

## GENERAL SESSIONS

### A Research Opportunity

J. B. COKE<sup>1</sup>

The conditions under which we meet for this third biennial meeting of the American Society of Sugar-Beet Technologists are far different from those in 1940. Today, our country is at war. The demand is for increased sugar production -not crop restriction.

This emergency can best be met by those engaged in our industry's commercial phases by increasing\* our diligence and skill in bringing to maximum production each acre of beets that can be grown. To reach this goal for increased production we should use to the utmost the tools provided by science. Labor supplies will be short—it is imperative that we immediately prepare to use machines and methods which will reduce the labor required to grow and process the 1942 crop. We have no time to lose. We must act now.

Those engaged in research—those who are attempting to find ways and means of increasing production or reducing costs—must intensify their efforts.

It is not to be expected that a society such as ours during the next 3 days will devise a program guaranteeing large increases in sugar production. It is expected that those responsible for sugar-beet research will, through their combined efforts, continue to find ways to increase yields in field and factory, and to decrease requirements for labor. To that end, much progress has been made. To that end, much progress is yet to be made.

If we are successful in this endeavor, we shall not only have assisted in meeting the present emergency—we shall have placed our industry on an economic footing where its existence will be less dependent upon political paternalism and its permanence in our Nation's agriculture more assured.

We are warned that this emergency will not be short-lived. Therefore, we must lay our plans not only for this year, but for an indefinite future, attempting throughout to select those projects which offer the greatest hope for meeting our objectives. If, during the past few years of beet-crop restrictions, we have felt discouraged because of a prevailing' reeling- in certain political circles that our industry was not essential, it is now time to forget our misgivings and strive as never before to increase the efficiency of the industry. World War No. 1 proved that food—and therefore our beet-sugar industry—was as essential to our country's welfare as the army itself. World War No. 2 will undoubtedly again offer such proof.

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In the field of sugar-beet research, there were being conducted in this country last year 229 separate sugar-beet projects under the leadership of 170 scientific workers; 50 of whom were in the U. S. Department of Agriculture, 5 in the Canadian Department of Agriculture, 62 in 16 state experiment stations, and 53 in 16 beet-sugar and other commercial companies. This is no small undertaking. If the beet industry permanently fills the place it deserves in our country's agriculture, it will do so largely because of the work and effort of this group of scientific workers, most of whom are gathered here. The future of this industry is largely in your hands.

Since about 1896 when the beet-sugar industry in the United States first took root and started to grow, the extent to which it has flourished depended to a large degree upon the political care it received. For the first 10 years in the life of the industry, it pushed rapidly ahead. Encouraged by a tariff of \$1.685 per 100 pounds raw sugar and relatively good sugar prices resulting from rapidly increased per capita consumption, 55 beet-sugar factories were built in those 10 years. Sugar-beet production during this period rapidly increased, but did not keep pace with this increased factory capacity.

During the next 10 years, conditions changed. The circumstances favoring expansion of the domestic industry became increasingly unfavorable. The attention of the country was centered on the development of off-shore sugar supplies. The period ended with the removal of all sugar tariffs, leaving this new industry unprotected and exposed to the ravages of foreign and insular sugars. It was certain death!

World War No. 1 gave this condemned industry new life. Before duty-free sugar became a reality, increased production of beet sugar was demanded as a war emergency. During the years 1915 to 1920, 23 factories were built, 17 in the year 1917. Notwithstanding the largest building program in the history of the industry and the demand for more sugar, the total production of sugar each year from 1915 to 1918 was progressively less in spite of some increase in acreage. The increased acreage was more than nullified by adverse agricultural conditions. Agriculturally, we did not come through.

During the last 20 years there has been a reduction in the number of factories. Where 106 were available for operation in 1920, today there are only 96. However, during this period, the total daily slicing capacity of these plants has gradually but consistently increased. Chemists, engineers, and factory operators during this period did their part to increase the efficiency of this industry. Sugar-beet agriculture, on the other hand, made little progress until about 1930.

