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EDITORIALS

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THE MICHIGAN INOCULATION CASES

In all the history of the inoculation of man with leprosy, whether of deliberate attempts to infect or accidental accomplishments, there is no other event which carries quite as much conviction as the one reported last year by Porritt and Olsen of Michigan, and dealt with as an "extended abstract" in this issue (p. 514).

Briefly, the events as reported were these: In June 1943, two young members of the same unit of the U. S. Marine Corps, in civilian life friends and residents of the same town in eastern Michigan—a place where leprosy is not and never has been endemic and, as far as has been learned, no case has ever lived —were stationed at Melbourne, Australia; and, while under the influence of liquor, they were tattooed by an operator who was also inebriated. Early in 1946, within three months or so of each other, both of them noticed changes involving and extending beyond the entire areas tattooed on that occasion, and the condition was diagnosed as leprosy of the maculo-anesthetic or tuberculoid variety. One of the men soon developed two small secondary lesions above the elbow which enlarged and began to merge, and which—as the original photographs show most clearly—had the fine marginal pebbling characteristics of minor tuberculoid lesions.[1] That both of the men who were tattooed

[1] Through the courtesy of Dr. Malcolm H. Soule, of the University of Michigan, and of Dr. Richard E. Olsen, the junior author of the report, we were privileged to see at Ann Arbor, in September 1947, one of the patients and the pertinent materials from both, including bacilli stained in the tissue, and to acquire a set of photographs and sections.

together developed the condition, in the same location exclusively and in about the same period of time, is one of the most significant features of the affair.

To connect these events related as definite facts there has to be made an essential assumption, namely, that the tattoo wounds were infected with leprosy while in the making or while fresh. The most reasonable assumption is that the tattoo artist had previously used his instruments on a person with leprosy and so had contaminated them, and in his allegedly befuddled condition had neglected to sterilize them. It would be difficult to entertain a suggestion that both men, coming from a strictly nonendemic region, had somehow acquired the latent infection elsewhere and at another time and that it was exteriorized or brought to a focus by the tattooing to become apparent nearly three years after that was done. Equally difficult to accept is the suggestion, which had been heard, that after being tattooed these men may have visited some lady of the night who had leprosy. If there was someone with leprosy in the shadowy background of the picture there in Melbourne, despite the rarity of the disease there, it seems far more likely that it would be one who would seek the services of a tattooer, possibly to cover up a skin lesion, than any other person with whom the men could have had effective contact.

Assuming, then, that the inoculations actually occurred when and as they are believed to have been done, the first point of special interest with regard to the outcome is that the total inoculum must have been very small. Compared with the amounts of bacillus-rich leproma suspensions used in the ordinary inoculation experiments, it must have been infinitessimally small. (Incidentally, it would be of interest to know whether the work on one man was done completely before that on the other was started, or whether the tattooer alternated from one to the other perhaps to give each of them periods of rest from the discomfort of the needling. Under the former of these alternatives there would presumably be considerable differences in the density of seeding in the two cases.)

A second point is that the inoculation was intradermal, as presumably is the case in natural infections through the skins and not subcutaneous as in the usual experimental inoculations.

Thirdly, the inoculum was accompanied, unquestionably in overwhelming proportion, by the tattooer's pigments, instead of by the various tissue elements of the leproma as in the usual experiments. In all but a small part of the design, where there was a touch of red, the pigment used was black.

Still another possible factor has been sugested,[2] namely, that hereditary, genetic "susceptibility" may have had a part in the outcome. On that basis both of the men involved were, by chance, "susceptibles"; had one of them been a resistant he would not have developed a lesion and the whole business would have been much less striking.

When one considers from this point of view the various deliberate human experiments to which reference is so often made, it will be appreciated that they have invariably been by means of large amounts of material from a heterologous individual given subcutaneously, a method certain to give rise to active inflammatory reaction. The same holds true also of most experimental inoculations of animals, except those involving intradermal inoculations under conditions which simulate the lepromin test and which evoke much the same effects. In any case the inoculations are usually accompanied by relatively large quantities of human tissue, against which the animals' tissues react hostilely.

On the other hand, in the history of apparent accidental transmission of leprosy from man to man there is more than one instance in which small inocula given intradermally have appeared to be effective. For the more general aspect of the matter one may take as an example the supposed instance of infection of a servant by the wearing of his leprous master's clothing. For specific instances we have the accidental needle-inoculation cases (de Langen, Marchoux)[3] to which Porritt and Olsen refer, and also that (Wayson) of a priest who habitually and absent-mindedly rubbed his forehead while reading and developed lesions—of tuberculoid nature—in that area. In those cases the inoculation was intradermal, at least primarily, and the amount of inoculum was obviously very small. Here are pertinent suggestions for further human inoculation experiments, should that be possible, and for extensive trial on laboratory animals in the hope that one may be found whose dermis is less resistant to infection than his subcutaneous and other tissues and organs.

—H. W. WADE.

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[2] W. Lloyd Aycock, personal communication.

[3] It happened that the writer, while in Paris in 1932, had an opportunity to learn the history of Marchoux's case and to see the biopsy material. As recalled, the histological change was essentiallly tuberculoid though of much more chronic nature than those of the Michigan cases and with more bacilli.