**Control Measures.** Pre-emergence treatment of cotton with dinitro can now be handled more safely in view of results presented by F. L. Davis and D. E. Davis, Alabama Polytechnic Institute. The danger of vapor burn when daily temperatures go as high as 85° F. may be decreased 50% or more by using slaked lime either as a dust or a spray. The lime may be applied to reduce volatility as much as three days after the cotton has been planted, but before it has emerged. At least 50 pounds per acre should be applied to the chemically treated band, based on their tests with Norfolk soils.

Some interesting results were disclosed in this study. Rain falling within a few hours after planting and before the cotton has germinated may move sufficient dinitro down around the seed to decrease the stand. On the other hand, rain falling after the cotton has germinated and before it is well out of the ground may decrease the danger of vapor burn. Dangers of vapor burn are greatly increased by high volatility where there is a rainfall for the first time three or four days after the cotton has emerged. A very slight or heavy rainfall could change this behavior based on 0.5 inch of simulated rainfall.

**Integration.** Those in the administration of research have a special interest in weed investigation, according to A. H. Moseman, director of crops research, USDA.

An outstanding example of integration, it demonstrates how the efforts of scientists in public service can be teamed effectively with those in the equipment and chemical industries. The research cuts across a number of lines in agronomy, horticulture, chemistry, plant physiology, agricultural engineering, and other disciplines.

High on the list is work on brush control. With strong support from industry the work has not required a large investment of public research funds. Farmers throughout the South have watched with great interest the results in controlling sandsage and mesquite through aerial sprays.

And now growers from the Arkansas Ozarks through the Piedmont region further east are pressing for similar recommendations. They need an effective, low-cost method for bringing the woody species in cut-over timber lands under control. This is an important step toward building a more productive grassland agriculture.

There will be no let up in the pressure for new information on the control of weeds and other crop pests, said Moseman. Instead it will increase. There will be added pressure for information on the effects of new pesticides on public health and safety, an area of knowledge of first importance to those in public service research.

# Granular Herbicides Showing Promise

NEW YORK.—Experimental use of herbicides on granular Fuller's earth is showing promise for the control of weeds in vegetable crops, according to L. L. Danielson of the Virginia Truck Experiment Station. While reporting on small-scale tests at the Northeastern Weed Control Conference, held here from Jan. 5 to 7, Danielson indicated that results justify further work on an expanded scale. These were carried out in an attempt aimed at broadening the use of herbicides. The convenience of applying dry materials rather than sprays was also considered.

Previously, the application of CIPC (isopropyl-N-3-chlorophenyl carbamate) and Sesin (2,4-dichlorophenoxyethyl benzoate) to vegetable crops has been limited, in general, to preemergence spray applications on the soil. Efforts have been made to impregnate these and other herbicides on granular carriers so they may be used on growing crops in postemergence applications. In practical field use, the herbicide-impregnated granules could be applied as either a directed or over-all treatment, followed by the use of a cloth drag to shake the material off the foliage. Granular Fuller's earth (Attaclay) and granular tobacco pulp have been employed in recent years as carriers for insecticides and also lend themselves quite well to use with herbicides.

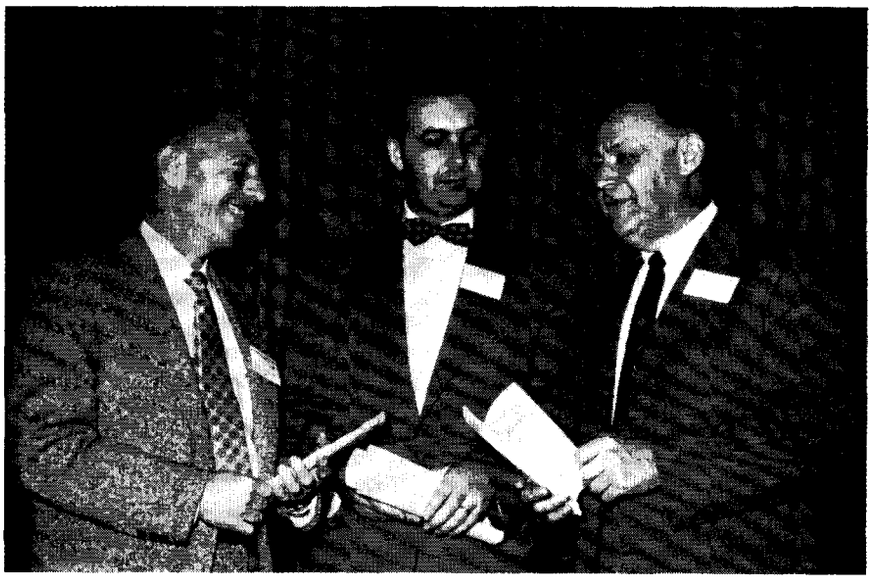
Granular applications of CIPC appear to have about the same weed-killing potency as that normally obtained with spray applications, said Danielson. Granular applications of CIPC over the foliage were tolerated by such transplanted crops as tomatoes, peppers, and sweet potatoes, even though the material was allowed to remain on the foliage. Although cantaloupes were severely injured by postemergence granular applications of CIPC, kale was able to tolerate postemergence applications of CIPC and Sesin either singly or in combination. These small-scale tests show, said Danielson, that this approach has considerable promise, and experiments should be continued and expanded.

