ADDRESS GIVEN TO THE 15TH EASTERN REGIONAL MEETING OF
THE AMERICAN SOCIETY OF SUGARBEET TECHNOLOGISTS

By: George E. Rush [1]

It is both a privilege and a pleasure to be with you today in East Lansing, to participate in the 15th Eastern Regional Meeting of our Society. As President of the American Society of Sugar Beet Technologists, I would like to take this opportunity to convey the greetings and best wishes of the Society to members of the Eastern Section of the Society. The Eastern Regional Meetings of the Society serve a very important function in bringing together society members in this area of the country to review and discuss research subjects of special interest to the industry in this important beet growing area.

Also, on behalf of the Society, I would like to extend a cordial invitation to all of you to attend the 16th General Meeting of the Society to be held in Denver, Colorado in February 1970. Lloyd Norman, General Program Chairman, and his committee have developed some new innovations in the program which promise to provide the most informative and interesting meetings in the history of the Society.

This morning I would like to make a few general remarks with respect to three broad areas of research that I believe require immediate and special attention in order to improve the economic well-being of our industry. I am referring to the need to - (1) Develop practical and effective spring mechanization programs; (2) To achieve higher quality beets through improved agronomic practices; and,(3) Improved storage practices to reduce the tremendous losses that occur each fall between the time beets are harvested and processed.

With regard to spring mechanization, we have made remarkably little progress - even with the introduction and use of monogerm seed. This is not to say that we have not progressed with respect to reducing seeding rates and the need for stoop labor. But we still do not have an acceptable program for mechanical stand reduction and the elimination of labor in thinning beets.

In most beet growing areas, and certainly in the areas served by the Amalgamated Sugar Company, down the row, random mechanical thinners have not been accepted by growers. A wide variety of these machines have been developed and sold in all beet growing areas over the past twenty years. None has been successful and none is in general use today.

I believe these machines have failed to win acceptance by growers for three reasons:

First, these machines were designed to operate in uniform stands of closely spaced beets. As you know, these conditions rarely exist. Moreover, it is unrealistic to expect to have uniform stands of beets throughout all fields year in and year out.

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Secondly, the advent of monogerm seed has resulted in a trend towards lower seeding rates and spaced plantings. These reduced seeding rates tend to increase the percentage of stands that have marginal initial stands. The use of mechanical thinners in these areas removes too many beets leaving unacceptable stands.

Third, random mechanical thinners are relatively inflexible in their adjustment and adaptation to stand variations. They are just not flexible enough to meet the requirements needed to do a satisfactory job of reducing stands.

Too often the variation in plant population that exists in beet fields at emergence remains after the mechanical thinning operations have been completed. The total plant population has been reduced, but the variability in stand remains. I believe it is this variability in stand more than any other single factor that has limited the acceptance of mechanical thinners.

Electronic thinners, on the other hand, are designed to thin irregular stands of space planted beets. These machines can adapt readily to the wide range of emergence patterns that are normally found in beet fields. Certainly, they are much better adapted to operate in space planted, light stands of beets than in the solid stands of closely spaced beets that were common prior to the advent of monogerm seed.

In addition, to operate effectively, electronic thinners require certain specific refinements in cultural practices which are in addition conducive to optimum sugarbeet production. In order to operate effectively, electronic thinners require:

1) Smooth clod-free seed beds.
2) Precision drilled beets.
3) Uniform emergence.
4) Weed free rows.

Smooth seed beds, space planting and weed free rows are essential requirements for the effective operation of these machines.

Electronic thinners, however, have two important drawbacks. They are expensive and quite sophisticated pieces of equipment. For these reasons, it is perhaps unreasonable to expect all growers ultimately to own an electronic thinner. Nevertheless, it does seem feasible and realistic to visualize the development of some form of custom operation for these machines if and when they prove to be effective. Such a development would eliminate the need for most growers to own a machine and would limit the actual operation of the machines to a relatively small number of operators who could be trained to operate and service them effectively.

