The American Society of Sugar Beet Technologists[1]

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In trying to decide what I should discuss with you I found it difficult to choose between two desires. I would have enjoyed bringing to you a story of some of the modern advances in plant breeding- how the plant breeder has worked hand in hand with the plant pathologist and other plant scientists to bring into a hungry world varieties of wheat, corn, oats, and other crops resistant to the ravages of diseases that used to peril these crops, and how for our own sugar beet crop there have been similar amazing advances. But, instead, I have chosen to discuss our own American Society of Sugar Beet Technologists, since this was an opportunity for me to bring together something of the early developments which led to the organization of this Society, along with its present status and future possibilities.

Our organization is unique, in that it is the only technical society of its kind in this country devoted to one crop. There was no hesitation or extensive deliberation by the organizers about the need for such an organization, nor did there seem to be any apparent doubt about the possibility of its success. This, the fifth general meeting of the Society encourages one to think that it may continue to serve indefinitely as a permanent and essential medium for interchange of ideas and an outlet for release of experimental results to the public.

This Society was officially created at Salt Lake City on January 13, 1938, when the first constitution and by-laws were adopted. Preliminary to this, however, sugar beet people had been invited to Fort Collins, Colorado, each year for three years, beginning in 1935, to take part in a so-called "Sugar Beet Round Table." Particular credit is due T. G. Stewart, then extension agronomist for the Colorado State College of Agriculture, for taking the initiative in calling the first meeting of the Round Table in 1935, and for taking an active part in all three sessions. Acknowledgment is also due C. V. Maddux for encouragement and active participation in organizing and conducting the Round Table meetings.

Action was taken at the Second Annual Round Table in 1936 to invite sugar beet people from California to the 1937 meeting, at which time actually most of the sugar beet areas and research institutions interested in beets in the United States and Canada were represented. At the closing session, January 5, 1937, W. W. Robbins in a keynote address put added enthusiasm into the idea of a national society. Prompt action followed to create The American Society of Sugar Beet Technologists.

[1]Presidential address delivered to the 5th general meeting of the American Society of Sugar Beet Technologists, San Francisco, California, Jan. 12, 1948.

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A. W. Skuderna, elected as its first president, drew up the first draft of the constitution and by-laws. Under his inspiring administration formal development took place, culminating in complete organization at the first general session at Salt Lake City.

Succeeding general meetings of the Society included the 1940 session at Denver with N. R. McCreery, president; 1942 at Salt Lake City with J. Earl Coke, president; and 1946 at Denver with Wilfred Y. Cannon, president. Due to war-time restrictions the 1944 meeting was not held.

This Society could not have been developed in so few years to such stature and dignity, as you will observe at this meeting, were it not for the whole-hearted cooperation of many people, all of whom were scientists either in their own right or in their personal interest. I would like to mention those men who have contributed so much to this development, but the list would be unduly lengthy and I can merely suggest that you take a few minutes sometime to go back over the Proceedings to see who they are.

The Proceedings of this Society have been preserved. For the first two meetings they were mimeographed, largely because of lack of funds to do otherwise. For the last two meetings the cost of printed Proceedings was underwritten by the United States Beet Sugar Association, and these constitute published volumes of which the Society and the industry can justly be proud. Because of limited editions, these Proceedings might well be expected to become of considerable historical value.

Objectives of the Society

The purpose of the original Round Table was "to direct attention to improved methods of sugar beet culture and to develop more complete understanding regarding research and field experience between beet sugar companies, beet growers, and State and Federal workers." Representatives of both the growers and processors were invited to attend the meetings, it being held by the organizers that sugar beet research was of mutual concern to both groups and that research might serve to bring the entire industry more closely together. Actually, support from the processor was enthusiastic but only nominal from the growers' representatives. As one of those who took an active part in this enterprise the lack of support from the growers' group was a source of some disappointment, for by early experience and training my interest has largely centered around the farmer and his problems. The fact that we had to some extent failed to enlist wide and enthusiastic interest of growers no doubt entered into the planning for the national organization with its objective "to foster all phases of sugar beet and beet sugar research, and to act as a clearing house for the exchange of ideas resulting from such work."

