Challenges on the Frontiers of Knowledge

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Thank you very much, and thank you, President Oaks. This is really my first opportunity to view this audience from this particular perspective, and as you can probably imagine, it is indeed overwhelming. But I do want to express, both for myself and I am sure for all of the other recipients of the Karl G. Maeser Awards today, our appreciation to the Alumni Association and to the University. We feel that this is an honor to be invited to join such distinguished company as the past recipients of these awards, and we do thank you. Since teachers wouldn't be teachers without students, I would also like to take this opportunity today to express my own appreciation to my students and to tell them how much they mean to me and how special they are. I see them scattered over the audience.

At an assembly recognizing achievement in research and teaching within a university, it seems appropriate to talk about challenges on the frontiers of knowledge. A true university is on the frontiers of knowledge. It is a community of scholars dedicated to expanding the bounds of knowledge in all disciplines. The university offers both faculty and students a challenge, not only to learn what others have discovered, but also to feel that joy of discovering for themselves something really new after long and diligent research. Challenges create excitement, and the university world can be a very exciting place—for the fresh young undergraduate completing his first independent study project, for the young faculty member with a new Ph.D. just beginning to test his research abilities on his own, for the seasoned researcher with many publications to his credit and with the earned respect of his colleagues, and for everyone in between.

Dr. DeBakey, the noted heart surgeon, pointed out a few weeks ago when he visited this campus that every one of us has an important obligation to at least support scientific research that will be used to improve the quality of life for all mankind. Dr. DeBakey, of course, vividly demonstrated this point by showing films of lifesaving open-heart surgery that had been made possible through the efforts of hundreds of researchers working in laboratories throughout the world.

There are new challenges on the frontiers of knowledge in every academic discipline of the university. Many of the unsolved problems that present challenges overlap several disciplines,

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and interdisciplinary approaches to their solution are essential. We do need to work together in this community of scholars that is a university. Cooperation among disciplines and understanding of each other's abilities and contributions will help greatly to further the knowledge explosion and the application of new knowledge to the problems of living.

Food and Nutrition an Applied Science

Today I would like to take my own academic area, which is nutrition and food science, to illustrate just a few of the unsolved problems that are today creating challenges. As I talk about some of the unanswered questions in nutrition, equally challenging problems in each of your own academic areas should come to mind. The problems may be different, but the challenges of discovery should have a common thread.

My chosen field of study is one that might be classified as an applied science. Consequently, it draws on many other areas for basic scientific principles to be applied to the practical problems dealing with food and nutrition. It draws on chemistry, biochemistry, physiology, microbiology, medicine, sociology, psychology, anthropology, economics, agriculture, and engineering—all important to food and nutrition. It is in itself interdisciplinary, at least in a sense. The area of nutrition and food science is also one that is somewhat unique because it actually involves a personal experience for everyone who lives. Whether you eat to live or live to eat, you are still involved with food. Everyone eats, or he doesn't live very long. Thus, everyone is something of an expert on foods, at least where his own food habits are concerned. This situation creates both advantages and disadvantages for the educator and the researcher in nutrition and food science. It is an advantage in that he has a really tremendous audience interested in his subject, but it is sometimes a disadvantage in that he has to compete with so many self-styled authorities, to whom subjective personal experience is sometimes more important than documented research data.

Yes, the problems in nutrition and food science are many. It is a relatively new science, only about sixty years old. Although it is a rapidly expanding field, the expansion often seems to do little more than open up new areas of the unknown. And I think that this is common to most disciplines—a sometimes overwhelming recognition of the tremendous store of knowledge and application yet to be discovered.

Social Implications of Food

Let's begin with some social science implications for food and nutrition. We might say that food is more than nutrition. Man as a biological being does require food to sustain life. He eats to satisfy his hunger and to meet his basic drive for food. But man is also a social being, and food is intimately woven into the social, psychological, and intellectual lives of men. Men have learned to live and work together and have organized themselves into societies. As human infants grow and develop, they are incorporated into one of these societies through varied experiences, and many of these experiences involve food. The term *culture* may be used to describe a way of life in which there are common customs or rules for behavior and in which there is a common understanding among members of the group. Food is filled with many different meanings and much symbolism for all individuals at various ages and stages of their maturity. Food is part of the fabric of life, and this fact must be recognized by anyone who seeks to change or to modify the food patterns of individuals and groups.

