content of all organic wastes produced in the U.S. (apparently in the late 1970s) was 8.1 million tons, 62 percent of it in animal wastes and virtually all the rest in crop residues. The nitrogen content of fertilizers used by farmers at that time was 9.1 million tons, most of which was applied to cropland. These numbers indicate that even if 100 percent of the nitrogen in crop residues and animal wastes could be made available to farmers on economical terms, it would not be enough to replace nitrogen fertilizers, unless the losses of nitrogen in waste material were substantially less than the losses of fertilizer nitrogen.

The last sentence raises two questions: could all the nitrogen content of crop and animal wastes be made economically available to farmers? And are the losses of nitrogen from wastes less than from fertilizer?

Since 70 percent of crop residues already is returned directly to the soil, the nitrogen in this source already is available to and being used by farmers. The issue, therefore, is the economics of utilizing the nitrogen in animal wastes, which includes that in the 24 percent of crop residues fed to animals.

A major problem in making economical use of animal waste is that so much of it (61 percent) is excreted in unconfined habitats, most of it no doubt on range and pasture land, not on cropland where it is most needed. We have seen no estimates of the cost of collecting these wastes, but it surely would be high relative to the price of an equivalent amount of nitrogen in fertilizer.

Apart from collection costs, the costs of transporting nitrogen in animal wastes is high because 75 to 90 percent of the waste is water (CAST, 1980, p. 13). This observation applies especially to that part of animal wastes excreted in unconfined habitats. It would apply also, however, to the 27 percent of confined animal wastes not now returned to the land. Since the