I think it is safe to say that the results of much, perhaps most, of the research which will be reported at these meetings is of primary concern to the grower. His qualified representatives should be taking as active

a part in these meetings as either the processors or other industrial interests. Is it not reasonable to suppose that the grower should also contribute extensively to the support of research that makes possible improvements in methods of growing sugar beets and in the varieties themselves? I believe this Society can contribute a real service to the sugar beet industry by encouraging more interest and participation in its activities from the grower side of this great partnership of beet growing and processing.

This Society was developed on a strictly technical basis, and on this basis it has enjoyed a prosperous development and recognition by the industry which it serves, as well as by a scientific audience throughout the world. The Proceedings have served to place before the scientific world a compendium of recent advances in sugar beet research. From the standpoint of the scientist this constitutes a favorable outlet for strictly scientific publication, for it not only reaches the sugar beet audience but is also available to all scientists and administrators in other fields of science. This is an important feature which cannot be disregarded. In order to continue to enlist the support of our scientists, particularly those in State and Federal institutions, quality of the papers accepted and the standard of excellence adhered to in publication of the Proceedings or other official organs of the Society must be kept on a plane that will be both highly desirable and entirely legitimate as an outlet for their contributions, for without such contributions the Society itself would fail in its objectives.

Now, I fully realize that the two briefs just expressed, first for more grower participation in the activities of this Society, and second, for a continued and improved high scientific tone in our meetings and publications, may seem incompatible. Personally, I do not think so. I know many growers who are well qualified to read scientific literature, and furthermore, many of our best scientists today are specializing in writing or reporting so that they can be completely understood by the non-technical public.

In a plea for even better scientific writing a scientist of national reputation, A. J. Riker, plant pathologist, University of Wisconsin (4)[2], wrote recently, "Among the diseases of manuscripts, a diarrhea of words is perhaps the most common." To prepare a scientific report in a comprehensive manner, yet done clearly and simply so that one can always be understood, is an art worthy of real effort on the part of the scientist. It is an essential part of research and the manner in which it is done not only reflects upon the individual but upon the organization of which he is a part and the Society to which it is reported or the publication which accepts it. For this reason some special effort was made this year by the program chairmen and the editorial committee to improve the general level of the manuscripts prepared for this meeting.

There are, of course, fundamental phases in science which can only be treated in a manner to be understood mainly by fellow scientists, and

[2]Numbers in parentheses refer to literature cited.

such may be set off from those less technical as sectional programs at our Society meetings for the principal concern of scientists. Everything possible should be done to encourage such programs at our meetings, for out of these come the applications to our pressing problems.

Need for Intensive Research

I picked up recently the following quotation from *Arrowsmith,* by Sinclair Lewis:

> "God give me unclouded eyes and freedom from haste. God give me a quiet and relentless anger against all pretense and all pretentious work and all work left slack and unfinished. God give me a restlessness whereby I may neither sleep nor accept praise till my observed results equal my calculated results or in pious glee I discover and assault my error."

Sometimes I think even the scientist takes entirely too much for granted. There is real danger of becoming provincial in our thinking. We need to spend time visiting with scientists in other fields, attending national meetings other than our own, and studying methods and results with other crops. In this, I speak particularly for those of us associated with research in an industrial organization, for we are more likely to be somewhat isolated from research institutions. This Society established a worthy precedent at its first meeting by inviting scientists in unrelated fields as guests of the Society to address the meeting. This practice is a valuable one which should be continued.

The orthodox, the accepted thing, all too often proves to be faulty when exposed to critical tests. Someone has aptly said, "There is nothing so perishable as an established product or idea." For example, probably most of you have heard growers, and sometimes others, remark that a reddish color developing quickly on a scarred beet means that it is "ripe," or has high sugar. We have checked sugars from hundreds of mother beets and have failed to find any correlation between this color and sugar content. The scientist needs imagination and some daring in designing experimental work, for the accepted may often be challenged with surprising results.

