NUTRITION REVIEWS

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SCIENTIFIC DEVELOPMENTS LEAD TO NEW CONTROL PROBLEMS

Advances in our knowledge of nutrition science have brought about changes in emphasis on problems in the enforcement of the Food, Drug, and Cosmetic Act. The first problem that related to nutritional adequacy of our diets, undertaken in 1926, was the vitamin content of cod liver oil. With the demonstration that cod liver oil was an important source of vitamin D and the knowledge that rickets was present in as many as 75 to 80 per cent of the babies in some eastern cities, commerce in this item grew at a tremendous rate.

There were also numerous attempts to concentrate vitamin D and to incorporate it in tablet or other pharmaceutical preparations that would be more acceptable to children and adults. The method of assay for vitamin D that was developed at that time has not been improved to an important degree since. When compared with a cod liver oil arbitrarily chosen as a standard, the medicinal oils then supplied commercially were found to be surprisingly uniform in their vitamin D content. The U. S. Pharmacopeia at that time limited the oil that could be called cod liver oil to that from the liver of the genus *Gadus*. The medicinal cod liver oil offered for human use has continued to be of satisfactory quality. With very few exceptions, all pharmaceutical preparations alleged to be made from cod liver oil were found devoid of vitamins A and D.

Our poultry industry expanded greatly with the knowledge that the incorporation of vitamin D in the ration made it possible to grow chicks at all seasons of the year. The demand for cod liver oil for poultry feeding soon exceeded the supply and there were many reports of unsatisfactory growth response of chicks attributed to the quality of the oil being supplied for feeds, only a small fraction of which was of domestic origin. An intensive examination of imports in 1936 resulted in the denial of entry of one third of the oil offered for import because the oil failed to meet the U. S. P. standard for vitamin D. The rejected oils complied with the chemical tests in the U. S. P., but were usually darker in color and had odors and flavors that were objectionable. The following year only 4 per cent of the oil examined failed to meet the legal standard.

The passage of the Food, Drug, and Cosmetic Act in 1938 gave greater recognition to control of foods from the standpoint of nutritional value. This law gives authority to establish a standard for food when such action will promote honesty and fair dealing in the interest of the consumer. The interest of the consumer is not served if the nutritive value of a food is not assured. The only basis for the requirement of certain levels of vitamins and iron in enriched flour is to guarantee a certain nutritive value.

The authority to prescribe labeling requirements for foods for special dietary uses clearly recognizes advances that have been made and may be made in our knowledge of nutrition. It aims to assure that these products will be marketed without taking unfair advantage of the consumer. Shortly after the passage of the law, hearings were held for the purpose of establishing regulations pertaining to the labeling of food for special dietary uses. The regulations issued in 1941 pertain to the labeling of vitamin and mineral supplements, foods for control of body weight, infant foods, non-nutritive substances, and hyperallergenic foods. The labeling requirements were designed to provide useful information for the intelligent use of the products by the physician as well as the layman. Fifteen years after the law

was passed, the importance of this part of the law became apparent when it provided a basis for the labeling of foods whose use depends on a low sodium content. The use of foods of low sodium content for controlling blood pressure of unknown origin had not been recognized at the time of the 1941 hearings, and there were no problems of labeling to be controlled.

However, the problem of control of misleading representations will probably always confront agencies engaged in food law enforcement. The gullibility of some purchasers is amazing. We have seen an instance of a man's profiting by more than a million dollars by the sale of filtered Pacific Ocean water, to which a little potassium iodide was added. The theme of the representations was that the product was an important source of minerals, with some pertinent quotations from well-known textbooks. The producer in this instance had the advantage of an unlimited supply of the raw material at a minimum cost. Constant surveillance of the many avenues through which representations for special dietary foods are made is an important part of enforcement effort.

As the proportion of our food supply that is subject to processing increases, those responsible for development of methods of processing must also assume responsibility for studying possible changes in nutritive value, and be guided thereby. In the Food and Drug Administration, we are concerned not only with the general problem of food processing and nutritive value, but we also have the responsibility of detecting deceptive practices that will result in interstate shipment of inferior products.

The processes which have been developed by our food technologists for serving food with a minimum of preparation in the home have served a very useful purpose, but they have also opened the door for possible debasement of foods. Experience has shown that if it were not for a small minority who are guided solely by the profit motive, and have no interest in serving their fellow men, there would be little need for a Food, Drug, and Cosmetic Act, and my comments here are directed to that segment of the industry.

The more processes a food goes through before it reaches the home, the greater the opportunity for debasement and sophistication. The nutritive value of fresh food as prepared in the home under good cooking practices is the desirable standard of reference in assessing the nutritive value of processed and prepared foods. Vitamins A, C, B_1, and B_{12} are particularly susceptible to destruction under adverse conditions. Every step in the processing of foods may result in some deterioration. Storage must also be considered. By selection of ingredients it may be possible to mask flavors that are developed by specific processes and the consumer may be led to believe that the ingredients of a prepared meal are fresh foods, when in fact they have been processed and stored for a considerable period of time before use.

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THE COMPOSITION OF BODY TISSUES FOLLOWING OVEREATING IN MAN

Nutritional studies in man have been facilitated by the development of methods for the measurement of the total body fat and the lean body mass. Recent progress in this field has been the subject of earlier reviews (*Nutrition Reviews* **12,** *324 (1954)*; **13,** *9 (1955)*).

A. Keys and his collaborators at the University of Minnesota have been investigating the changes in body composition during caloric deficiency and excess. In their now classic studies of starvation in previously normal subjects it is evident that much more than mere loss of fat per se occurs with