

plastic coating is comparable to peeling a banana.

Polyethylene. Polyethylene continued to hold the spotlight as the most rapidly ascending of food packaging materials. In the last three years, according to George C. Miller of Bakelite Co., the amount of polyethylene used for packaging has increased approximately 260%; it is estimated that by 1956, packaging consumption of polyethylene will have risen another 365%. About 28% of the more than 10 million pounds of polyethylene produced each month now is used for packaging, and many applications are only now in the early testing stages. Some new uses offer large tonnage requirements; a polyethylene wrap for bananas alone could require as much as 10 million pounds of polyethylene per year, Miller stated.

In the packaging conference held in conjunction with the exposition, C. M. Woodcock of General Foods Corp. pointed out, however, that polyethylene should not be looked upon as a panacea for all the aches and pains of the packaging business. It will do many things better, perhaps, than any other material, said Woodcock, but some things it does no better than many competitive materials, and others it will not do at all.

Combinations of packaging materials are often the answer to specific problems, Woodcock said. The basic types of plastic packaging film—cellophane, polyvinyl chloride, Pliofilm, polyethylene, and saran—all have valuable properties, but each has drawbacks. Proper combinations, he observed, can minimize such drawbacks as handling difficulties or deficiency in certain functional properties. For a frozen orange juice envelope recently introduced, for instance, a combination of cellophane and polyethylene provided oxygen resistance and printability in the cellophane layer, and strength, low temperature properties, and weld-type heat sealing in the polyethylene portion.



Speakers at the ACS New York Section meeting were: Howard K. Nason of Monsanto, Firman E. Bear of Rutgers University, Charles G. King of the Nutrition Foundation and Columbia, and Conrad A. Elvehjem of the University of Wisconsin

Soil Conditioners Improve Utilization of Fertilizers

NEW YORK.—Of potential major significance to the agricultural and horticultural industries is the apparently improved utilization of fertilizers when added to soils treated with chemical soil conditioners, said Howard K. Nason of Monsanto Chemical Co. Speaking before the ACS New York Section on April 10, Dr. Nason indicated that, by the addition of 0.19% Krilium soil conditioner to properly fertilized soil, corn yields have been increased to 116 bushels per acre, where unconditioned soil produced only 86 bushels per acre. Where soils had received no fertilizer, the yield for Krilium-treated soil was 75 bushels per acre, for untreated soil, 68 bushels.

During the past 16 months, Dr. Nason continued, every effort has been made to chart the limitations of chemical soil conditioners. As a result of this deliberately realistic approach, it has been found that the moisture-retention characteristics of soils are not materially affected by treatment with conditioners. In addition, it is not reasonable to expect, he said, that soil conditioners will produce yield increases in the case of all crops. In some experiments at Ohio State University, for example, treatment resulted in a 40% yield increase in oats, but no increase in sugar beets on an adjoining plot. Yet it is accurate to emphasize, he said, that yield increases have been reported for a sufficient number of crops to warrant further intensive study of the yield increase-soil conditioner relationship.

Soil Chemistry. The importance of soil chemistry was highlighted by Charles Glen King of the Nutrition Foundation, who served as moderator of the New York meeting. The need for food throughout the world, he said, is both a quantitative and qualitative problem. Quantitatively, there is an ever-growing population that demands more and more food. Qualitatively, there is the urgent need for foods of increasing nutritional value. Dr. King went on to say that, of the major causes of death in the U. S., the first four are degenerative diseases related to nutrition. These are heart

On The Cover . . .

Man's Servant in the Study of Nutrition

MOST PEOPLE affected by agricultural and food chemistry probably consider the rat only an enemy or a competitor in the fight for food. But in laboratories throughout the world, thousands of rats, somewhat like the curious creature on the cover, are depended upon to guide the course of research work. What is the effect of a given amino acid imbalance in the diet? Studies on the rat will serve as a guide in the approach to human testing.

On the other hand, the producers of

agricultural chemicals work constantly to produce more effective rodenticides. In fact, the very potent rat-killer ANTU was discovered by a research worker who observed that humans found α -naphthylurea either virtually tasteless or extremely unpleasant to taste. Curious to learn if such a variation in reactions existed in animals, he fed it to rats. They all died and a new rat poison, safe to humans, was found.

The rat is deeply involved in man's efforts to feed himself better.

disease, cancer, arteriosclerosis, and diseases of the newborn.

