhabitants of London, a notable excess over the mean annual rate (240 per million) of the preceding 10 years. Recent more distinct "epidemics" in the metropolis have given the death-rates of 620 in 1881, 390 in 1878, 710 in 1877; and the very severe epidemic of 1871, the largest experienced by the metropolis since registration began, was accountable for a death-rate of 2,420 per million: on each of these recent occasions the rate of death was much larger in London than in the provinces. In non-epidemic years the deathrate in the Metropolis has subsided even to 15 and 11 per million (1874 and 1875): and in the provinces to 6 and 11 per million (1879 and 1880).

To state these facts in another way: small-pox, which on the mean of 1874-83 contributed 11 deaths to every 1,000 deaths from all causes in London, was responsible for 15 deaths during 1884; while in the epidemic year 1881, it caused 29; in 1878 it caused 17; in 1877 it caused 33; and in the severest epidemic of 1871 it caused 98 deaths out of every 1,000 from all causes in the metropolis. In the non-epidemic years just quoted, the contribution of small-pox to total mortality has fallen to 0.7 and 0.5 in the metropolis; to 0.3 and 0.5 in the provinces.*

I have reproduced in an appendix to this Report (No. 5, In London p. 9) the Statement from the Yearly Bills of Mortality delivered during last three in by Dr. Lettsom to the Committee of the House of Commons appointed in 1802 to consider Dr. Jenner's petition to the House;

As I am referring in the text to small-pox mortality in London during the 17th and 18th centuries, I have here used both of the above methods of indicating the

recent intensity of the disease in London.

^{*} The plan of estimating the relative mortality from a given disease by taking its death-rate upon a known population is, on many grounds, to be preferred to the method of taking its proportion to total mortality. The former plan is now, thanks to our excellent registration system, available everywhere in England, and when we have to compare mortality at one and another place during the same period or at the same place during the last half century, we of course consider the rate of death by the disease upon the population. But when it is desired to examine the varying mortality from a particular cause, in the same place during a long period, including times before registration existed and before censuses were taken, a good way of appreciating the changes in its fatality, one that serves for most practical purposes, is to note the share of total mortality that is borne at one and another time by the cause in question.

and I have brought the series of figures down to the present time (pp. 32-33). They show the share of London mortality borne by small-pox in successive years during the last three centuries.

The recent average contribution of small-pox to total deaths is less than a sixth of what it was in the 17th century, about an eighth of what it was in the 18th. The maximum contribution of which I have spoken as having been recently made by small-pox to the general mortality of London (viz., in the great epidemic of 1871) was during the 17th and early 18th centuries exceeded every five, ten, or twenty years; and it was no more than the customary yearly contribution made by small-pox during the latter half of the 18th century when inoculation was in vogue. As for such petty yearly contributions as one and two per thousand, they would formerly have been regarded as Utopian, not even to be hoped for.

This reduction of the customary amount of fatal small-pox in London to a sixth and an eighth part of what it used to be (as measured by the contribution of small-pox to mortality from all causes) is unquestionably attributable to the general use of vaccination;* but it is not a complete fulfilment of the anticipations of those who at the beginning of the century saw the protection that vaccination was able to confer upon the individual. Yet the gain to be obtained by the community from vaccination is

even more demonstrable to-day than it ever was.

Small-pox mortality at different periods of life:

In a notable passage in his 43rd Annual Report (here reproduced in Appendix No. 6), the Registrar-General says: "In discussions concerning the protective influence of vaccination, " too exclusive attention is usually given to the change that has " occurred since its introduction in the death-rate from small-pox " at all ages. It is important" he points out "that not only this, " but the changes in the death-rate at successive periods of life, " should be taken into account." And inasmuch as, during the whole period for which such investigation is possible, vaccination has always been in use, and there has always existed some or other public provision for its gratuitous performance, there are no means, the Registrar-General says, of comparing with precision the small-pox rates at different age-periods before and after the introduction of vaccination. Recognizing this, he proceeds to examine the differing mortality from small-pox in divisions of the period of 33 years last past, during which there had been notable changes in the extent to which vaccination had been used by the public and in the nature of the State provision for ensuring its performance. I shall presently have to use the information he supplies.

Now it is true that there do not exist the means of comparing with the precision desired by the Registrar-General the small-pox

^{*} The Registrar-General, in the passage quoted in the Appendix (page 35), disposes of a belief which some people have entertained, that improvement in drainage, water-supplies, and like sanitary conditions is to be credited with the observed reduction of small-pox fatality.

death-rates at various age-periods before and after the introduction of vaccination. But reasonably accurate measure of any change that has taken place, between the past and the present, in the incidence of small-pox mortality upon one and another age may be got by an examination of the records of small-pox among communities which, although they do not furnish the material for differential age death-rates, yet have recorded the facts about age at death in the case of this disease.