**Translocation Downward.** Various organic compounds are known to be readily translocated upward through the stems and into the leaves of plants, said John W. Mitchell of the Department of Agriculture. In contrast, he said, relatively few compounds are readily translocated downward from the leaves to the stems and roots. From a practical standpoint, translocation downward in plants represents a major problem in utilizing the systemic effects of organic compounds for weed control and other types of crop protection.

As has been known for some time, the downward movement of such compounds as 2,4-D in plants is associated with the downward transport of sugars and possibly other products of photosynthesis. Recently, it was discovered that boron accelerates the rate at which plants translocate sugar from their leaves to their stems. This direct effect of boron can influence indirectly the rate of translocation of 2,4-D and other growth-modifying compounds.

Several compounds of the indole and

**Discussing program of the Northeastern Weed Control Conference are A. E. Hitchcock (left) of Boyce Thompson, D. E. Wolf of Du Pont, and P. W. Zimmerman of Boyce Thompson**



J. W. Brown of Camp Detrick (right) receives the prize for the outstanding paper delivered at the conference from C. E. Minarik, chairman of the award committee

benzoic acid type have been used experimentally to control the direction of transport of 2,4-D. Although the accumulation of 2,4-D in different parts of the stems of bean plants has been controlled in this way, the total amount translocated from leaves or stems to roots has not been greatly increased.

In this connection, considerable interest has been shown recently in the new growth-modifying compound, α-methoxyphenylacetic acid (MOPA). Not only is this compound absorbed by the leaves and translocated from them to distant parts of the plant, but it moves out of the roots of some plants and into the roots of untreated plants growing nearby. It then travels up the stems of these untreated plants, where it induces significant growth responses.

**Entry of 2,4-D.** In the application of 2,4-D to the foliage of plants, the rate and extent of entry of the material into the leaf may be of great importance in determining the ultimate effectiveness of the herbicide, according to a report by R. L. Weintraub, J. N. Yeatman, J. W. Brown, and coworkers at Camp Detrick. At present, however, there is virtually no information available concerning either the mechanism of entry or the factors that influence its rate and amount. This neglect has doubtless resulted from the lack of convenient experimental techniques.

Three methods, each with its limitations, are available for measuring the entry of 2,4-D into the leaves. Use can be made of the plant response as a criterion of entry. Even with the best techniques available, however, this method has relatively low precision and does not always distinguish entry by other processes, such as translocation.

In entry studies, use can also be made of nonabsorbed 2,4-D recovered from the leaf and its determination spectrophotometrically. This method is subject to interference by other materials that are also washed from the leaf and is suitable for only relatively high doses of 2,4-D. Finally, use can be made of radioactive 2,4-D, followed by removal of the nonabsorbed portion and determination of either the absorbed or nonabsorbed radioactivity. This appears to be the most useful method available at the present time.

The report by the Camp Detrick researchers indicates that, although some insight has been gained into the influence of a number of biological and environmental factors on 2,4-D entry, uncertainty still exists as to the exact mechanism of entry. The bulk of the evidence suggests that absorption into the leaf is primarily by penetration of the cuticle. The stomates may also serve as points of entry.

**Soil Organic Matter.** Herbicide researchers are well acquainted with the variability of results often obtained, said Stewart Dallyn of the Long Island Vegetable Research Farm. In many cases, this variability is limited to unsatisfactory weed control. On the other hand, all too often the effect is in the opposite direction, with the much more serious consequence of crop injury. A great deal of work has been conducted in the past on this problem, and numerous environmental factors have been found to play important roles, particularly in the case of some chemicals. Among the more important of these factors is the organic matter content of the soil.

A marked relationship has been found between the response of sweet corn and red beets to CMU (3-*p*-chlorophenyl-1,1-dimethylurea) and the organic matter level of the soil involved. The interaction indicates that the organic matter content should definitely be considered when making recommendations concerning the use of CMU on such crops. Each increment of CMU consistently reduces the weed population, regardless of the organic matter level of the soil. Any given amount of the chemical, however, gives better weed control at the lower levels of organic matter.

# Demand, Not Supply, Seen as Determinant of Food from Sea

BOSTON.—Although the ocean is by far the greatest factory of living substance on the earth, the harvest of this potential food by man is statistically negligible, according to Harden F. Taylor.

Dr. Taylor discussed the determinants of food production from the sea at the recent meeting here of the American Association for the Advancement of Science. Any discussion of potential food harvests from the sea must be predicated on a discussion of the potential production or how much can be taken. According to Dr. Taylor this question is difficult to answer. He says we do not know how much fish the ocean can produce, although present public policy and conventional belief seems to be that the amount of fish produced is determined by the abundance of the fish in the water. The basic fallacy of this reasoning as he sees it is explained by the fact that the people of the world are not where the fish happen to be. Some of the great concentrations of fish seem to be far removed from dense human populations, the polar regions for example.

However, the supply of fish does not determine fishery production according to Dr. Taylor. The chief determinant of this production is the demand for the product, or the lack of demand.

Indications are that generally fisherman catch all the fish they can sell, and according to Dr. Taylor, they have done so in the past and will continue to do so in the future. An examination of statistical data on the yearly catch of fish in the U.S. leads to the conclusion that