Trace Elements. The term, trace element, has been applied in the biological sense to those elements that, in extremely small amounts, play a part in the nutrition of plants and animals, said Conrad A. Elvehjem of the University of Wisconsin.

About 20 or so mineral elements occur commonly in foods in trace amounts, or in amounts of less than 0.005%. Of these, seven or eight may be listed as essential to animal life. These include copper, cobalt, fluorine, iodine, iron, manganese, zinc, and perhaps molybdenum, he said. Three of these elements—cobalt, fluorine, and iodine—are probably not essential to plant life.

Cobalt is perhaps the most interesting of all the trace elements, he said, since it is needed in such extremely small amounts and because it functions in living tissues through its presence in vitamin B₁₂. As far as is known today, vitamin B₁₂ is the only vitamin that contains a mineral element. In animals suffering from cobalt deficiency, the administration of cobalt allows the adequate synthesis of vitamin B₁₂ in the rumen. This vitamin must come from the rumen rather than from the animal's natural food since plant material is practically devoid of vitamin B₁₂.

In biochemical studies, each trace element must be considered separately, Elvehjem said. "No generalization can be made that will take in all the elements."

Soil Requirements. Soil consists mainly of substances that plants do not need and cannot use, said Firman E. Bear of Rutgers University. The value of soil lies mainly in its providing standing room for plants and storage capacity for water, nitrogen, and mineral nutrients required by plants. In recent years, there has been a sizable increase in the use of soil additives. At present, said Dr. Bear, we are using about 50 million tons of liming and fertilizer materials a year—enough to fill a line of 40-ton freight cars four times the distance between New York and San Francisco.

Dr. Bear illustrated the importance of trace elements by describing studies of requirements of the alfalfa plant for molybdenum. Only after a careful redistillation of water in borosilicate glass and a thorough repurification of the best grades of reagent chemicals could deficiency be developed. Then, all that was required to overcome this deficiency was the addition of one part of molybdenum to a billion parts of the culture solution. Yet, a New Jersey farmer who had planted 75 acres of cauliflower on a strongly acid soil failed to get a single head of cauliflower on 45 acres of this crop because of molybdenum deficiency.

McKay Says Ocean May Be Last Food Frontier

WASHINGTON.—"If people throughout the world are to have more adequate diets a large share of the increased food supply must come from the oceans," declared Secretary of the Interior Douglas McKay before the meeting of the National Fisheries Institute held here April 12 to 15. "The fishing industry is fortunate," said McKay, "That its raw materials come from the water. Water ranks high as one of the world's great natural resources. The oceans which cover about three fourths of the earth's surface, may some day become our last great food producing frontier."

Feed Supplements. There were several papers on fish oil and meal as feed supplements. Originally these materials were utilized primarily for their high protein content but recently there has been much additional interest in them as sources of growth factors. The results of some work done in the U. S. Fish and Wildlife Service's Technological Laboratories by Neva Karrich on levels of various known nutritional factors in processed fish meal were presented by Frank T. Piskur. Miss Karrich's studies indicated that the highest levels of niacin, riboflavin and vitamin B₁₂ tended to accumulate in the so-called "fish solubles," a by-product of the fish meal industry. Fish meal with the solubles added gave higher levels than either meal or solubles alone.

Another growth factor in the fish solubles which is presently identified as the "fish factor" was discussed by J. R.

Secretary McKay addresses fisheries institute on food potentials of the oceans



J. R. Couch discussing the role of fish factor in nutrition

Couch of Texas Agricultural and Mechanical College who reported that the unidentified factor in fish solubles effected chicken growth more than either antibiotics or vitamins including B₁₂. The "fish factor" apparently increases the efficiency of methionine metabolism and is probably necessary in protein and amino acid metabolism, according to Dr. Couch.

TV in Fishing. Underwater television means the end of the privacy which fish have enjoyed in spawning and other activities of biological interest according to C. P. Idyll, University of Miami Marine Biological Laboratories. He addressed the by-products session of the convention on some new applications of television and its possible interest to the fishing industry. Of more immediate interest to the fisherman was the fact that Dr. Idyll intends to use underwater TV to study the action of nets when catching fish.

American Producers Claim Russians Dumping Potash Here

Russian produced potash is being dumped on American markets at cut rate prices in an attempt to undermine American production. This was the picture revealed by American potash producers who went before a subcommittee of the House agriculture committee last week.

George E. Pettit of American Potash Co. testified that the Russians have no qualms about gouging American buyers when supplies are short. As an example,