An anthropologist, Dorothy Lee, has written about food and human existence:

When I speak of FOOD AND HUMAN EXISTENCE, I am not trying to use a special synonym for the phrase "nutrition and life." I mean

something beyond mere biochemical nutrition and more than mere physical survival. Food can engage me completely as a person. It can bring to life my keen anticipation, my impatient or happy waiting; it can evoke my memory in all its pain and joy; it can pierce me with nostalgia; it can revolt me to the point of vomiting. Its preparation can be an act of relatedness, of obligation, of self-fulfillment, of creativity, of love; its eating can be participation and communion. Let us hope it also nourishes me physically, supplying me with the proteins, vitamins, carbohydrates, and other nutrients I need to stay alive and healthy so that I can experience the fullness of human existence. ["Food and Human Existence," National Dairy Council *Nutrition News* 25 (October 1962):3]

Technological Influences on Nutrition

Much of modern society has become oriented toward science and technology. Engineering developments and food technologies have been extensive in recent years. Such things as prepared infant formulas have become readily available. The large-scale food production and service outside the home are expanding the habit of eating out. The increasing use of convenience food, both in the home and in the eating-out establishment, is another part of this expanding technology. This technology has influenced the food habits and patterns of eating for most of us in the United States. The fact that much food preparation is now done outside the home may very well influence the social aspects of food within the home, since this situation decreases individual family members' reliance on each other for providing food to eat. Anyone can warm up his own TV dinner; he doesn't need mother to do it for him. Probably the impact of technology has had an influence in stimulating the back-to-nature movement in food. Organic home gardening is becoming more popular, especially in groups among whom so-called natural or unprocessed foods are emphasized. For those who are part of this movement, actually more rather than less food preparation is done at home. Thus, we have opposite trends, both influenced by modern technology.

Symbolic Uses of Foods

With all of these technological influences, I think it is important that the meanings of food other than the merely biological ones be considered and talked about. Food, we might say, means security. The infant learns about security when his mother responds to his crying by giving him food. Familiar foods bring back memories of home and family and make one feel more secure even when away from home. A food package, home baking sent by a mother to a son or daughter in college, has much more significance than the empty calories it may contain, and I suspect that most of you know this from personal experience.

My nephew is now on a mission in Japan. Next to a letter from home, he seems to find a box of home-baked American cookies the best antidote for homesickness and for the problem of getting used to strange and unfamiliar foods—even though the cookies are only crumbs when they arrive in Japan, and he has to eat them with a spoon. The feeling of being full and physically satisfied and of knowing that there is a year's supply of food stored in the basement also brings security of both a temporal and a spiritual nature, especially to the breadwinner of the family.

Food is also the symbol of hospitality, and it is used to show that one cares about others and is a friend. A new family is welcomed into the neighborhood with food. Gifts of food are given, both in times of happiness and holidays, and in times of sorrow when a loved one has been lost. Certain foods show status. Beefsteak has status in the United States. Taking someone out for a steak dinner usually means a little more than going out for a hamburger, although the nutritional quality of the meats is the same. White rice, although nutritionally inferior to brown rice, has status in some countries of the

world and is preferred and eaten primarily for this reason. Foods commonly eaten by blacks in the southern United States—such as collards and turnip greens, fat pork, and certain fish—were for a long time not acceptable to whites because of status. Now, however, this attitude is changing, and soul food is being served and enjoyed in many prestigious restaurants throughout the country.

To quote Dr. Lee again:

In our own society food is . . . the center of values and feelings that have nothing to do with nutrition, with the stilling of hunger pangs, or even with eating itself. Why else did the supermarkets in Detroit begin to stock black-eyed peas and mustard greens as soon as the influx of Southern immigrants hit the city? Why do stores in the big city carry queer things like seaweed, vine leaves pickled in brine, or dried stringy abominably (or is it deliciously?) smelling fish?