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In former centuries, out of a thousand persons dying from informer centuries, small-pox, some 800 would have been children under 5 years of age, and 150 of the remaining 200 would have been between 5 and 10 years of age.* I do not know whether in any community these proportions were ever materially smaller. I have not been able to find an instance, though I can find cases where infants suffered in still larger proportion.

In the present century, and after registration began, the share in nineteenth of total small-pox mortality borne by English children under century, 10 did not at first greatly decline from its former amount; children under 5 continued to furnish about 700, and children between 5 and 10 about 130 deaths to every 1,000 small-pox deaths at all ages. When Mr. Simon, in his "Papers" of 1857, took stock of our vaccination experiences, the reduction of the share borne by children was discernible in English records. That descending series of figures which (in the absence of vaccination) had formerly testified to the almost exclusive incidence of small-pox on children, and to the protection against death by second small-pox afforded to those who survived, had now become interrupted by a rise in that part of the series which showed the proportion of deaths borne by adults, particularly by a rise in the figure for ages 20-30. This interruption of the regular descent in the series of figures that showed the small-pox mortality of England at successive periods of life was more visible in the metropolis than in the provinces. Mr. Simon found occasion to observe that the degree of this reduction in relative infantile fatality was far more conspicuous in the Paris than in the London records. In Paris, so early as 1842-51, the children under 5 in Paris. were no longer bearing four-fifths of the gross small-pox mortality, but only about one-third; the rest of the deaths being contributed by people of higher ages, but most conspicuously by young adults between 20 and 30 years old.

For explanation of this altered incidence of small-pox upon Significance of persons of one and another age, there was of course in the first change of incidence as regards place the arithmetical consideration that, of necessity, any insusceptibility given preponderatingly to the infants of a community

^{*} See Mr. Simon's Papers relating to the History and Practice of Vaccination, p. xxix and following pages and diagrams; also, in Appendix (A., No. 7) to the present Report, extracts from an "Inquiry," by Dr. M'Vail, "into the Prevalence of Small-pox in Kilmarnock in the last Century." I may here note, from a lately published old record belonging to the University of Cambridge, that in an epidemic year, 1774, in the city of Chester, out of 202 deaths by "natural small-row" at all ages, 180 were contributed by children under 5, and all the remaining 192. pox" at all ages, 180 were contributed by children under 5, and all the remaining 22 by children between 5 and 10 years old.

meant (so long as any small-pox continued to exist) a corresponding increase in the proportionate contribution made to the small-pox death register by adults. This consideration sufficed in the case of London, but did not suffice in the case of Paris. For Paris, when contrasted with London, a further explanation of the displaced incidence of small-pox mortality was required; and Mr. Simon regarded it as meaning a loss by the individual, as he grew up, of the protection afforded by vaccination in infancy. The increased proportion of young adult small-pox in Paris was such as to mean post-vaccinal small-pox; and the age-period in which the increase began to be observable showed the age at which the vaccination which had protected during childhood against the current small-pox was losing its ability to protect the average individual during later periods of life.

The difference between London and Paris in this respect was to Mr. Simon a very startling circumstance. It appeared to indicate a different protection, in the two cities respectively, afforded by the current vaccination against the current small-pox of each. The contrast was such as to suggest to Mr. Simon the question whether it might be dependent on anything peculiar to the French administration of vaccination; and he commends to the critical consideration of the French authorities the question whether the vaccine lymph of Paris was of the same good quality

as in London.

Since 1857, as time has gone on, it has been observed that in England the share of small-pox mortality borne by children 0-5 years old has steadily decreased in amount. In the evidence which I had to give to the Royal Commission on Hospitals in 1882 I showed this contribution falling by successive steps from its 700 out of every thousand deaths at the commencement of registration to 560, 550, and 540 in the several five-year periods 1855-9, 1860-4, and 1865-9; and then in the two five-year periods 1870-74 and 1875-9, to 320 and 280, the amount of infantile contribution always keeping very closely the same in London and in the provinces. In the metropolitan small-pox of 1884, the share of small-pox mortality borne by children under 5 has been only 240 out of a thousand deaths at all ages; and another hundred deaths out of the thousand have formed the contribution of children between 5 and 10 years.

The reduction is of course in the first place to be regarded as an expression of the arithmetical fact to which attention is above called: namely, that the insusceptibility to small-pox gained by the English community has, during recent years and by the influence of recent legislation, been gained in preponderating measure by the infantile section of the community; wherefore the peculiar incidence of small-pox on the early years of life has to an increasing extent been reduced, and later periods of life are contributing more and more to each thousand deaths by the current

disease.

We wish, however, to ascertain not only whether grown-up people are contributing a larger share to the prevailing small-pox

Decrease in share borne by infants in English experience.

