THE EDINBURGH OUTBREAK OF SMALLPOX, 1942

BY

C. KILLICK MILLARD, M.D., D.Sc.

Past-President, Society of Medical Officers of Health

I have recently received, through the courtesy of the M.O.H. for Edinburgh (Dr. W. G. Clark), the official report on the outbreak of smallpox which occurred in that city towards the end of 1942. There has been so little major smallpox in this country during the past 40 years that any important outbreak is worth reporting upon fully, and this has certainly been done as regards the one in question; for although the total number of cases was only 36, the report extends to 90 closely printed pages, and few material aspects of the outbreak or of the great vaccination drive which attended it have been omitted. The report is a model of careful writing and a painstaking record of the great amount of administrative work entailed.

Brief Outline of Outbreak

The outbreak began at the end of October and terminated at the end of December. It was practically all over in a matter of nine weeks. Dr. Clark and his staff deserve hearty congratulations on achieving such a highly satisfactory result. The outbreak was presumably linked with the one which had occurred in Fife in August–October and which was just coming to a close. That in turn was presumably linked with the ship-borne outbreak in Glasgow earlier in the summer, though in neither case could any direct connexion be discovered.

The first of the Edinburgh cases occurred in a patient in the Edinburgh Royal Infirmary—a miner, aged 46, who had been a patient in the institution since Oct. 5. He sickened on the 23rd and the eruption appeared on the 27th—22 days after his admission. It is clear, therefore, that he must have been infected while in the Infirmary. It is noteworthy that this man had been vaccinated in infancy and again during the war of 1914–18, and had good foveated scars. Although a moderately severe case, it was modified in character. It was diagnosed as chicken-pox, and as such was transferred to the Edinburgh City Hospital, where that diagnosis was at first tentatively accepted. The case was not finally diagnosed as smallpox until Nov. 1.

On Nov. 1 a second case—that of a boy, aged 12, who from Oct. 15 to 29 had been a patient in the same ward at the Royal Infirmary as the first case—was admitted to the City Hospital with smallpox. He had sickened on the day on which he had been discharged from the Infirmary, and the rash had appeared on the 31st. The boy had never been vaccinated and the attack proved fatal.

During the first week in November further cases of smallpox occurred in three medical students who were attending the Royal Infirmary, and in six patients in the convalescent home to which patients are transferred from the Infirmary. There were three other cases in patients who had been recently discharged from the convalescent home, thus making a total of 14. It seems clear that all these cases were traceable, directly or indirectly, to some source of infection in the Royal Infirmary. The report suggests as the most probable explanation a "missed" case, but though careful search was made no such case could be identified. Assuming that the source of infection was a "missed" case—and certainly this is the most likely explanation—it was probably a very mild modified case with trivial symptoms and a few insignificant spots, occurring in a vaccinated subject (possibly another medical student), such as has so often been the cause of outbreaks of smallpox in the past.

The Mass-vaccination Campaign

Once the presence of smallpox in Edinburgh was recognized the usual routine measures for dealing with the disease, which have now become universal in this country and which have proved so remarkably successful if efficiently carried out, were put into operation. But the authorities decided that this was not enough. They had before them the example of the neighbouring city of Glasgow, where, a few months earlier,

a mass-vaccination campaign had been carried out on a very great scale, and, as it was then assumed, had promptly brought the outbreak in that city to an end. Certainly, within a week or two of launching the campaign all further cases of smallpox in Glasgow had ceased. The personal attitude of the M.O.H. for Edinburgh is indicated by a passage in his preface to the report, where he writes: "The protection afforded by vaccination renders specific inoculation the sheet anchor in controlling the disease in the presence of an outbreak." Accordingly, without losing any time and without waiting to see whether the routine measures taken were likely to control the outbreak, a mass-vaccination campaign of the whole general population—with all that such a measure inevitably entails in the way of painful arms, temporary illness, interference with work, general upset, and widespread scare, even risk of a certain number of deaths—was decided upon, and on Nov. 8 22 vaccination centres were opened in various parts of the city.

Was the Vaccination Campaign Really Necessary?

The object of the present article is to suggest that this serious step was not really necessary or called for. For an outsider to make such a suggestion is of course a thankless and seemingly ungracious task, but if the example of great cities like Edinburgh and Glasgow is allowed to go unchallenged it is only to be expected that other places where one or more cases of smallpox may happen to occur will be encouraged to do likewise.

As regards Glasgow, the matter has already been dealt with (*B.M.J.*, 1943, 1, 288), and it was then shown that the outbreak in that city was really over before the vaccination campaign was even started, and therefore that no claim that it was the campaign which brought the outbreak to an end can be substantiated. It is now suggested that the same consideration applies to the Edinburgh outbreak also.