I will tell you why they carry vine leaves. They carry them for me because I yearn for them. For me, born and nurtured in the Near East, a vine leaf wrapped around cold rice cooked with olive oil, onions, herbs, pine-nuts, and currants, evokes a whole way of life. It brings to me a re-enactment of the time I sat around the table with my mother and my sisters, skillfully spreading out the wrinkled vine leaves with sensitive fingertips, gauging to a grain the right amount of filling as I piled it on each leaf, wrapping and rolling and stacking interminably, smelling the tangy scent, talking and quarreling and laughing and singing. ["Food and Human Existence"]

Problems of Poor Nutrition

How do the many meanings of food offer challenges on the frontiers of knowledge? There are worldwide problems of health related to poor nutrition. Poverty and ignorance are probably the major reasons for consumption of inadequate diets, but results of dietary surveys, at least in the United States, suggest that only at the very bottom of the economic scale, where there is the greatest poverty, does lack of money play the dominant factor in determining food choices. If a nutrition educator wants to help people make wiser food choices from a biological or a health standpoint, he must be interested in the process of changing food habits. And these habits, as we have been pointing out, may be very deeply ingrained. Anyone who works with changing any part of cultural food habits must study the entire cultural pattern carefully, because a change in food habits may have extensive and sometimes undesirable effects on other parts of the culture. Food habits are changing in many parts of the world; I don't want to give the impression that you can't change food habits. But they're not necessarily always changing for the best. Affluence brings its own problems in relation to food. The challenge is to find out more about how good habits do change and to channel this discovery into areas that will bring lasting benefits to human health.

What are some of the other unsolved problems in nutrition waiting to challenge anyone who is willing? Changing patterns of disease over the years have pushed certain chronic diseases to the top of the list for causes of death in the United States. A leader is heart disease. The abnormality that underlies much of the heart disease is a condition with the unpronounceable name *atherosclerosis*, a type of degeneration of the arteries that is characterized by the accumulation of fatty substances as lesions in the walls of the medium and large arteries of the body. Atherosclerosis of the coronary arteries, narrowing and blocking the arteries that nourish the heart muscle itself, is probably the basic cause of heart attacks that claim the lives of so many relatively young American men each year. A recently published textbook says, "It is hard to overemphasize the enormity of the problem of atherosclerosis as a disease." What does nutrition have to do with atherosclerosis? Here is another challenge. An elevated level of

blood cholesterol and possibly triglycerides or plain fat in the blood is now considered to be a major risk factor for coronary heart disease, even though many people who have heart attacks do not have high levels of blood cholesterol. It has been shown in many research studies that the amount of fat in the blood is affected by the type and amount of food that is eaten. But in spite of the publication during the past fifteen years of literally thousands of research reports on this subject, an incontestable direct link between diet and coronary heart disease in the human has not been proven. Who could ask for a greater challenge than to solve or to clarify this problem and related ones for mankind?

In other areas, what is the relationship between the amount of fiber or bulk in the diet and cancer of the colon, which is a problem of increasing magnitude in the United States? How does nutrition affect the aging process? How can the accumulation of excess fatty tissue in the body, a condition that we call obesity, be prevented in an affluent society such as ours, where we have really outdone ourselves in providing, not only an abundance of food, but also an abundance of food that delights the palate without regard to the nutritional contribution that it might make to meeting the body's physiological needs?

Is it really desirable to feed babies in a way that produces the most rapid growth possible? Is that peak growth curve going to bring long-term dividends? Some animal studies have suggested that baby rats fed both calories and protein a little sparingly, so that they did not grow quite as rapidly as they might have done, actually reaped benefits in longer life and in extended prime of life, or period of productivity. When the rats grew rapidly, they matured earlier—but they also died at a younger age. These are only animal studies. Is this pattern true for humans?

What are the roles of the trace elements, such as chromium, zinc, and copper, in human nutrition and in the prevention of disease? Will massive doses of vitamins really decrease illness? And is this a nutritional problem or is it a pharmacological one? Are vitamins being used as drugs in this case? After the researchers discover and clarify new knowledge, who translates these masses of scientific data into a practical language, understood by everyone who chooses the food he will eat each day, day by day and year by year?

The dietician or nutritionist has been called a translator of nutrition information. How effectively are we doing this? How can it be done better? Challenges—there are enough challenges for all of us, both in my academic discipline and in yours. Look for these challenges and get involved in them.

Finally, speaking of challenges, I would like to tell you that this has been a great challenge as well as a pleasure for me to talk with you today. I hope that while you are here at BYU you will each catch the spirit of discovering, the search for truth and light in the academic world, and that you will know the excitement that comes from making even a tiny contribution to expanding the frontiers of knowledge. This is my prayer in the name of Jesus Christ. Amen.