

GENERAL SESSIONS

President's Report

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In the 4 years since tin¹ last meeting of the Society, our country has fought His greatest war in history. We have seen our sons and relatives go to war many never to return. We have seen science marshaled for war work as never before. We have seen scientists by the score working on, one small segment of a problem and, when the parts were joined together, some of the greatest inventions and discoveries of all time were the result. There never has been in the history of mankind the teamwork among scientists and scientific workers that there has been in the past 4 years. This work was integrated so that our armed forces were given the new tools, machines, and arms which made our own forces mid those of our allies successful.

It is probably not out of order to suggest that this Society can be the integrating medium for piecing the parts together on which sugar beet scientists are working, thus bringing to a fruitful conclusion the problems which confront us.

Let us, therefore, review some of the past and see if some problems of the future can be outlined.

It is now 10 years since the American Society of Sugar licet Technologists was organized at Fort Collins. This was one of the most important steps ever taken for the benefit of the industry. The wealth of material along the different lines, as outlined in our program, is the proof of the need for such an organization. The group of men who promoted this organization deserve the gratitude of all of us who are today being enriched in our ideas, for their vision of the necessity for such an organization.

In Genesis, third chapter, when Adam and Eve were cast out of the Garden of Eden the Lord said to Adam, "In the sweat of thy face shalt thou eat bread." We have been castigated by our critics so that the general public view is that this statement, applies especially to the beet sugar industry. One of the aims of this Society is to improve the methods of growing beets so that this statement will in no way be true.

Starting in 1898 there was a tremendous upsurge in the development of the beet sugar industry and the building of sugar factories. On July 25, 1897, a tariff was established on raw sugar, of \$1,685 per hundred weight. There were nine factories in the United States at that time. In the next 5 years this number increased to 53. Factory extractions were low, being approximately 70 percent on beets bought. Beets were purchased for \$3.75 per ton. In the beet contract which

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the grower signed with the sugar companies please note that it was stipulated that beets must not weigh over 31/2 pounds each. In the area with which I am familiar beets were hauled in ordinary wagon boxes and were carrot-like in size. Sugar content of beets ran from 13 to 14 percent. Sugar prices were \$5.00 per hundred pounds as compared with \$5.40 at the first of this year. Factory efficiencies have been improved. The price paid to the grower has multiplied. We now take beets much larger than 31/2 pounds and like them. Sugar content of beets is much higher. But the price of sugar is almost the same as it was 48 years ago. We have probably made the major improvements in factory operations that are possible. If the industry, therefore, is to survive and be prosperous we must find ways to lower the cost of growing beets. This can be done by mechanization and increasing yields.

The beet sugar industry has proved its value to the agricultural areas in the United States. Reclamation projects which have sugar factories in the neighborhood have become prosperous. Good schools, fine homes, churches, and roads have been built. Fattening of sheep and cattle has become a major enterprise in these areas.

Markets have been developed for automobiles, farm machinery, and household appliances. Coal mines, lime quarries, and railroads have benefited. Employment in rural communities has been stabilized.

No successful sugar company manager or fieldman will recommend that more than 20 to 25 percent of the individual farm be planted to beets, yet no other crop will improve farming practices as will sugar beets. Beets are a bread and butter crop; this crop keeps taxes paid: it pays off the mortgage. It is so important to our rural economy that it must thrive and improve.

During the 30 years I have been intimately familiar with the sugar business, the handling of beets by the sugar companies has been improved tremendously. At the time I started, the beets delivered to the factory were either forked into the bins or a hand winch hoisted up one side of the wagon and the beets were dumped into the bin. Rail points were provided with highline dumps with hand operated winches, or beets were forked into piles at the rail point. Then came the belt conveyors at factories, and power dumps at rail points. Then more recently came wet hoppers for rail beets, portable pilers for receiving beets at both factory and rail points. Storage piles are now reclaimed with equipment such as the Athey or Garner loaders. This now makes the handling of beets from the farmer's truck to the factory as efficient as any material handling in any industry known to me. The farmer's problem is not solved until he has reached this same efficiency.

In 1936, (the year of the founding of our Society, the domestic beet seed business had just been established on rather a firm basis. The rapid expansion of domestic beet seed production built up during the first World War had practically died out. Then came the establishment of the over-wintering method of seed which was worked out in this country about 15 or 16 years ago. Under the spur of growers and processors the Division of Sugar Plant Investigation of the Bureau of Plant Industry, U.S. Department of Agriculture, had a good start on the development of beet strains resistant to curly top diseases. The past 10 years, which mark the Society's existence, have seen a development of seed varieties with a very high state of resistance to various diseases so that the domestic beet seed industry is on a firm foundation. There are still many problems which the plant breeders must solve. There is continuing improvement necessary in sugar content and purity of the beet. With the coming of mechanical harvesting; it would be advantageous to improve the type of crown of the beet so that it will better lend itself to mechanical harvesting. Single-germ beet seed would be of tremendous advantage from a mechanization viewpoint. Our present methods of breaking down seed to approximately a single germ are very costly.

The mechanization of the industry has been talked about by both the grower and the manufacturer for at least 30 years. One of the first jobs that I had after starting to work for the Utah-Idaho Sugar Company was to make shop drawings for a beet topper. The topping principle, even at that time, would have been satisfactory if ways could have been found to harvest, the beets. Because it did not solve the lifting problem the development did not meet farmers' approval.

