THE OUTBREAK OF SMALL-POX IN GLASGOW

SOME COMMENTS, A CRITICISM, AND A COMPARISON

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The outbreak of small-pox in Glasgow last summer, a report on which has been published in the *Journal* (1942, 2, 627), was an exceptionally interesting one and calls for some comment. First, I would draw attention to the following points:

1. The outbreak probably would never have occurred but for the unfortunate mistake in diagnosing the first case—the electrical engineer on board the ship from Bombay—as one of measles. It is often difficult to distinguish the eruption of confluent small-pox (as this case was) from measles at the outset, while it is still in the papular stage, but after 48 hours, when the eruption becomes vesicular, there is usually no real difficulty. In this instance the diagnosis of small-pox was not made until after the arrival of the vessel at Glasgow on May 29, five days from the first appearance of the eruption.

2. The great majority of the ship's crew of over 200 had been recently vaccinated (in 1940). Not one of these contracted the disease. But of 37 members of the crew who had never been vaccinated, seven contracted the disease and one of them died. This is fairly conclusive evidence of the value of recent vaccination, and of the desirability of all those sailing to or from the East—the home of small-pox—being protected by it.

3. On the other hand, of two passengers who contracted the disease, one was a Polish officer aged 23, who had been vaccinated in infancy and again at the ages of 7 and 14—evidence that even three vaccinations, if not recent, are insufficient to protect from attack.

4. One of the "ship" group of cases was a boarding medical officer, aged 34, vaccinated in infancy but not since. It seems surprising that a medical man, specially appointed to board ships, and presumably for the purpose of looking out for cases of small-pox, should neglect to take the elementary precaution of adequately protecting himself by recent vaccination.

5. Not one secondary case of small-pox (apart from the "city" group) resulted from the 10 cases in the "ship" group which were infected from the original case—striking testimony to the efficacy of modern routine measures.

The "City" Group of Cases

There were 25 cases in this group, of which 21 were primary. Of the latter, all except the last three occurred in a close bunch in the space of 16 days. Allowing for variations in the incubation period, it is possible, the report suggests, that they were all infected in the short space of 10 days—June 9 to 19. This is a point of some importance, as I shall show later. It clearly points to a common infecting cause of strictly limited duration. When that cause, whatever it was, ceased to be operative the outbreak collapsed.

A remarkable feature of the "city" group was that in not one of the 21 primary cases was any clue discovered as to the source of infection. Their occurrence within a month of the arrival of the ship points, of course, to there having been some connexion with the ship cases; but, whatever its nature, it was not discovered. The authors of the report suggest that it was either (1) a "missed" case which left no trace behind, or (2) aerial convection from the small-pox hospital. They are inclined to favour the former because of the distance from the hospital. The four secondary cases in the "city" group were all direct contacts, and the fact that there were only four and that these gave rise to no further cases again indicates the remarkable success of modern preventive measures.

It is interesting to note that of the 25 cases in the "city" group, eight had never been vaccinated, 13 had been once vaccinated, three had been twice vaccinated, and one (a woman aged 49) had been vaccinated three times (1, 17, and 27 years). As is almost always the case, those patients who had never

been vaccinated suffered more severe attacks than those who had.

The Mass Vaccination Campaign

We now come to a debatable and very important practical question, the mass vaccination campaign: Was it really necessary, and what effect did it have in controlling the outbreak? It is no light matter to inflict vaccination and all that it entails upon 500,000 persons—men, women, and children. The report states fairly the grounds which led the authorities to decide on June 28 (four weeks after the arrival of the ship) in favour of the step. The determining factor was, of course, the occurrence of the "city" cases. On the date in question there had been nine such cases in the last four days, scattered over different parts of the city, and with no clue as to the source of infection. A war was on, and it was thought that this might make routine measures less effective. Also, a widespread epidemic would seriously affect war production. The history of past outbreaks had to be taken into consideration too. It is easy to be wise after the event, and nobody could then foresee that the outbreak was going to collapse so suddenly. On the basis of accepted theories and teaching about small-pox and vaccination, very many people will undoubtedly acclaim the decision as a wise and proper one—including, of course, all those who think "the more vaccination the better." All the same, there had been only 15 cases altogether in the "city" group up to the date in question.

