

Major Contributions to World Health by Chemical Additives to Foods Cited Before AAAS

Charles Glen King says well-organized forthright program of public and administrative education is called for

BOSTON.—We cannot afford to overlook the great advances that have taken place in human and animal nutrition as a result of chemical science which has been applied to the production, preparation, and preservation of food stuffs and feeds, Randolph T. Major, Merck and Co., told the chemical section of the American Association for the Advancement of Science, meeting here last week. In support of his contention, Dr. Major reviewed the history of such nutritional diseases as scurvy, pellagra, and beriberi, which have been major causes of death and debilitation throughout the world. Today all can be prevented or cured through the use of chemical materials developed through research. Thiamin can cure beriberi, vitamin C or ascorbic acid can cure scurvy, and niacin can cure pellagra. These were only a few of many examples which Dr. Major cited in support of the idea that the health of the world today is better than it was a few centuries ago because of the use of chemical additives to food.

He said that reputable food processors and chemical manufacturers are vitally concerned with the public safety and would not use any potentially harmful substance in the preparation of food stuffs. As a matter of principle, he declared, they have no quarrel with any necessary legislation to protect the public. But it is important that we should guard against unwise legislation which would seriously handicap the continuation of our progress toward more nutritious and more convenient foods for people and feed for animals.

Dr. Major quoted Russell M. Wilder, formerly of the Mayo Clinic and more recently of the U. S. Public Health Service who said in his George R. Siedenbergs memorial lecture last year

before the New York Academy of Medicine: "Contrary to some hysterical statements made most by food faddists, no harm of serious consequence is apparent at the moment from the use of additives. This is the conclusion recently announced by the Food Protection Committee of the National Research Council's Food and Nutrition Board." The Food Protection Committee was quoted as saying that there is no evidence that consumption of food resulting from the use of the new materials in crop production or in the production and processing of foods has created a serious disease epidemic or endangered the health of the people.

Current Practices. Charles Glen King of the Nutrition Foundation reported estimates of current practice in the nutritional fortification of com-

monly used food through the use of chemical products: 22,000 million units of vitamin A are used in margarine and large quantities find their way into baked goods and dairy products, 60 million cases of vitamin D fortified evaporated milk were produced in 1953. More than 400 billion units of vitamin C go into foods with approximate quantities as follows: frozen fruit, 10,000 kilograms; canned apple juice, 6000; beer, 7000; meats, 6000; canned vegetables, 1000; milk and cream, 1000; and about 500 kilograms each for sauerkraut and freshly peeled potatoes and apples. Three hundred thousand kilograms of niacin go chiefly into flour, bread, cornmeal and prepared cereals, along with some 35,000 kilograms of thiamin and 20,000 kilograms of riboflavin.

Dr. King pointed out that roughly one half of the table salt used in the United States is thought to be iodized by a standard formula. He noted that in each of the cases cited, the most common practices have followed recom-

George L. McNew of Boyce Thompson (right) and Perry J. Culver of Massachusetts General Hospital, both participants in the chemicals in food symposium, confer with Symposium Chairman Charles N. Frey, consultant



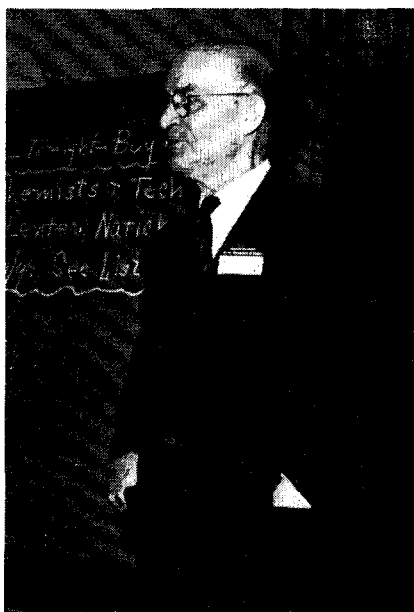
recommendations by the National Research Council. The ingredients added are those for which there is an acknowledged serious need. In addition to the examples cited, he mentioned acid phosphate, citric acid, tartaric acid, pectin, and calcium salts. These are used in foods and can be regarded as normal food constituents. They are metabolized without injury within reasonable quantities. The last mentioned group, it was pointed out, is useful in aiding in the preparation of foods rather than on the basis of their nutritional value but they are desirable and useful additions.

Dr. King mentioned a third group of chemical additives which he said will always merit careful review. With these, he said, special responsibility exists for the screening against risks of inner injury. Examples include benzoates, salicylates, antibiotics, hormones, and a long series of phenolic antioxidants. It is only fair, he said, to insist that published and verified records should demonstrate the safety of any intended use of such materials before they are permitted to enter the food supply.

