reduced the work of thinning to a minimum.

Fertilizer tests, starting back in 1914 at the Northwest Experiment Station, indicated that 100 pounds of 0-20-0 up to 100 lbs. 0-40-0 gave profitable returns on many crops. The use of phosphate fertilizers at the rate of 125 lbs. of 0-16-0 was made a part of the growers contract from the start of operations in the Red River Valley. The good results obtained from the use of 100 to 200 pounds of commercial fertilizers on sugar beets prompted some fertilizer salesmen to recommend much heavier applications, however, cooperative tests starting in 1928 by the Northwest Experiment Station in which varying amounts of phosphate alone and phosphate in combination with nitrogen and potash up to 400 pounds per acre disproved the heavy application theory. With normal rainfall in the Valley the law of diminishing returns applied to the heavy applications of fertilizers. In recent years, with the soil testing service of the Minnesota Experiment Station, beet growers can compute quite accurately the fertilizer needs of his soil and can expect, with normal cultural and climatic conditions, a maximum return from his crop. Tribute should be paid to the American Crystal Sugar Company for its insistence in its contract that soil building practices be followed and that phosphate fertilizers be used by the growers. The sweet clover, green manuring crop and late summer fallow recommended for the sugar beet crop was found to be a good soil building practice for other crops. Soil tests have shown that on many farms nitrogen applied with the phosphate fertilizers may give profitable returns, in such instances a combined fertilizer such as 10-40-0 is used. While the heavier soils of the Valley have a potential supply of potash, yet in many instances small amounts of available potash added to the fertilizer mixture show profitable returns. With the competition between fertilizer manufacturers today, a farmer can secure almost any combination of fertilizing elements he may desire.

Much of the research in sugar beet culture is now being carried on by the sugar companies. With their well equipped laboratories and well trained scientists, they can quickly translate their findings to field operations with the beet growers, the state and federal experiment stations are confining their efforts quite largely to basic research with this crop. It has been found with sugar beets, the same as with other fields crops, that as a crop becomes more widespread in acreage and its culture becomes intensified, disease and insect problems multiply so the problem of the research worker is never ended.

The contributions made by machinery companies, and the inventive ingenuity of farmers themselves in developing planting, cultural and harvesting machinery, should be recognized. The beet growing picture has changed in less than thirty years from the horse drawn 4-row drill and one and two rowlifter with hand piling, topping and loading, to the twelve and sixteen row drills, cultivators and multiple row harvesters and loaders. Where we