This much can certainly be said: a vaccination campaign on such a great scale, involving the rapid opening of 25 emergency vaccination stations in various parts of the city, the provision of the necessary staff, medical and lay, the arrangements with general practitioners for private vaccinations, the obtaining from the Government of the very large amount of calf lymph required, together with all the publicity and propaganda necessary to secure the co-operation of the public and to induce them to come forward and submit to vaccination, was a great administrative effort, calling for much energy and ability in its successful execution. It must have entailed a vast amount of hard work upon the staff of the Glasgow Health Department, under the leadership of their distinguished M.O.H., Sir Alexander Macgregor.

It is only natural, human nature being what it is, that, having made this great effort, much if not most of the credit for the sudden termination of the outbreak should be attributed by many people to what was undoubtedly the most outstanding and spectacular—as well as the most expensive—of the measures taken to control the outbreak. Thus the authors of the report, after explaining the considerations which led to the decision to initiate the campaign, and after referring to previous outbreaks which had lingered on for many months, say: "The present experience is in strong contrast; and it may be said that the people themselves, by taking timely advantage of the advice given and the facilities provided, stopped the outbreak at its start." And Sir Leonard Rogers, in an address entitled "The Efficacy of Vaccination against Small-pox" (*Medical Officer*, Dec. 5, 1942), reprints of which are being issued free by the Research Defence Society for distribution to members of local health authorities, says: "The remarkable accomplishment of the Glasgow health authorities in vaccinating 500,000, nearly half the total population, saved the situation for the time."

I hope that it will not seem grudging or ungracious on the part of one who has himself spent the greater part of his professional life in administrative public health work if I express a doubt as to whether all this mass vaccination had anything whatever to do with the sudden termination of the outbreak. Was it really a case of "cause and effect"? Was it *post hoc* or *propter hoc*? Would not the "routine" measures (as the report calls them)—i.e., the prompt isolation of every case as it occurred, the surveillance and vaccination of contacts, together with other incidental precautions—have been just as efficacious without all the great effort of the vaccination campaign?

The issue is of much practical importance because the example of a great city like Glasgow is likely to be followed by other local authorities faced with outbreaks of small-pox; and especially so if it is believed that it was the mass vaccination campaign which really saved the situation. Moreover, since any outbreak of small-pox, once it gets a firm foothold, is a danger to the entire country, the issue raises the whole question of our

national policy in regard to vaccination. Therefore the issue must be faced, and no personal considerations must stand in the way of free discussion.

The first point, then, which I wish to make is that although such a large number of persons were vaccinated in the Glasgow vaccination drive it only amounted to about half the total population; so that there were still some half-million persons who did not get vaccinated, and only a very small minority of these would be protected by recent vaccination already performed. Therefore there was an ample supply of susceptible material left for the infection to spread amongst, had it not been under control, and had the circumstances been otherwise favourable. But the chief argument against the campaign having had anything to do with the cutting short of the outbreak is to be found in a comparison of dates. If we refer to Table II in the report, which gives the date of eruption in each case, and if we allow 14 days for the incubation period, we shall find—excluding the last three cases of the outbreak (i.e., the case at the mental hospital, the contact case arising from it, and the patient who sickened in London)—that there was no case infected later than June 26 in the whole outbreak. But the decision to start the vaccination campaign was only taken on June 28, two days later. It is true that seven cases (three of these being contacts, and therefore under surveillance, and one the London case) developed the disease after June 28, but they were all infected before that date. It seems quite evident that the infecting cause, whatever it was, which led to the infection of the bunch of primary "city" cases during the 10 critical days, June 9 to 19, had ceased to be operative before the decision to start the campaign was taken. In other words, *the outbreak was virtually over before the vaccination campaign was started*. This is not intended as a criticism of the decision to launch the campaign, because, as we have already said, it was not possible on the date in question to foresee what was going to happen; but it is a criticism of the claim that it was the vaccination campaign which brought the outbreak so quickly to an end. I submit with confidence that the indications all point the other way. I suggest that if only the authorities had waited another week or two they would never have embarked on the campaign at all.

Experience of Other Towns

In order to view the Glasgow experience in proper perspective it is desirable to compare it with that of other towns where outbreaks of small-pox have occurred but where recourse was not had to mass vaccination; and I will take the case of Leicester, of which I can speak from personal experience.