We have witnessed in recent years tremendous advances in the application of good scientific principles to the sugar beet crop. The development of a highly successful domestic seed industry presented the challenge of new varieties and this has been met with considerable success by our plant breeders and plant pathologists. Segmented seed resulted in a very important saving of labor. Cultural practice has been improved, and with approximately 17 percent of the 1947 beet acreage being harvested by machines, it is obvious that material progress has been made in mechanizing beet production. Beet by-products are appreciated more for their feeding value than ever before, this being particularly true now when grain shortages are severe as a result of world-wide demand for these products. Some new chemical by-products from the processing end are indicative of real

progress toward using "everything but the squeal," as they say in the hog-packing industry.

New developments and new information often serve to open up new opportunities. May I cite a few examples. One of the rather exciting possibilities coming out of atomic research is radioactive phosphorus which can be traced from the soil through the plant and animal, and it now becomes possible to determine accurately the phosphate-fixing power of our soils and the efficiency of the various methods of phosphate application. A host of new chemicals offer undreamed of possibilities of weed, insect, rodent, and disease control. New beet characters such as single-germ seed, a short, round root of concern to the engineer moving toward complete mechanization of the crop, and male sterility which becomes invaluable in a breeding program, are definitely in the picture of sugar beet improvement. To obtain the answers to these new problems, intensive research, additional highly trained personnel and resources will be needed.

In an address entitled "Industry, Science and the Public," Edward Pendray, assistant to the president of Westinghouse, made the following very pertinent remark, "No major industrial organization can long remain in business without research." To show the tremendous development of research as applied to industry the following facts[3] are of interest:

In 1920 297 industrial companies employed 7,400 research men

In 1927 1,000 industrial companies employed 19,000 research men

In 1940 2,350 industrial companies employed 70,000 research men

In 1945 the Du Pont Company (2) alone employed 3,500 men and women in their research department. In that company, research is considered as a major activity, research activities do not follow a "profit and loss" curve, highly trained personnel are employed, and fundamental research is recognized as "one of the most valuable phases of their research work."

While much has been accomplished by research in various phases of the sugar beet industry, I think we will all agree that the surface has only been scratched, and the need for further intensive research has never been recognized as it is now. In this connection in a keynote address to the 1947 Eastern Regional Meeting of this Society, Geoffrey S. Childs made a remark of particular significance to us: "It is through research that we may hope for strength and growth in our work," and of the American Society of Sugar Beet Technologists he said, "This has proved a boon to stimulating interest in research work."

Cooperative Trends in Research

A Christmas card which came to my desk only recently may have been designed specifically with this Society in mind. At any rate, with two hands clasped together it appeared symbolic of what this Society stands for, and what I want to discuss with you for a few minutes; namely, cooperation and coordination in research.

[3]Reported by Mellon Institute.

The Farmers & Manufacturers Beet Sugar Association deserves credit for facilitating cooperative efforts between growers and processors as early as 1934, when it was organized. This Association has continued to serve the eastern segment of the sugar beet industry in an effective way since that time.

Various phases of fundamental research can best be carried on in the United States Department of Agriculture and the state universities. Industry is making an increasing demand upon the facilities of these institutions for trained personnel and for various phases of industrial research. There is some danger that for purely economic reasons or a desire to cooperate and to provide the answers to such requests that "these institutions may fail to keep in mind that the training of students and the conduct of basic research is their primary responsibility" (1).

Cooperation between industry and Federal or State research agencies can, however, be mutually productive. Many problems have been approached cooperatively by the Sugar Plant Office of the United States Department of Agriculture and industrial research agencies. There is no better example of cooperation between fundamental research and industry than the sugar beet machinery project at the University of California, which was administered so ably for a 16-year period under the supervision of H. B. Walker, a resume of which he is to give at these meetings.

At the third meeting of the Sugar Beet Round Table at Fort Collins, Colorado in 1937, Eubanks Carsner in a keynote address spoke on the "Value of Coordinated Research." His address was an informal one, and unfortunately, was not recorded in the mimeographed Proceedings of that meeting

Some progress was made in this connection at the 1942 meetings when a Research Coordinating Committee appointed by President Earl Coke made rather specific recommendations for an active program of coordination of the efforts of various research agencies with the ultimate objective of bringing about a more comprehensive approach to the unending problems of concern to the sugar beet industry.