"Changes are going on constantly in this area of the food industry," declared Dr. King. "They should be encouraged because they are, in fact, when used with proper safeguards, contributing to public health to lower consumer costs, to economic progress in agriculture, and to a desired enjoyment of foods of high quality in all respects." Dr. King repeated, however, that these developments in the public interest cannot be accomplished without full recognition of the risk and the values on which they are based. This will be possible, he said, only when there is vigorous research under way with a hearty regard for the value of biological evidence. In addition, it calls for a well-organized forthright program of public and administrative education.

The Role of Law. The scientist and the lawyer have responsibilities to understand each other's problems, emphasized Fred Bartenstein, Merck, who presented a lawyer's view of the role of law in food safety. He said that in the face of increasing discovery and development of substances having utility in the growing, manufacturing, and producing of foods, there is a general feeling that legal controls and procedures should be strengthened to assure that no harm to man results or at least that any harm that may conceivably result is balanced against the advantages. He expressed the opinion that we can accept the principle that scientific development in this field should not be shut off completely; in view of the chemical nature of all foods there is nothing basically wrong in the further development and use of synthetic substances having dietary or other utility in foods.

Were remote possibilities of con-



R. R. Williams of Research Corp., a participant in the symposium on chemicals in foods, answers questions from the AAAS audience

ceivable harm to be the criteria for proscription by government in any field of scientific development, it would be a dark blow to science, said Mr. Bartenstein. Automobiles, airplanes, paint, and electric and atomic power among others, he said, would in principle be subject to proscription. Our inherently progressive and optimistic natures lead us to ask that our laws and our government that enforces them shall allow as well as disallow, providing it be on scientific and reasonable grounds.

As the results of science are brought to bear ever more intimately in the service of man, said Mr. Bartenstein, it will be clear that there must continue to be arbitration between the public and those who produce the benefits of science to assure that there is a proper balancing of harms and benefits. The scientist and the lawyer will have their individual responsibilities—to understand each other's problems and to work for understanding, clarity of vision, honesty, and perspective. Only with these can the people speaking through their legislatures write good laws that will protect the public, promote and not retard progress for the short and long term, and at the same time maintain our traditional democratic processes and traditions.

Spray Residues. The tendency of agriculturists to shift from inorganic to organic pesticides has caused some concern for the health of the public, stated George L. McNew of Boyce Thompson Institute for Plant Research. But much of this excitement probably has been misplaced, he said, although every precaution must be taken to see that materials are used so that they will not represent a serious hazard to con-

sumers. Obviously we cannot forego the use of pesticides on crops if we are to increase our agricultural production.

The upsurge of organic chemicals has given chemists and biologists an opportunity to develop materials more or less tailored to specifications, declared Dr. McNew. Very encouraging results are being obtained in avoiding hazardous residues. This is coming about through the development of new chemicals that are so selectively potent against crop pests that they can be used in very light applications. Insecticides such as allethrin and malathion are much safer for animal life than their predecessors, and other materials are being developed which volatilize, hydrolyze, or decompose shortly after application so they are dissipated before harvest. Some organic pesticides are known to be attacked readily by soil microorganisms so that there is less danger of their accumulation in soils. More data are needed, he said, on the formulation of active compounds and on the interaction between various types of soil organisms and artificially introduced molecules. The compounds of most concern are those highly stable on foliage and fruit and those that accumulate in animal bodies in harmful concentrations. Also those that are likely to accumulate in the soil where they may interfere with crop growth or be taken into plants in harmful concentrations.

Biological Testing Problems. We must abandon hope of progress in food technology or be willing to accept as bases for evaluation of new materials the results of the best possible studies that can be made with the tools and knowledge we have, it was indicated by Perry J. Culver of Massachusetts General Hospital. To illustrate this point, Dr. Culver described the work that he has been doing during the past seven years with polyoxyethylene sorbitan fatty acid esters, the stearate and oleate of which have been known as Tween 60 and 80.

As a result of extensive hearings a few years ago these products are not included in current standards of identity for bread.

On the basis of clinical studies, Dr. Culver found no evidence of alteration of the compounds or symptoms of harm to the body. Dosages ranged from 4.5 to 15 grams of the esters per day, with the usual level about 6 grams. Some patients had been fed such diets for nearly seven years while several others have been under such study for shorter periods.

Studies of the absorption of both oleate and stearate indicated that 95 to 96% of the compound never left the intestinal tract. The alcohol portion of the remaining 4% was excreted rapidly by the kidneys. There was no evidence of storage. No deleterious effect on the sensitive pancreas enzymes was found.