

Each of these elements, as well as arsenic, is almost ubiquitous in nature. Each is essential to, or an important aid to, animal nutrition. One of the most promising and exciting areas in nutritional research today concerns the ability of high tolerated levels of these and other trace elements to minimize disease and to improve total health and the useful life span.

In the quest for an operable approach to use of feed additives on a measurable-hazard basis, some of the issues are now fairly well established, and some require continued attention are.

- There has been no evidence of injury or ill effect to animals or man over 12 years' use of medications in feeds. Twelve different groups of compounds, numbering at least 50 individual compounds, have been used.
- The new labeling requirements offer greater protection than heretofore, suggesting the possibility of close control of drugs in feeds by each state.
- Each drug should be treated on the basis of its own merits and demerits. Feed additives and feed additive residues in tissues of food animals should not be equated with pesticides and pesticide residues. Feed additive residue tolerances should be invoked only where clearly needed to ensure public safety.
- Government and industry should continue to study and to correct inequities which may result from strict en-

forcement of the Delaney clause. Because most of the rulings under this clause must be based on attitudes, rather than scientific measurements, its scientific implications should be continually re-evaluated.

Demonstration of the utility of feed adjuvants is a logical requirement. But final judgments of the value of promising additives can be best provided through FDA, by the Department of Agriculture (as now is done with pesticides), by the state agricultural experiment stations, and in the market place. Because the nobility of freedom lies in individual responsibility for public good, voluntary compliance, based on mutually acceptable safety regulations, promises the ultimate for progress in a free economy.

Dr. Charles G. Durbin, Veterinary Medical Director of the Food and Drug Administration, and Dr. Herbert Haller, Deputy Administrator of the Agricultural Research Service of USDA, were invited to chair the morning and afternoon sessions of the symposium. In Dr. Haller's absence, due to illness, Dr. Stanley A. Hall acted as chairman.

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FEED ADDITIVES

A Broad View of the Problem of Additives in Feeds and Foods

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Anything that affects the safety, nutritive quality, cost, distribution, or attractiveness of food merits serious consideration. We cannot escape making choices between alternate courses of action. Choice of crop varieties, fertilizers, pesticides, processing, additives, packaging, storage, and distribution all require evaluation in terms of the consumer's interest in flavor, cost, nutritive content, safety, appearance, and convenience. Increased efficiency in meeting these requirements has been and will continue to be one of the greatest factors in permitting cultural progress in every part of the world. Public understanding of the way scientists contribute to such advances and the necessity of weighing advantages against disadvantages is essential to progress and survival.

THE QUESTIONS that arise from the presence of additives in feeds and foods cannot be dealt with adequately except in relation to the broader problems of making the best use of our agricultural resources and meeting the total requirements for human health. Although food is not the only essential requirement for health, it is certainly the most essential requirement next to air and water; and anything that affects the nutritive quality, cost, distribution, attractiveness, or

safety of food requires serious consideration because directly or indirectly health will be involved.

In an ideal situation, no one would advocate unreasonable restrictions or economic penalties on our limited agricultural resources. Neither would they advocate unnecessary risks to human or animal health. However, the simple truth is, we cannot escape making choices between alternate courses of action, both in the use of our agricultural resources

and in deciding what constitutes reasonable safety in protecting human health.

By conducting vigorous programs of research in plant nutrition and in animal nutrition, in parallel with genetic research to improve the basic potentialities of our farms, we have managed to keep our food production expanding fast enough to meet the needs of our growing population and to export many food-stuffs. This accomplishment would not have been possible, however, had we not

also developed ways of protecting crops and farm animals against the attacks of pests and disease.

Those who are expressing extreme views and criticism of modern agriculture and food technology have made two fundamental mistakes—they have glossed over or omitted reference to the very great gains that have been achieved for the public good, and second, they have magnified and distorted the significance of mistakes in practice and the minor risks to health that have accompanied great progress.

