

Similar difficulties arose when other tentative networks linking positive cases were examined with a critical eye. There seemed to be no order or reason about the way in which these illnesses sprang up amongst a group of susceptibles. Two cases occurred, for example, in families living next door to each other. The victims were children with a marked difference in age who seldom came in contact, but were linked through the agency of playmates of their own ages, a sister of one and a brother of the other. Yet these two cases fell ill on the same day, and the illnesses of the "links" occurred afterwards—one two days later, the other eight. In other instances a family of children of susceptible age in close daily contact would develop their illnesses not simultaneously, but successively, often with a considerable interval between them. It was all so haphazard that one was almost tempted to reject altogether the idea that these minor illnesses had any important connection with the epidemic. At this stage in our inquiries we were the more inclined to scepticism about it, because of an almost involuntary tendency to regard droplet infection as the prevalent mode of spread. We were, of course, aware of the stress which has been laid in recent years on other means of transfer, especially intestinal, but we found it difficult to believe that an outbreak so widespread and increasing so rapidly could be other than a droplet infection. But surely no droplet infection ever behaved like this!

It was obvious that an investigation of the kind just described could only be of very limited value. It tends to overlook those who, despite close contact, escape unscathed; yet such people are far more interesting than those who fall ill. Why, how, and for how long do they continue to escape? A study of illness amongst contacts is handicapped, also, when one does not know what particular types of contact are of most importance. One naturally thinks of a school-child's classmate, the boy or girl who shares a desk with him, as a close contact; as indeed he is, if it is droplet infection that matters. But other less obvious contacts, much less easily traced, may be more interesting. For example, the child "Mary" (Fig. II) and her friend "Marjorie" were in different classes, did not know each other's surnames, and never met outside school; neither could have named the other as a contact; but they met each day at lunch-time, and their routine was interesting. First they would play together for a while with a hand-ball, tossing it from one to the other. Then they sat side by side on a bank and ate their sandwiches. Before meeting they had, of course, visited the lavatory, and neither ever bothered to wash her hands; and in this school, as in many others, the children had an amiable habit of exchanging their more interesting sandwiches with their friends. There may not have been much interchange of droplets between these two, but the mechanism for the transfer of faecal organisms was complete.

### III. PLAN FOR AN INVESTIGATION

What we really wanted to know was what was going on in the population at large while these positive cases were hobbling up so haphazardly; and particularly what had happened in the month or two before recognizable cases began to appear, and especially in the affected households. How did it all begin? What happened afterwards? What about the family contacts who had no history of illness? Did they eventually fall sick with a minor attack; and, if so, why did not all the susceptibles in close contact get it at about the same time?

It was with these and similar questions in mind that the investigation about to be described was undertaken.