The relevant facts, as stated in the report, were as follows: From Nov. 1, when the first case was diagnosed as smallpox, up to and including Nov. 7, 14 cases of the disease had been discovered, all, as we have seen, apparently connected with an undiscovered source of infection in the Royal Infirmary. The mass-vaccination campaign was actually started on Nov. 8, but we are not told when the decision to take this drastic step was really arrived at. In view of all the arrangements which had to be made, one may assume that it must have been decided upon some days prior to Nov. 8, when the number of cases which had occurred would be less than 14. Four cases had been admitted to hospital on Nov. 7, three on the 6th, and three on the 5th. It looks, therefore, as if the decision must have been arrived at almost at the very outset, when only some half-dozen cases or less had occurred. The authorities were, of course, quite right to treat the outbreak as serious; and in the old days, before modern methods of control were possible, when there was no notification of disease, practically no hospital isolation, and no skilled sanitary staffs—not even medical officers of health—such an outbreak would probably have become a widespread epidemic. But what really did happen in this outbreak which we are now considering? If we classify the 36 cases into weeks according to the assumed date of infection (the dates are given in Appendix I of the report, calculated as being 14 days before the appearance of the rash) we get the following table. (By taking the date of infection rather than the date of removal to hospital one gets a truer picture of the progress of an outbreak, as it cuts out the time-lag between the date of infection and the date when a case can be recognized as smallpox.)

Smallpox Cases arranged in Weeks according to Date on which Infection was Contracted

Week	Cases Infected
1 (Oct. 12–18)	2
2 (" 19–25)	14
3 (" 26–Nov. 1)	7
4 (Nov. 2–8)	2
Vaccination campaign started on Nov. 8	
5 (Nov. 9–15)	5
6 (" 16–22)	0
7 (" 23–29)	4
8 (" 30–Dec. 6)	1
9 (Dec. 7–13)	0
10 (" 14–20)	1
Total	36

Will any unbiased person looking at this table seriously suggest that it affords support to the contention that it was the vaccination campaign which brought the outbreak to a close so speedily and satisfactorily? Compare it with a similar table for other outbreaks—e.g., that in the Home Counties in the early part of 1944, where no comparable vaccination campaign was undertaken—or with the one at Glasgow, which, as has been shown, was over before the campaign began; or with the one in 1903 in Leicester, where, in a practically unvaccinated population, the weekly number of cases fell from 48 to 22, 14, 10, 4, 2, 1, in successive weeks. I submit that in all probability an almost identical result would have been attained if the Edinburgh vaccination campaign had never been embarked upon. Indeed, one cannot help thinking that if only the campaign had been deferred for a week or ten days it would never have been launched at all.

Objections to a Vaccination Campaign

It is not as if vaccination were a trivial operation comparable, say, with immunization against diphtheria. On the contrary, it entails definite illness in a substantial number of cases. The report states that it was not possible to assess the proportion of vaccinations which were attended by "severe" reactions, but from what we know about vaccination, even when performed under the most favourable conditions, we may assume that the total number was considerable,* and doubtless entailed a good deal of interference with work as well as much personal suffering. The psychological effect of a mass-vaccination campaign is also an important factor which should not be ignored. Then there is the risk, now definitely recognized, of that serious complication, post-vaccinal encephalitis. The Edinburgh campaign resulted in 22 such cases, with 8 deaths. The total number of deaths due to vaccination was 10. Incidentally, the number of deaths due to smallpox was 8, only two of these being in unvaccinated subjects.

There would still seem to be some who think that in dealing with smallpox their motto should be, "The more vaccination the better." Years ago I remember being told that the control of smallpox could be summed up in three words—"Vaccinate, vaccinate, vaccinate!"; also that "every individual you can get vaccinated is a brand snatched from the burning." The "sheet anchor" simile was very popular in those days. But, when all is said, it cannot be denied that vaccination is only the lesser of two evils. Surely, then, our motto ought rather to be, "The less vaccination the better, so long as we can achieve our object, which is the effective control of smallpox."

In a paper read at a health congress 42 years ago (Exeter, 1902) I wrote these words, which perhaps are worth repeating:

"It must never be forgotten that vaccinia is, after all, a disease, and those of us whose profession it is to prevent disease should be ready to abandon it at the earliest possible moment consistent with the public safety. The control of disease by the substitution of one disease for another, whilst it may be expedient, can never be regarded as an ideal method."

It only remains to say that the total number of persons vaccinated during the Edinburgh campaign was estimated at 254,000, to which must be added an estimated number of 20,000 vaccinated earlier in the year as the result of the scare caused by the limited outbreak in Glasgow. As, however, the population of Edinburgh is 440,000 there were still a very large number of unprotected persons remaining in the city, even allowing for those (mostly young children vaccinated in infancy) who were already protected by recent vaccination. Therefore, if the outbreak had "wanted" to spread there would still have been plenty of susceptible material for it to work upon.

