To the Editor:

Since "borderline" leprosy was added as a "group" in the classification of the disease, it has provoked many discussions among us about whether it represents a special form of the infection or is only a transitional form between the polar types.

Four years ago I started to make observations with the electron microscope on approximately 20 leprosy patients who had been diagnosed by Dr. Convit clinically—including the methylene-blue test and the Mitsuda reaction—and histopathologically as "borderline" leprosy. The observations have disclosed many interesting details with which to identify the borderline leprosy lesion, and a report of them will appear in The Journal in the near future. In the meantime, however, I should like to express an opinion especially concerning the difference between the environments of the bacilli in the lepromatous and borderline lesions. This is in effect a reply to your question as to whether perhaps the "electron-transparent substance" of the ultra-

thin sections may be no more than an empty space left by the dissolving out of the gloeal matrix during the embedding of the tissue.

It remains a problem whether the electron-transparent zone consists of nonosmiophilic substance or one of low molecular substances which show their low density in electron microscopy, or whether the zone only represents the space remaining after some substances have been extracted by solvents during preparation of the tissues for sectioning.

Electron micrographs of ordinary lepromas show large clumps of bacilli which are almost always surrounded by an electron-transparent zone, thus corresponding to the "globi" of light microscopy. On the other hand, observation by light microscopy shows spaces left by the so-called "gloea," or "*Schleim,*" which constituted the matrix of the globi as they existed when the specimen was fixed. Comparing the results, it is possible that these two substances, at different optic levels, are the same, as you suggest.

In the study of human fat tissue with the electron microspoce (*Arch. Hist. Jap.* **18** (1959) 57-68), I found that neutral fat showing an affinity for osmium still remained after passing through alcohol and methacrylate, both of which are fat solvents. Furthermore, electron micrographs of xanthoma cells (*J. Invest. Dermat.* **34** (1960) 331-337; *Internat. J. Lerosy* **27** (1961) 343-354) demonstrated electron-transparent vacuoles, presumably containing cholesterol and its derivatives which have a lesser affinity for osmium. However, histochemical study of lepromas proved that there is little or no cholesterol in lepra cells. Furthermore, the limiting membrane which separates the electron-transparent zone from the lepra cell cytoplasm is clearly identified, whereas the surrounding membrane of the xanthoma cell vacuole is mostly diffuse. Based on these facts, it appears that electron-transparent zones around globi have no osmiophilic lipids or cholesterol originally, as I suggested in my article on lepra cells (*Internat. J. Leprosy* **27** (1960) 22-37). They may, however, contain nonosmiophilic lipids, if these lipids exist, or they may be composed of other substances of low molecular weight.

It should be noted that electron-transparent zones have not yet been found around bacilli, even when in large clumps, in any borderline leprosy case, thus differing from lepromas in which globi occur. This finding may serve to distinguish true globi in lepromas from the large clumps in borderline lesions, although these large groups of bacilli appear to be similar at the light microscopic level.

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