Increase of rate among adults. mortality of the time; but also to learn whether they are really dying from small-pox in larger numbers than formerly, and if so, at what period of life the increase is discernible. With the object of learning this further lesson, the method of observing the proportion of mortality borne by different ages must be abandoned, and we must recur to the records of death-rates of persons living at each age. The Registrar-General, as I have said, divides the period 1847 to 1880 (during which the causes of death were abstracted in combination with ages) into portions; a first, namely, of six years 1847-53, when vaccination was optional; a second of eighteen years 1854-71, when it was obligatory but not efficiently enforced; and a third of nine years 1872-80 when it was obligatory and more efficiently enforced by vaccination officers. For England and Wales the mean annual death-rate from small-pox of children under 5 years old in these three several periods fell from 1,617 per million, at which it stood during the period of optional vaccination, first to 817, and then to 323; and the death-rate of children between 5 and 10 years fell in a similar way from 337 to 243, and then to 186. The rates for children between 10 and 15 years in the three successive periods of time have remained without much change, having been 94, 88, and 98. At higher ages of life to which I shall immediately recur there has not been decrease but increase in the rate of death by small-pox. Never- Decrease in theless, when all ages are considered together, the average annual all-age rate. death-rate by small-pox, 305 per million persons living, during the period of optional vaccination, is found to have fallen to 223 during the following period of obligatory vaccination, and during the period of enforced vaccination to 156.

Statutory enforcement of vaccination then, as contrasted with its optional use before 1853, has availed exclusively for the protection of those who cannot protect themselves. People aged between 15 and 25 years, the Registrar-General goes on to tell us, used thirty or forty years ago to die at the rate of 109 per million, and now under the system designed for the protection of their juniors they are dying at the rate of 173. between 25 and 45 years who thirty or forty years ago died at the rate of 66 per million, are now dying at the rate of 141; and persons over 45 years old, instead of dying at the rate of 22 are dying at the rate of 58 per million of their number.

Thus it has become obvious that the transference from infancy to later ages which we have noted as observable in the ageincidence of small-pox mortality in England and Wales is not wholly an affair of abolition of infantile small-pox. There is something more than this wanted to explain an increase in the actual death-rate by small-pox among English adults.

Conducing to an increase in the registered annual death-rates significance of between the first and second period of the Registrar-General, increased death-rate in I find two circumstances that deserve mention. These are, first, adults. the probability of small-pox death-rates among adults having

been artificially low during the Registrar-General's first period 1847-53; an exceptional number of the men and women of that time having very recently passed through their primary vaccination; and secondly, the increased mobility since the end of that period of the population, essentially of the adult population, which has brought grown-up people ever more and more into towns and into contact with the infectious diseases that find their homes specially in towns. These considerations may, I believe, account for a part, but only a part, of the increase in the small-pox death-rate observable in adults since 1853, the date at which the decrease in the death-rate of children began, thanks

to the legislation of that year, to be conspicuous.

The Registrar-General, in the passage I have reprinted from his forty-third Annual Report, explains this recent increase in the actual rate of small-pox mortality among adolescents and adults in England by reference to the following consideration. It is to be observed, that the security against small-pox afforded by an attack of small-pox in infancy, though not absolute, does most commonly last through the whole of life. For evidence of this among communities, witness afresh the extremely small fraction of small-pox mortality borne by adults last century, and the perfect regularity observable in old records, in that declining series of deaths, which shows the contributions made by people of successive age-periods towards the general mortality of the disease. The resistance to adult small-pox, formerly afforded by an infantile attack of small-pox, was almost complete and lifelong. It has been exchanged now-a-days by a larger number of people for the resistance furnished by the average English Without reference to changes that may have occurred in this average vaccination between one and another epoch, we know of it that for many people it is of chief avail for the first years after it has been gained, but gets measurably The Registrar-General points out forfeited as age advances. that those who have grown up in recent years in our English communities have in increasing numbers exchanged the life-long protection conferred by surviving an attack of infantile small-pox, for the protection, less durable in their case, furnished by the average vaccination of the Kingdom; and he finds in this consideration the explanation of the circumstances that only 22 deaths per million occurred from small-pox 30 years ago among people past middle life, whereas 58 deaths per million would now-a-days occur among people of the same age. According to this explanation, 30 years ago English adults were in larger numbers the survivors of an infantile community which had passed through small-pox, paying an enormous tribute of deaths, but by their survival acquiring a more durable protection against subsequent death by small-pox than the same number of adults would have received from an infantile vaccination.

