

be used within 60 days. He may postpone issuance up to 180 days to study the application.

If, after a hearing, the secretary feels that the proposed additive does not meet the required criteria, he may deny the application. He may approve the additive at a later date if facts so require. He may also revoke a previously approved application if information becomes available showing that the additive is unsafe or that the application contained false statements. The applicant can apply for a hearing in such cases.

The secretary or the applicant has 90 days from the time of rejection of an application to request that the matter be referred to an advisory committee, which has 60 days to consider the question. The secretary then has 30 days within which to act on the committee's report and recommendation. The secretary is not bound by the actions of the committee. The committee is composed of equal numbers of experts designated by the applicant, the secretary, and the Food Protection Committee of the National Research Council.

Within 90 days of issuance of a regulation concerning an additive, any interested person may file objections, which are then considered by the secretary and ruled upon.

An applicant adversely affected by a ruling of the secretary may appeal to the U. S. District Court within 60 days. The complete record is filed with the court, which will then consider the evidence and any additional data which it requests. The court's ruling is subject to review of the U. S. Supreme Court.

### Plant Growth Research

The National Science Foundation has awarded a two-year grant of \$11,000 for research to investigate the effect of light on the growth of plants. The work will be under the direction of Professor A. W. Galston of the California Institute of Technology. Dr. Galston intends to study the chemical reactions produced by light which affect the rate and nature of plant growth.

### MCP for Stem Rust

Use of MCP (2-methyl 4-chlorophenoxyacetic acid) promises to speed up eradication of barberry bushes, which harbor stem rust, a disease of wheat, oats, barley, and rye. According to the U. S. Department of Agriculture, MCP has proved effective in tests to eradicate the common or European barberry, the most prevalent stem rust host in the U. S.

USDA plans to use MCP as a spray application for control of the rust host this year. It is claimed that the pro-

cedure will be much more effective and economical than the previous control programs, which send workers into the fields to cut the bushes down.

The stem rust disease lives alternately on the barberry and grains or grasses. By destruction of the secondary host, the barberry, officials hope to control the disease which in epidemic years has destroyed wheat over wide areas of the nation. Losses to the rust have already been reduced by 75% in the principal grain states by the barberry control program and the use of rust-resistant varieties of grain.

### Industry

#### Monsanto Pushing Production Of Sodium Bisulfite for Silage

A 50% increase in production of sodium bisulfite and a nationwide system of distributorships are planned by Monsanto Chemical to meet growing demand for the chemical as a silage preservative.

The production increase will be met by stepped-up schedules at Monsanto's Merrimac division plant at Everett, Mass.

Bulk distributors for sodium bisulfite will be Louis E. Page, Inc., of Concord, Mass.; G.L.F. of Buffalo, N. Y.; P. J. Oesterling & Sons, Inc., of Butler, Pa.; Pennsylvania Farm Bureau of Harrisburg, Pa.; and Hopkins Agricultural Chemical Co. of Madison, Wis.

Recent studies at Pennsylvania State College, by R. W. Swift, J. W. Bratzler, and R. L. Cowan have indicated that sodium bisulfite addition to unwilted



### CalSpray Opens Plant

Shirley Cecil (left) and Mildred Rowe greeted opening day guests of California Spray-Chemical at its new and enlarged San Jose, Calif., facilities. Color blow ups in the background featured CalSpray's new Orthocide, a captan-containing fungicide. Orthocide is one of many Ortho products which will be formulated at San Jose for central California farmers

silage results in "very satisfactory silages."

The Penn State scientists advocate use of eight pounds of sodium bisulfite

## On The Cover . . .

### Trace Elements May Mean Health or Failure

THE FACT that certain minimum requirements of a number of nutritive elements must be met in the diet to produce either healthy plants or healthy animals is generally known. But the knowledge isn't always used in production. Some of those requirements have been emphasized so much that it probably is only carelessness that allows their neglect. Such may be the case of the pig with the curled foot, who didn't get enough calcium. However, certain elements are needed only in microgram quantities or traces and it is much easier for the farmer or feeder to rank their importance on the same relative scale. But it is easy to see more than a trace of harm has come

to the cow that has failed to get a trace of cobalt. The hen with the slipped tendon only needed a trace of magnesium, but without it she's in bad shape—and her eggs will hatch poorly.

Trace elements are vital to plants as well. A direct comparison is made of two beet plants—one with and one without the needed trace of boron. The serious effects of absence of the necessary small amounts of zinc is clearly visible in the apple leaves across the bottom of the page.

The minor elements are required only in traces, but their importance, compared with that of nutrients is not related in magnitude to the requirements. It is absolute!

per ton of silage, which, at present costs, would run the farmer 60 to 70 cents a ton of silage. Their experiments indicate that silage so treated is superior from the standpoints of: reduced nutrient losses; improved composition of the product with regard to nutrients (especially carotene); better color and odor; more complete digestibility; and increased palatability.

Experiments to date have been with varying mixtures of orchard grass, alfalfa, brome grass, sweet clover, red clover, and timothy.

Tests with other types of silage are going on at other universities, state experiment stations, and other groups.