It was shortly after the organization of the Society that the U.S. Beet Sugar Association, in cooperation with the University of California, started active work on mechanization of the beet crop. Probably the greatest impetus to Spring mechanization was the work that was done on the segmenting of beet seed and on single-seed planters. That fundamental work gave the incentive to a development which has been going on since, covering accurate spacing of the seed ball in tin-row and the lessening of the hand labor in the thinning operation. It also gave momentum to mechanical blocking experiments such as down-the-row, or cross, blocking. Where field germination was uniform it made possible the actual mechanical thinning of beets.

The work done at Davis, Calif., stimulated work on the mechanical harvester. Implement manufacturers were watching the development and after certain basic principles had been established these implement manufacturers started the development of machines in quantity production. Such harvesters as John Deere, Marbeet, International

Harvester, and several others have now reached a stage where they are actually harvesting beets in an acceptable manner under field conditions. Field loaders began to come into use several years ago, doing away with the forking of beets into wagons or trucks. Sishc, at Torrington, Wyo., did a lot of pioneering in this regard. Other manufacturers, using some of the principles he developed, continued the expansion of this particular phase of field loaders. Therefore, today there are several field loaders doing a very acceptable job.

Just about a year ago at Salt Lake City, representatives of the various sugar companies held a 3-day meeting on the problems of beet machanization. A survey was made of the work accomplished to date and a discussion of the problems still to be solved. This marked the beginning of the formation of the Beet Sugar Development Foundation, which was organized under the laws of Colorado in July of last year. Every beet sugar company in the Fnited States is now participating in this organization. This Foundation should furnish the leadership for the completion of many of the problems which still confront us. I wish to make this statement, which I believe cannot be contradicted, that had it not been for the formation of the American Society of Sugar Beet Techonologists, which brought industry and scientist closer together, this kind of cooperative effort would not have been achieved. This Society, through interchange of ideas, broke down many of the barriers between companies and caused a free discussion of mutual problems between its industry members.

I had a letter recently from one of our educational institutions asking if "Mechanize or Die" was not the situation facing the beet sugar industry. I do not know whether this is entirely so, but if we are to have a thriving industry it is certainly true.

There are still many problems confronting all of us who are working with all of our might to improve this industry. I do not think it possible to enumerate all of them in this discussion but some of them loom large. The elimination of weeds in beet fields is paramount before complete mechanization is attained. Even with perfect field germination and mechanical thinning, weedy fields still require a tremendous amount of hand labor. The cost of weed removal in weedy fields, even with mechanical thinning, is nearly as great as the cost of complete hand thinning.

This problem is so general that experimental work on chemical or hormone treatments for the elimination of weeds will be very worthwhile. Also those areas where the practice is used of plowing under a cover crop and then fallowing the land, have made very definite progress toward spring mechanization. This practice should be tried out on experimental bases in other areas.

The accurate placement of seed in the row has progressed faster than obtaining: uniform field germination of that same seed. The field germination problem for study, therefore, involves a number of factors: First, conservation of moisture in the field; second, opening and closing of the seed furrow; third, placing seed down to moisture and then removing a layer of soil by mechanical means; fourth, covering the seed with an excess of soil which is removed after germination has started but before emergence of the plant. There may be many other methods open up as further study and research is carried on. This problem must be solved. Please bear in mind that, the shoe or the disk opener with a press wheel following has been used for the placement of beet seed for at least the last 40 years without any particular change.

In the harvesting of beets the main problem yet to be solved is the separation of clods from the beets and the elimination of trash. The harvesters in use need further mechanical perfecting. There will probably be new methods or systems whereby tops will be harvested and hauled directly from the field. This will help solve the trash problem. We do not yet know what effect it will have on storage piles if beets are allowed to lie in the field after topping as compared to loading direct into trucks. Further research is needed here. This part of our problem is probably nearer to ultimate solution than is the mechanization of Spring work, but they go hand in hand in the final solution.

Beets in storage piles will probably give more trouble as mechanical harvesting is increased. Spoilage losses, where beets are stored over long periods, may become too great for the industry to bear. Important fundamental research on lengthy beet storage is now going on and basic principles must be established.

California factories should benefit from this research also, especially if ways could be found permitting beet storage enough to carry the factories through rainy seasons. Further research and full-scale experiments are now necessary. If this problem is solved the saving to the industry in avoiding shrinkage losses and deterioration in sugar will be tremendous.

The plant breeders still have plenty of problems. As stated above, the necessity for single-germ seed, improved crown type, improvement in sugar content and purity are vital. In addition to that there is much work that can be done in further improving varieties which are resistant or immune to the various diseases, such as seedling diseases, which confront the grower. This is a never-ending fight. Tremendous progress has been made and with the additional skill that scientists are developing further improvement is bound to come and, I believe, very quickly.

One of the major problems confronting both the scientists and the field staffs of the various sugar companies is the improvement of yields. This is going to involve further studies of soils, fertilizers, beet population, rotation practices, which may involve the plowing under of green cover crops, utilization of manure, irrigation practices, and drainage problems. Many other factors will become evident as further study is made.

In summarizing, we know much progress has been made in the past 10 years. However, before the growing of sugar beets is competitive with offshore producers with their low wages, we must do away with the use of large movements of migratory labor. The soil must be treated properly. Plant food must be returned to the land. Preparation, seeding, thinning, and harvesting must be done mechanically. Better use of the beet tops must be worked out and put into practice. Beet yields must be increased. Better beet types will be developed. More will be learned about irrigation and drainage.

The members of the Society will play the major role in the consummation of these problems. Those who are here 10 years from now will look back and see these problems solved. Others will, in the meantime, develop. We all know we are living in a world where new problems loom up daily. With vigorous leadership and interchange of ideas this group can solve the problems as they come up. There is a very necessary place for this Society and I am sure it will live up to its place in the scientific world.