* H. J. Parish (*B.M.J.*, 1944, 2, 782) analyses the results of 214 specially observed vaccinations in adults (Wellcome Laboratories staff) performed by the "multiple pressure" method, which it is claimed gives less severe reactions than the methods usually adopted in this country. He found that 9.8% had severe reactions. The total number of persons vaccinated in the Edinburgh campaign is given as 254,000, but this included some 58,000 children under 15 who had already been once vaccinated and in whom, therefore, severe reactions would be unlikely to occur. Deducting these we are left with 196,000. If we apply Parish's 9.8% to those figures we get 19,000 as the approximate number of persons who had severe reactions in the Edinburgh campaign.

POSTSCRIPT.—It is interesting to note that of the three medical students who fell victims to the disease one had been vaccinated in infancy, another had been vaccinated in infancy and again in 1927; while the third had been vaccinated in infancy, again in his school days, and a third time in 1940-4. In this last case the "sheet anchor" seems to have dragged somewhat! A cynic might suggest that another metaphor would be more appropriate.

WITH THE F.A.U. IN CHINA

The work of the Friends' Ambulance Unit where fighting is hardest and where living conditions are the most difficult is too often taken for granted. It is right, therefore, that we should be reminded from time to time of the work the Unit does behind many battle fronts, and one such reminder has just reached us in the form of a report on the medical work of the F.A.U. with the Chinese Army in 1944, from which the following facts have been taken.

Military Medicine and Surgery

Some 40 members of the F.A.U., including nine doctors and nine State-registered nurses of American, British, and Chinese nationalities, have provided a number of medical and surgical teams in the field as part of the Chinese Red Cross programme. At the beginning of 1944 there were three teams—at Yungping, Yenshan, and Tengchuan. The first of these, at a divisional field hospital at Yungping, was to begin with mostly concerned with treating medical cases. During the first three months of the year over 7,000 out-patients were seen, and some 250 in-patients. Later the division went into action, and the team moved with it to do first aid and emergency surgery close to the fighting line. The need for maximum mobility in country without roads meant travelling with a minimum of personnel and medical equipment. Living conditions were often very primitive, and the fact that the campaign was conducted during the monsoon did not improve matters. In one month 435 casualties with wounds in all parts of the body were treated. More exact figures of the work of this particular unit are not available owing to campaign conditions when the team acted as a C.C.S. during the siege of Tenchung.

Another team, numbering at times some eighteen members, including three doctors, was stationed at an intermediate hospital at Paoshan, which for some time was the principal receiving centre for a large sector of front. All surgical cases were referred to the team for examination and treatment, and although it was not possible to keep more than a percentage for operation, those likely to suffer serious aggravation of wounds by evacuation to the rear were admitted. In a two-week period in May 548 cases were admitted, of which 97 were kept for treatment; 75 operations were done during this period, chiefly for fractures and for removal of foreign bodies. During June 2,739 cases passed through the hospital, 208 of which were kept for observation. There were 138 operations. X-ray examinations numbered 130, not including those done in the theatre for the reduction of fractures, etc. In July the figures were 2,195 cases seen, 238 kept for special examination; operations 165, for fractures, extraction of foreign bodies, wound débridement, amputations, and rib resections. In August and September there was the same story of a stream of surgical cases being dealt with expeditiously by this team until October, when the numbers were somewhat fewer. A report of this unit's work for the remainder of the year is not yet available.

Surgical mechanics are now an integral part of the Unit. Three are engaged in making such things as artificial limbs, splints, special equipment for orthopaedic surgery, instrument sterilizers, washing equipment, delousing plants, hot-water systems, and in repairing instruments of all kinds—safety valves, power plants, operating tables, microscopes, and x-ray machines.

Medical Care of Civilians

Another side of the work of the F.A.U. in China is the medical care of civilians in districts without adequate facilities. One team was sent to a small town in South-West Yunnan, where the local hospital badly needed help. Here the incidence of malaria of all types was as high as 80%; indeed the incidence of diseases of all kinds was higher and they were more severe than in any other area of which the F.A.U. had had experience. The chief difficulty was, of course, communications. The quickest transport was over pack trails, and the journey took at least two weeks; the dispatch of supplies and the replacement of personnel were therefore problems of the first magnitude. To equip and supply even a small hospital under these conditions would have been an expensive and difficult undertaking, so that most of the work was confined to out-patients, many being visited in their own homes.

In reply to other appeals for help the F.A.U. sent a team to staff a hospital at Kutsing and also to start one in Tenchung after this place was reoccupied by the Chinese. The staff sent to Kutsing