Your medical officer has inevitably some misgiving as to accepting this explanation of increased small-pox mortality among adults, allowing him to look on post-vaccinal small-pox as a

necessary and constant quantity, though manifesting itself to a greater extent as time passed on. To one who fills the office which I have the honour to hold, the likelihood of change in the protective power of English vaccination between one and another epoch must needs be an element of the problem. We know too well that what is called "vaccination" may be of various characters, the one differing from the other in influencing the recovery of persons attacked by small-pox; and the question, as it presents itself to us, must needs be similar to that propounded by Mr. Simon in respect of Paris 40 years ago. It has of course reference to past times: was there, during the successive periods in which these English adults received their infantile vaccination, any deterioration in the vaccination procedures of the kingdom, of a sort to account for the later born possessing, as they grew up, an inferior degree of protection against small-pox than had been possessed by the earlier born? In answer I may say that not improbably there was something of such deterioration in successive decades before vaccination was made a matter of State concern and before those measures began to be taken under the auspices of the General Board of Health that had for their object to secure throughout the country the efficient performance of the operation.* But while recognising this probability, I see that the time has not yet come for statistical evidence whether the present vaccination of the country is for the individual a more durable protection against small-pox than that given to the infants of twenty or thirty years ago.

I find, however, that I may confidently say from the recent experience of my department that infantile vaccination in England is being carried out far more intelligently than in the times to which I have adverted, and year after year with increasing solicitude; that public vaccination is as a rule excellently performed, and much private vaccination also; so that, after all deduction for those bastard operations of which I have had to speak with reprobation,† the average vaccination of the country is making good progress towards its proper standard.

^{*} Claiming consideration equally with a possible diminution in vaccine protection is the question of a possible intensification in the current small-pox of the country. As regards this, there are not wanting indications of a recent malignity and fatality of the disease, among unvaccinated and vaccinated persons alike, in excess of that which was customarily observed in English small-pox 30 or 40 years since. Some evidence on this head, important in the present connexion, was given to the Hospitals Commission of 1881 by Dr. Munk, one of the physicians to the Highgate Small-pox Hospital; and the question will arise for further consideration in a later part of this report. The Registrar-General, indeed, offers this increase in malignity as an alternative explanation for the acceptance of those who may be dissatisfied with the other hypothesis which he brings forward concerning the increase of adult small-pox mortality; and he points out that, if we must believe small-pox itself to have become more virulent, it is plain that the saving of life due to vaccination has been even greater than hitherto supposed. "For not only did the small-pox death-rate fall with its "extended use from 305 per million to 156, but it so fell in spite of an increased intensity of the virus which would, if unimpeded, have enormously increased the mortality." (43rd Report.)

† In Report of 1881, reprinted in Appendix No. 4.

MEDICAL OFFICER'S REPORT. Necd for re-vaccination.

It is to be regretted that all who apprehend the fact that smallpox continues to prevail in England, having largely transferred its fatal incidence from the period of infancy to a later time of life, do not, instead of decrying the agency which has preserved through childhood, accept and urge on others to accept that renewal of protection that may be had by a second vaccination. The English vaccination system, though it provides facilities for renewal of the vaccinc protection at puberty, does not provide for any second enforcement of the operation, but leaves the adult to decide whether, in his own interests, he will receive the full measure of protection that vaccination is capable of giving him. Yet in the case of some people there is a period of life between childhood and manhood, before the age of legal responsibility is attained, in which period the protective influence of their infantile vaccination is so far lost as to leave them liable to small-pox, and in some instances to death by small-pox. The German legislature, in enacting its compulsory vaccination law of 1874, had regard to this fact, and considering that the protective influence of vaccination might reasonably be trusted for 10 or 12 years from the time of operation in infancy, directed that all children should be vaccinated a second time during their school period, and made the parent of the child responsible for this being done.

German experience of re-vaccination. An important report on the influence of this law upon small-pox prevalence has recently been made by a German Vaccination Commission, and it is there shown that during the 10 years last past Germany has not only experienced smaller death-rates by small-pox than ever before, but even has passed from a position of inferiority to England into a position of distinct superiority, as regards its immunity from the disease, and it would appear certain* that this result has been brought about through the working of the compulsory re-vaccination law of 1874. In the large towns of Germany, since that date, small-pox death-rates have become actually trivial, whereas in London, Paris, and Vienna there have been several appreciable epidemics, in the case of London, as we have seen, having to an unusual degree their fatal incidence upon young adults.

Respecting the renewal of protection which people can, if they please, obtain by a second vaccination, the familiar experience of nurses in small-pox hospitals hardly needs to be quoted afresh; but it may here be mentioned that in the great majority of the instances where small-pox has attacked people employed about small-pox hospitals, it has been found as the result of recent inquiry, that there has either been chance exception to the rule of re-vaccination, or the re-vaccination was not done until after the individual had received the infection of small-pox.

^{*} The extent of the protection afforded to the German adult community by this enforced re-vaccination of individuals cannot indeed, as yet, be exactly measured; but there would appear to be no question of its having been considerable in amount.