The article by Convit and associates on experimental inoculation, in this issue, merits special attention. It reports success in producing, in hamsters only, transferable bacillus-rich lesions from leprosy-bacillus suspensions. Success appears to have been dependent primarily on two original ideas, one about the choice of animals and the other about the selection of material for the inoculum.

The reason for choosing the hamster especially was that it is persistently lepromin negative, even after BCG vaccination or repeated lepromin testing. Thus there does not occur, at the site of the inoculation the Mitsuda phenomenon which would create a particularly hostile

environment. For the sites of the inoculations, they followed Binford in using the cooler superficial tissues, the ear, the testis, the footpad, or the cheek pouches.

The inoculum chosen was the bacillus-positive borderline lesion. Talking of genetic changes in the leprosy bacillus with a confidence that seems a trifle venturesome for so esoteric a subject, the authors hold that in lepromatous leprosy the bacilli are genetically adapted and fixed, with respect to the metabolic environment of the lepra cells in which they are harbored. Such bacilli, it is held, will necessarily find particular difficulty in adapting themselves anew to life in the tissues or cells of a different animal species. In the work reported, hundreds of hamsters were inoculated with material from many lepromatous cases, but not one of those animals developed an evident lesion.

On the other hand, according to the hypothesis, the bacilli in the positive lesions of an early borderline case, numerically much fewer, have in general not yet developed into a genetically stable mutant in that environment. The electron microscope shows these bacilli to be mostly solid and healthy, without the degeneration seen in the great majority of bacilli in the lepromatous lesion. The hypothesis that such bacilli might be able to adapt themselves to life in the hamster's tissue was the principal one on which the investigation was based, and that seems to have paid off.

The actual condition of the bacilli was also considered an important point. It was suggested that, since tissue immunity and hence the lesions in borderline cases are so variable, it might very well be that a specimen taken from one lesion or part of a lesion would give material that would succeed in the inoculation test, while specimens from other sites in the same case would fail. And so, even from borderline cases, to obtain an effective inoculum would be a matter of chance. In the experiments, inocula from seven such cases were used, but positive results were obtained with only two of them.

The original lesions of the successful trials, which occurred only in the hamsters' ears (number of animals or of lesions not stated), took 8-10 months to develop. In the earlier passage experiments the time was reduced to 4 months, and in later passages it was 2 months, showing adaptation to the hamster. From none of the lesions has any culture been recovered.

An incidental but interesting observation was made when two litters of newborn hamsters were given transfer inoculations. In both instances a control group of adults all developed lesions, as did the mothers of the litters, but none of the youngsters showed any response. In explanation, the authors speculate about the immaturity of the skin in the very young.

A feature of the situation which seems to us significant, not discussed

by the authors in the paper but stated in the correspondence that—whatever the genetic situation of the bacilli might be—the strains of bacilli concerned were *derived from cases that were originally tuberculoid* and became borderline by repeated reaction. This is the case with all borderline cases encountered in the ordinary course of events. In the torpid tuberculoid state the conditions are so hostile that the bacilli, although necessarily present and alive in the lesions to cause them, can multiply to only a limited extent, so that smears are ordinarily negative. These bacilli might find little more difficulty in maintaining themselves and multiplying in a hamster's tissues than in their natural environment. The tissue of a torpidly active major tuberculoid lesion has never, so far as we know, been used as an inoculum; from the orthodox point of view it would be utterly unreasonable to bother with it.

Sometimes, by a mechanism as yet not known, a tuberculoid case may undergo a reaction, with the activation of old lesions and the production of new ones—reactional tuberculoid leprosy. The lesions are usually bacteriologically positive, typically to a limited degree. The authors suggest that the lesions of such cases might prove to be a good source of the inoculum for experimenting. Indeed, they might prove to be the best source, the bacilli least changed from their original condition yet relatively numerous. In borderline cases, which usually have had further reactional disturbances that tend to break down the patient's tissue resistance and approach the lepromatous condition, the bacilli—according to the hypothesis—may have undergone further change in adaptation, while still remaining solid and healthy in appearance on electron microscopy.

Convit and associates have opened a new approach to leprosy experimentation—and also seem to have given borderline leprosy a further basis of distinction from the true lepromatous form. It seems a good bet that this line of investigation will be taken up by other researchers.—H. W. Wade