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Current Opinion

Science and Human Nutrition

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HUMAN NUTRITION is not my special field. I have, however, worked extensively on the genetics and biochemistry of nutritional deficiency in microorganisms. I assume I was invited to testify at these hearings as a response to my general concern for the application of biochemical science towards the alleviation of human problems.

Nutrition is undoubtedly the area of biochemical science which can make the most immediate contribution to human health. As many as a billion human beings are suffering significant impairment in the quality of their lives for want of the intelligent application of existing knowledge of nutrition. This is a guess, for we do not have good, detailed scientific information about the quality of the human diet in different parts of the world or in our own country.

WE KNOW even less about individual genetic and environmental factors which complicate the general nutritional picture. For example, we have learned only recently that an important nutritional disease, sprue, is based on an individual intolerance for certain wheat proteins. Even more strikingly, we have only just discovered that most of the world's adult population is incapable of digesting milk sugar; i.e., that Caucasians are the minority exception! (See *Science 106:83, April 5, 1968; Nature 216:1244, December 23, 1967.*) If we are now at the stage of only just learning about such individual peculiarities, how many others remain to be discovered under our eyes?

In the long run, good nutrition will have to be regarded as a much more sophisticated problem than distributing 1 pound per day of beefsteak to everyone in the population. We can also design far more economic answers to the problem, which will be viable in the famine-prone world of the next decade.

THE SHORT-RANGE PROBLEM to which this commitee is addressed must not be swept aside by these considerations. Crude hunger must be met by providing food today! But we must also be planning for the far-reaching and subtle problems of nutrition or we will be spending our resources only to replace starvation by malnutrition.

The most obvious humanitarian response is to suggest economic subsidies for the purchase of "balanced diets." I do not criticize this as a short-run approach, but it will not solve the more subtle problems. The construction of an economical but balanced diet is a taxing exercise in dietetics that overreaches the skills and practices even of many sophisticated groups in our society. (See, for example, a note on the diets of wives of medical students and house staff, *Ob. & Gyn. 29 (2) 244-246, 1967.*)

I PROPOSE that the Government take a more active role in promoting the specific enrichment of staple foods and with the production of special food formulations to help bypass the problem of individual dietetic ingenuity. The supplements I have in mind are those which have been found to be relatively deficient in the diets of a number of people, iron, calcium, the vitamins, especially folic acid, and essential amino acids. The latter especially have to be adjusted for regional differences, season, and group habits of food preference. Food stamps should ultimately be distributed as tokens for the purchase, not of conventional foods of dubious nutritional advantage but of scientifically constructed formulations.

The problems of consumer education and of economic distribution of these kinds of products are considerably more formidable than the material cost of technology of the diets. It will, however, be a telling irony if a consequence of such a program is to transform our underprivileged classes into those having the most superb nutrition. But this is certainly a technical possibility.

THE MAIN POINT I hope to convey to the committee is the urgency of more penetrating research on the diagnosis of nutritional adequacy and on technically practical ways to meet it. I would call your special attention to the need for nutritional improvement during pregnancy, lactation, and in early infancy. It is obviously difficult to conduct convincing experiments on the deleterious consequences of nutritional deprivation on human development. However, abundant evidence from animal experimentation and considerable clinical observation support the concept that prenatal and early infant malnutrition can have lifelong consequences for the mental as well as the physical development of the offspring. The social importance, and the call for action, that should be provoked by these observations are obvious!