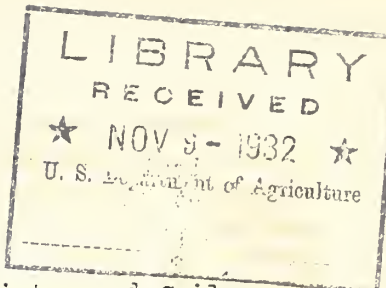


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THE CHEMIST SERVES WHEAT GROWERS  
MILLERS AND BAKERS.

Radio talk by Doctor Henry G. Knight, Chief, Bureau of Chemistry and Soils, delivered Friday, October 21, 1932, in the Department of Agriculture. National Farm and Home Hour, broadcast by a network of forty-six associate N.B.C. radio stations.

SALISBURY:

Once again Doctor Henry G. Knight, the Chief of the Bureau of Chemistry and Soils, brings us a report of the service of chemical research to a major farm industry. Doctor Knight today will give us the story of the way in which chemists serve the wheat industries of the United States.

To our farmers wheat is a most important crop. It yields grain growers a larger cash income than all the other cereal crops combined.

All of us consume wheat products and many people make their living from the manufacture of wheat into flour and flour into baked goods. Four of the food industries of this country are in the billion-dollar class. Two of these four are wheat milling and bread baking.

So it is natural to suppose that chemists would devote much attention to chemical problems of growing and processing wheat. They have. In fact, one particular class of chemists known as the cereal chemists, spend most of their time studying wheat, flour, bread and other wheat products.

Our speaker today is going to bring us up to date on the results of the work of these chemists.

Ladies and Gentlemen, Doctor Henry G. Knight.

KNIGHT:

Thank you, Salisbury. Greetings again to the Farm and Home Hour audience.

As Salisbury implied in his introductory remarks, chemists have conducted extensive research into the nature of wheat and wheat products. Back in 1847, the 30th Congress appropriated \$1,000 "for the institution of a system of analysis of different grains produced in this country, and of flour manufactured here and exported abroad."

In 1880 Congress began making yearly appropriations for the chemical study of cereals and cereal products.

As a result of chemical studies during the past fifty years, millers are now able to produce flour of uniform baking quality day in and day out. Chemical research also enables millers to produce special flours for use in making the various sorts of baked products. Chemical research has played a large part in the development of the baking industries also.

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Chemical research led to the present method of grading flour. Chemists observed that high grade flour was free from bran specks, whereas the lower grades contained particles of bran. Now bran, as every miller knows, is rich in mineral content. So the more bran specks in flour, the higher the mineral content of that particular flour. The modern method of establishing the grade of flour by determining its mineral content grew out of this observation of the chemists.

Chemists also developed the process of bleaching flour so that it is white instead of creamy in color. But more recent chemical research has established the fact that the creamy color of newly milled flour is associated with the Vitamin A content of the product. So now it has become a question whether a bleaching process which destroys this pro-Vitamin A in flour is economically beneficial. Further chemical research will settle this conflict as to whether or not flour should be bleached.

Chemists have helped solve a milling problem rising from modern methods of harvesting wheat. In the old days before the combine harvesting method came into general use wheat usually remained in shocks or stacks some time after it was cut. While in the shock or the stack, wheat went through changes that made it produce flour of good baking quality. Also some of the wheat sprouted, especially in rainy seasons. Now, while flour made entirely from sprouted wheat does not make good bread, chemists have shown that by mixing a small percentage of germinated grains in the wheat to be milled you improve the baking quality of the flour produced.

But wheat harvested with a combine has no chance to germinate nor to undergo the other changes in shock or stack that improve its milling quality. This fact created quite a problem until chemists developed a method of incorporating measured amounts of specially germinated or malted wheat with combine harvested wheat. Now millers are again able to produce flour of the highest quality from combine-harvested wheat.

Cereal chemists have studied the food value of different flours and have shown that all flours--wheat, whole wheat, and graham--are very nutritious and economical foods. They have shown also that the finer particles of wheat flour are better adapted for making cake and the coarser particles are better for bread. Also that animals digest fine-ground bran more easily and thoroughly than coarse-ground bran.

To illustrate the services of chemists to bakers, I need only mention the fact that chemists developed the flour improvers that are used by almost every large baker. Most of these improvers are chemicals that you might say are foods for yeast. That is, even small amounts of these chemicals stimulate the action of the yeast. As a result the baker often gets an improved loaf of bread. Other types of improvers modify the condition of the gluten in the dough and thus help to make better bread.

Well, there are some of the recent chemical discoveries that have been of service to millers and bakers and thus to consumers of baked products.

The cereal chemists also serve wheat growers. They find out for the plant breeders the characteristics of wheats that make the best flour and thus set up the goals for the plant breeders to attain in wheat improvement work.

Chemists and other scientists carry on fundamental experiments to find out just what influence environment and the soil have upon the composition of wheat. Al-



ready they have discovered that climatic conditions have much more influence upon the composition of wheat than such factors as soil or fertilizers applied in the usual way.

Other experiments have indicated that new methods of applying fertilizer may influence the composition of wheat. Fundamental research on application of fertilizers at different stages of the growth of the wheat has revealed that it is possible to increase the protein content of the wheat produced from 30 to 50 per cent, and to prevent the appearance of yellow berry, a serious defect reducing the market value of the wheat.

Wheat growers in many sections are now accustomed to selling their product according to the amount of protein it contains. High protein wheat generally commands a premium. Now this marketing of wheat on the basis of protein content is founded upon chemical research which showed that the baking quality of flour largely depends upon its content of gluten--and gluten is the main protein of wheat.

These brief comments I have given you upon the recent result of chemical research on methods of growing wheat and milling and baking flour will serve to indicate the importance of chemical research in the whole economy of wheat raising.

Next Friday I shall report to you the results of our recent chemical research on the problem of providing our huge leather industries with tanning materials from domestic sources.

Until next Friday, I bid you Good-bye.

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