### American Associates Buys Metal Closures Manufacturer

Brass Goods Mfg. Co., manufacturer of specialties and metal closures used in the food and drug industries, has been purchased by American Associates, Inc., it is announced. The latter company plans to bring the plant to higher efficiency and to offer the trade improved service, quality, and promptness of deliveries. American Associates has also appointed Flynn Industries Inc. as Eastern sales agents for its products.

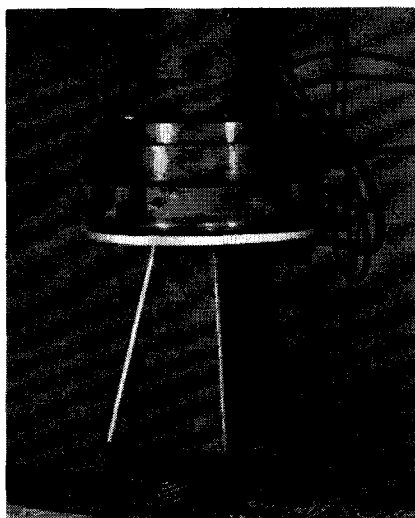
### Research

#### Cold Sterilization of Meat By Cathode Ray Irradiation

A cathode ray irradiation process for cold sterilization of meat has been developed by workers at Massachusetts Institute of Technology working under a contract with the Navy. The cathode ray process is much more rapid than the previously tested techniques, which used gamma radiation from radioactive sources. The latter process required up to 24 hours to sterilize small portions of meat and certain vegetables.

The MIT process, an assembly line in miniature, passes meat on a conveyor belt under the cathode ray discharge of a 3-million-volt Van der Graff accelerator. The MIT studies have indicated that the irradiation is sufficient to kill bacteria present in hamburger and extends the refrigerated storage stability of the meat by a factor of ten. Following radiant sterilization the keeping time of the meat has been extended to over 60 days. The importance to the Navy is that under a normal cruise of approximately two months, the ordinary refrigeration equipment is sufficient for storage of the ground meat, effecting a great saving in freezer space as well as cost.

The off-flavor and side-odor problem, which has previously been a serious problem in cold sterilization techniques



Irradiation for sterilization assembly line at MIT

has been met at MIT by the addition of free radical acceptors to the foods. The food technology department at MIT claims that this program has proved successful in the maintenance of flavor of chopped meat.

Working under the Navy contract, the MIT people have also preserved fresh spinach and newly ripened tomatoes.

### Foreign

#### Trace Elements to Improve Costa Rican Coffee Production

Trace element deficiencies may explain the cause of some heretofore baffling nutrition problems in the Costa Rican Coffee plantations according to Harold Mowry. Dr. Mowry, a member of the U. S. Department of Agriculture's Foreign Agricultural Service has reported on some recent work to improve the yields of the coffee plantations. It seems that the minor elements, zinc, copper, manganese, boron molybdenum and others, are destined to play a major role in overcoming some of the troublesome problems encountered in the coffee plantations.

Costa Rica's coffee yields have been among the lowest in Central America. Recent crops have been producing, on the average, less than one fifth of the yields reported in the early days of the industry there. These low yields have been primarily due to deficiencies of soil nutrients, the results of intensive cropping combined with leaching and erosion. However the responses from common fertilizers have not been as marked as would be anticipated. In 1950 a research program was initiated to study the problem and one of the results of these investigations was the discovery that much of the soil showed marked

deficiencies in trace elements. There are still difficulties in restoration of the deficiencies, for the steep terrain of the plantations rules out mechanical spraying, the preferred method of restoration.

Dr. Mowry believes that if these deficiencies can be corrected and if some of the necessary soil bases such as calcium and magnesium can be restored, greater responses in yield and vigor will be obtained from the common fertilizers.

### People

**Frank G. Helyar**, retiring director of resident instruction at the Rutgers college of agriculture, was honored by students at the recent field day held on the campus at New Brunswick, N. J.



Prof. Helyar joined Rutgers in 1917 as director of short courses and associate in experiment station administration, becoming professor of animal husbandry in 1919. He has been in his present position since 1929.

**James C. Rinehart** has accepted the newly created position of development agronomist with U. S. Gypsum Co. Dr. Rinehart was formerly with Rutgers University.

**Harold W. Schultz** becomes head of the food technology department at Oregon State College. He has been head of Swift & Co.'s baby food and table-ready meat research divisions.



Dr. Schultz replaces **E. H. Wiegand**, who founded the department in 1919 and is now retired.

**Arnold H. Smith** has resigned his position as president of Monsanto Canada, Ltd., to become a special assistant in St. Louis to **E. A. O'Neal, Jr.**, general manager of Monsanto's overseas division. **Leo E. Ryan**, executive vice president of Monsanto Canada, has taken over responsibility for company operations.

**John H. Payne, Jr.**, has been appointed senior research group leader for Monsanto's phosphate division. He will be in charge of certain phases of research in calcium and ammonium phosphates.

**L. E. Loveless** and **B. J. Katchman** have been promoted to group leaders at the Mound Laboratory's biochemistry section. Dr. Loveless will head the microbiology group and Dr. Katchman, the metabolism group.