The diseases, curly top and leafspot, were the plague of the industry. So dominant were they in limiting yields of beets that little

progress was possible in the technology of sugar-beet agriculture. The clutch of these diseases on our industry has now been broken. The way has been cleared for further progress.

In one of our small, compact, beet-producing districts, the average yield of beets varied in a single year from 14 to 39 tons per acre. Good explanations are available for some of the low yields. There are, however, no satisfactory explanations for the high yields. We assume that within that district, there were no differences in temperature or light values which would account for the difference in yields. Our knowledge of soil fertility or of available-soil-moisture conditions that existed in the various fields provides only partial explanation. Diseases and pests were not numerous or severe and, therefore, probably influenced yields only slightly. Unfortunately, we know almost nothing of the condition of the soil atmosphere, and the results of recent research indicate that a measure of this factor is essential to a more complete understanding of crop responses. If for these fields we had a measure of the factors of soil fertility, available soil moisture, soil atmosphere (as indicated by soil porosity), and diseases and pests, it is very likely some explanation of the large variation in yields would be possible.

Certainly we can learn little, for example, from fertilizer studies, if soil moisture or the lack of oxygen in the soil atmosphere is the limiting factor. My plea is that in our research work we should recognize and attempt to measure to the limit of our ability all of the factors affecting plant response. Unless we do this, our progress will be limited.

Most scientific societies, as well as research institutions, are organized on the basis of arbitrary divisions of science. The forces by which plants grow have been nicely divided into groups for the purposes of research, which unfortunately have of themselves assumed such importance that any attempt to determine the inter-relationship of the groups is almost unknown.

In this Society of Sugar-Beet Technologists, we have a real opportunity. We must have one common motive—that of producing more sugar per acre at decreased costs. Therefore, we have, I believe, an opportunity to contribute not only to our own industry, but to agriculture in general, if we undertake research based on the combined needs of the plant. Such a project would not supplant those now under way. It would bring together—to focus on one crop in one inter-related undertaking—the results of research from the various plant sciences. It would—if you please—act as an assembly plant, gathering from every available source the various parts, which would, when placed together in proper combinations, provide the conditions for maximum plant growth. We may not as yet have all the parts. We can assist in developing them.

I am not certain that the beet-sugar industry should establish a separate research organization for this work. Such an organization offers many problems. I do, however, strongly recommend a further study by the society of the establishment by the industry of a coordinating research project.

As you well know, the beet-sugar industry in this country has established a precedent of working together in the field of agriculture. Certainly the development of mechanization of sugar-beet operations has been greatly accelerated and advanced by the project sponsored by the U. S. Beet Sugar Association. This association, after careful study, selected an established research organization, with capable leadership and equipped with buildings and machines, to carry on the beet-machinery project. You know something of the success of the project, which is being directed by Professor H. B. Walker, our most able general program chairman. You will learn more of the project during these meetings.

In undertaking this work, the industry has recognized the necessity of combined effort to solve the beet-machinery problem. I firmly believe that the industry should and will pool its efforts in an attempt to make further progress in the problems of increased production, if a definite and logical program is developed.

This is our challenge.

## Old Timers

FRED G. TAYLOR<sup>1</sup>

It seems proper to record a report of a dramatic incident that occurred at the banquet, in which special recognition was given and tribute paid to those present who had been employed in the sugar industry for 40 or more years.

The toastmaster, Fred G. Taylor, referred to the presence of several men whom he characterized as Old Timers, and, calling them by name, asked them to present themselves at the speaker's stand and be introduced.

Henry A. Vallez of Isabella Sugar Company, was introduced as the Dean of Beet-Sugar Technologists, having been engaged in the business for 54 years—"and still going strong."

The toastmaster expressed happy recollections of having come under the benign influence of Superintendent Vallez at Lehi, 43 years ago, when he went there as a student sugar boiler.

<sup>1</sup>Toastmaster at the biennial banquet, 1942.