It appears that the development of electronic thinners and their use on a custom basis offers the best hope of achieving effective spring mechanization. Growers face increasing thinning costs. Available data show that growers have not benefited from the use of monogerm seed in terms of reduced thinning costs. In fact, thinning costs on a per acre basis have risen

steadily since the introduction and use of monogerm seed. On the other hand, labor has been able to thin more acres per man per day and the companies have been able to reduce substantially the number of migrant laborers imported per acre of beets contracted. It is ironic to realize that growers, who were expected to benefit the most from the development of monogerm seed have benefited the least!

I believe the development and use of electronic thinners offer the best hope for achieving an acceptable program of spring mechanization. Every effort must be made to encourage the development of these machines and to eliminate the need for labor in thinning beets.

The second area of research requiring more attention and increased effort is in the management of cultural practices - primarily the proper use of nitrogen fertilizers to achieve higher quality beets for processing in the factories. Several cultural practices affect beet quality, but the most important single factor is undoubtedly nitrogen fertilization.

Nitrogen is unique among the major fertilizer elements required for the production of sugarbeets. It has an overriding effect not only on yield and sugar content, but also on the level of extraction attainable in the factories. For this reason, the use of nitrogen fertilizers in the production of sugarbeets profoundly affects the economic interests of the grower and processor alike.

Too little nitrogen results in low root yields and a corresponding reduction in the per acre production of sugar. On the other hand, too much nitrogen depresses sugar content significantly and causes a reduction in extraction levels attainable in the factories. Very high levels of nitrogen fertilization may even cause a reduction in root yield in addition to drastic reductions in sugar content and beet quality.

Too much nitrogen, therefore, penalizes the grower in two ways: First, money is spent to purchase and apply nitrogen that cannot be utilized to increase production. Secondly, the beets are worth less at the factory because they are lower in sugar content. Likewise, the processor suffers in two ways: First, the additional nitrogen compounds introduced into the process cannot be eliminated. Secondly, one of these compounds, glutamine, breaks down in the evaporators forming organic acids which cause a marked reduction in the pH of the thin juice. To correct this problem, substantial additional quantities of soda ash must be added to the juice to maintain the pH at desired levels. This extra soda ash, like the nitrogen compounds introduced in the beets, cannot be eliminated. For each pound of these non sugars that remain in the juice, 1-1/2 pounds of sugar enter molasses. This two-fold loss in extraction is in addition to the reduced sugar content of the beets entering the factories.

The need to manage nitrogen fertilizer usage on an individual contract and field basis is becoming increasingly critical. No longer are general recommendations or averages acceptable. Growers must have the means to determine their nitrogen requirements more accurately and specifically.

The third area of research requiring more vigorous research effort relates to storage problems and storage losses. The losses that occur in storing beets from the time they are harvested to the time they are processed go on at an accelerated rate. Acreage increases and production levels have increased at a faster rate than slicing capacities resulting in net increases in storage periods.

Losses that occur in storage vary widely in different areas both as to the primary causes and also as to magnitudes. Nevertheless, in all areas storage losses represent major losses which reduce the efficiency of our factories and our ability to recover the sugar that is produced by growers each year.

In general, we have been content to accept these losses because the problems connected with the management of beets in storage have tended to be large and unmanageable. I believe our industry can no longer afford the luxury of these losses. New approaches and concepts in handling beets in storage are urgently required. Some new developments are being investigated, such as pile covering, pre-washing and controlled atmosphere storage. These and other new approaches designed to reduce storage losses need to be pursued vigorously.

I do not want to comment on the new and exciting storage research that is currently in progress. This will be the subject of a special report tomorrow morning. I would, however, like to acknowledge the fact that much of the impetus and new ideas for this research work originated here in Michigan. You are to be congratulated for your vision and courage in taking the leadership in this vital area of sugarbeet research. I trust that you will continue to stimulate others in the industry to expand their storage research work.

In conclusion, I would like to say that we, as the technologists of the beet sugar industry, have the responsibility for solving these three most pressing economic problems that face our industry.

1) The development of effective and practical spring mechanization programs.

2) Improved beet quality.

3) Improved storage practices that will reduce sugar losses in storage.

I was particularly pleased to see that all three of these subjects will be discussed during the course of your meetings and I am anxious to learn about the progress you are making to solve these major problems.