Cooperation in sugar research was effectively implemented through the organization of the Sugar Research Foundation, Inc., June 10, 1943, by the producers and processors of beet and cane sugar in the United States, Puerto Rico, Cuba, Canada, and the Dominican Republic. Grants-in-aid by this Foundation of half a million dollars are supporting fifty research projects on various phases of sugar. These studies cover a wide range of subjects: sugar in human metabolism, frozen fruit products, levulose extraction methods, beet by-products, dietary control of dental caries, utilization of sucrose by plants—to mention only a few. Research institutions throughout this country and Canada are cooperating. The fundamental basis on which the Sugar Research Foundation operates was aptly stated by its president, Ernest W. Greene: "Science is most fruitful when it is cooper-

ative—when interests, talents, and ideas are pooled and made easily available and when projects are coordinated to the major aims."

Of more direct concern to many of us is The Beet Sugar Development Foundation, which was created July 1945 by the United States Beet Sugar Association with the primary immediate objective of facilitating the mechanization of sugar beet growing. Of this very significant development the immediate past president of this Society, Wilfred Y. Cannon, had this to say in his presidential address: "Had it not been for the American Society of Sugar Beet Technologists, which brought industry and scientists close together, this kind of cooperative effort would not have been achieved."

In any event, the organization and encouragement of cooperative efforts in sugar beet research which has characterized the activities of The Beet Sugar Development Foundation during the short span of its existence is prophetic of a new era for the sugar beet industry in this country. For the limited base of its immediate objectives this Foundation has succeeded magnificently in carrying out the ideas of the research coordinating committee of this Society.

Wide-scale fertilizer tests constitute an excellent opportunity for cooperative relationships with the grower. The Utah-Idaho Sugar Company conducted such tests in cooperation with growers for 2 years with valuable results. In 1946, 50 such tests were conducted, the data being reported to the 1947 regional meeting of this Society. A similar wide-scale study was conducted in 1947 in a 4-state cooperation between the State Agricultural Experiment Stations of Colorado, Nebraska, Wyoming, and Montana, 75 cooperating growers, and The Great Western Sugar Company.

I mention these various developments merely as evidence of a growing spirit of cooperation in research on the sugar beet crop. They represent some of the more important developments during recent years which should be encouraging to everyone interested in the sugar beet industry. Scientific research has made great strides in connection with each of these developments.

In other parts of the World, however, biological research has not fared so well. It is not for any reason of boasting or particular gratification that we take note of the situation in our wartime ally, Russia, but because we have new members in this Society who found it necessary to give up their native country, Russia, for the freedom of scientific thought in this country. Dr. and Mrs. V. F. Savitsky, eminent scientists in their own right, have only recently arrived at Salt Lake City where they have come to serve the sugar beet interests and science in general in this country in their fields of genetics and cytology. The story back of their exodus from their homeland is one with which every one of us should become fully acquainted. It is a dramatic story of a world-recognized development in genetics and plant breeding which was reduced to a superficial shell under the relentless attacks of a suspicious Soviet dictatorship encouraged by a

false scientific premise (3). This story is a bit sobering as one becomes fully acquainted with all its implications. May we take a solemn resolve that scientific research here may always remain free and unfettered from dictatorial direction. Let us extend the right hand of scientific fellowship to these friends who have so recently come from Russia to join us at a time when we are more than ever aware of the advantages of research.

Finally, in this brief resume of the development and present status of our Society I think we might pause to remind ourselves that ours is a youthful industry; that whereas sugar was first produced from sugar beets just 201 years ago by Andreas Marggraf, the industry in the United States dates back less than 70 years to the first successful factory operation. Our Society has appropriately paid tribute to some of the "Old Timers." We are in a most exciting period of development, one which is a challenge to all of us who are active in research. As we look back on this occasion and this period a few years hence, I am sure we will all feel some real satisfaction in having had a part in making the sugar beet crop an indispensable part of agriculture in America.

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