The simple fact is that we could not maintain an adequate and reliable food supply for our present population without the intensive use of agricultural chemicals. Poor yields, waves of insect attacks, and the scourge of fungus and virus diseases would decrease farm crop and animal yields to a degree that would cripple our entire economy and social structure in a very short time. Furthermore, we would lose our opportunity to assist the developing areas of the world where inadequate food supplies already retard economic, health, and cultural progress, and this in the face of rapidly expanding populations almost everywhere.

Failure to understand and properly evaluate the remarkable progress that has been made in agriculture and food technology and nutrition would lead to a course of action far more dangerous and destructive than is involved in the mistakes and health risks in the use of agricultural chemicals and food additives.

No one wants to condone careless practices or unreasonable risks to health. And there is complete agreement that we should have strong, diligent surveillance of agricultural and food practices by federal and state agencies. These are a necessary complement to the normal sense of responsibility that is shared by farmers, by industry, and by the public. True, there have been many mistakes, accidents, and examples of bad judgment, but these experiences have led to corrective measures in due course, so that the over-all record has been remarkably good and continues to offer excellent prospects for further

improvements. This is the way applications of science normally develop with great advantage to the public.

No one objects to, in fact everyone heartily endorses the research programs that offer promise—some day—of combating insects and other pests by introducing biological enemies. Genetic research to develop disease-resistant crops is also commendable and much excellent work has been done. But meanwhile the world's population, including our own, must be fed—not left to the hazards of nature. The battle of the boll weevil that faced cotton growers, the grasshopper years in the midwest, the codling moth devastations of apple crops, the waves of typhus in the armed forces abroad, and the threats to the poultry industry by intestinal infections—these are still too vivid in the minds of farmers, scientists, and most civic and industrial leaders to permit them to be lulled into poetic adoration of the simple life, a life that was in fact all too often marked by tragedy and disaster instead of health or beauty or tranquility.

Presentation of only one side of the picture in modern agriculture creates an unfortunate degree of fear and illusions bordering on hysteria. It jeopardizes the orderly development of sound legislation, discourages continued support of needed research on all phases of the problem, and delays progress in agricultural and food research that is vital to both health and economic advancement in all parts of the world.

The biased concentration on "all things wrong" in relation to agriculture is comparable to a writer giving a distorted account of automotive traffic in the United States or in other industrialized countries. By selecting from the past 5-year record all the horror stories of traffic mishaps, treacherous roads, careless or drunken drivers, mechanical failures, neglect of safety measures, speeding, and insufficient policing—and pretending that all this happened in one community—would tend to make one afraid to venture on the highway. But we should not stop motoring or assume that the manufacturers of cars, the road construction engineers, and all the highway police are or have been grossly

negligent of the public's safety and welfare. Instead, better cars are made each year, highways are improved, laws are revised from time to time, educational measures are improved, and meanwhile all of society enjoy the many benefits of travel and transportation by motor cars.

The tremendous advances in food, feed, and related agricultural practices have been one of the greatest sources of progress in health and in nearly all aspects of life in the United States. We should look diligently to our responsibility to assure that the public understands the facts, so that progress can continue for human betterment on a broad base.

Among the many positive steps toward improved nutritive quality by the standardized use of additives, the feed industry has made use of minerals, vitamins, antibiotics, and amino acids. In the food industry, the most notable progress has been in the enrichment of cereal products, vitamin D milk, iodized salt, fluoridized water supplies, and cereal protein blends to accomplish a balanced intake of amino acids. The integrity and public service of industry in developing these and many other improvements, and the surveillance of the Food and Drug Administration, the Department of Agriculture, and the Public Health Service have been at a notably high level.

Other papers in this symposium point out and emphasize the unreasonable, nonscientific, and destructive nature of two current weaknesses in the federal laws, generally referred to as the Delaney Amendment and the "zero tolerance" concept as applied to specific or classes of substances in foods or feeds.

The Delaney clause should be annulled or corrected, as urgently recommended by the best scientific and legal authorities, and the "zero" concept of regulation should be replaced by carefully established limits of tolerance to assure protection of human and animal health.

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