In the year 1902, when there was a good deal of major small-pox in the country, the disease was introduced into Leicester on eight occasions. The first seven importations were successfully controlled, and only nine secondary cases resulted, making 16 cases in all. The type of disease was severe, and five of them proved fatal. Then at the end of the year a tramp, vaccinated in infancy, walked to Leicester and was admitted to the workhouse. He began to sicken the following day with a mild modified attack, which unfortunately was diagnosed as chicken-pox. No precautions were taken, and for six days he was not isolated, living in fairly close contact with 60 other inmates. Under these circumstances it is not surprising that 20 further cases occurred in the institution before the outbreak was suppressed. It is quite possible that the infection leaked out into the town, for a small number of cases kept cropping up throughout the first quarter of 1903. And then came the remarkable outbreak which I wish to set against the recent one in Glasgow.

The Leicester Outbreak, April, 1903*

On April 15, without warning, as there had been practically no cases for a fortnight, 4 cases were reported in various parts of the town. These were followed by 2, 2, 5, and 5 on succeeding days, and then no fewer than 14 cases occurred in a single day. For the first four weeks the figures were 53, 21, 34, and 48. What made the outbreak especially disconcerting was that in scarcely any of the cases could the least clue be obtained as to the source of infection, and no common factor in any

way connecting the cases could be discovered. Thus in the first 11 days, before secondary cases began to occur, there were 65 cases, 62 of which were untraced, and these were scattered over two-thirds of the town, in 61 houses in 58 streets. Of the patients 37 worked in 32 different factories or workplaces; and 14 school children were attending 11 different schools. Bearing in mind that for 16 years Leicester had openly revolted against vaccination, that all prosecutions for default had entirely ceased and the compulsory vaccination law was virtually a "dead letter," and that the amount of vaccination performed had been almost negligible,† it must be admitted that apparently the circumstances attending this outbreak were exceedingly favourable for a devastating epidemic. Undoubtedly many people thought that Leicester's hour had now come; and some even considered that it might not be altogether a bad thing if the town were taught a salutary lesson. But it was not to be. After the first four weeks the outbreak began rapidly to decline, the number of fresh cases each week falling from 48 to 22, 14, 10, 4, 2, 1, and a fortnight later none was reported. Even a well-vaccinated town could hardly have done much better. The total money cost of the outbreak was estimated at under £3,000.

The Cause of the Leicester Outburst

The only two possible explanations, as at Glasgow, seemed to be: (1) "missed" cases, of which absolutely no trace was discoverable; and (2) aerial convection from the small-pox hospital. When the outburst began 20 convalescent cases were under treatment and the prevailing winds were favourable; but there was no special incidence on the side of the town nearest to the hospital. Also, the distance of the hospital—a mile from the outskirts—seemed against the convection hypothesis; but on the whole it seems the most probable explanation. But whatever the cause, it ceased to operate—as was the case at Glasgow—and then ordinary routine measures were effective in preventing further spread. Fortunately the death roll was very much smaller than might have been expected, and the unvaccinated child population escaped much more lightly than was feared would be the case. There was only slight evidence of "picking out" the unvaccinated.

The Measures Adopted: No Vaccination Campaign

The measures taken to deal with the outbreak were the routine ones now universally adopted. As M.O.H. I personally visited every case, confirmed the diagnosis, arranged for immediate removal to hospital, and used my best persuasive powers to induce other inmates of the household to get vaccinated at once. Usually I vaccinated them myself on the spot. No appeal was made to the general public to get vaccinated, and there was an entire absence of alarmist posters urging vaccination. The local press co-operated by not "writing up" the outbreak and by avoiding sensational headlines; consequently, business went on as usual and there was little interference with the trade of the town. Where it was thought desirable that contacts should not return to work, compensation was paid to them for loss of wages. One thing I think may safely be said: if Leicester had gone in for a vaccination campaign it would certainly have been hailed by many as a triumph for vaccination and would have been given the credit of having saved the town from a great disaster.

Just one thing remains to be added. While I think that the Glasgow vaccination campaign was unnecessary, I can imagine circumstances in which such a campaign would be called for—and that is, if a serious epidemic of major small-pox were really to get out of hand. Such an occasion happened at the town of Dewsbury in 1893 and again in 1894, and in the notorious Gloucester epidemic of 1895. At both these places there was a complete breakdown of the ordinary routine measures for dealing with small-pox; the local authorities were quite overpowered, and they were left to their fate by the old Local Government Board, so far as giving them any practical assistance was concerned. But this was half a century ago, and the likelihood of such a breakdown occurring to-day, with our so greatly improved health organization, both local and central, is comparatively small.

* The abbreviated account which is here given is taken from my book, *The Vaccination Question in the Light of Modern Experience*, H. K. Lewis Ltd.

† The number of unvaccinated children in the town at this time would be about 70,000.