containing from 100 to 500 parts per million of the antibiotics were also effective in controlling the blight.

The unparalleled development of the antibiotic industry in the United States from a laboratory curiosity in 1942 to a $152 million industry 10 years later was the topic of Robert D. Coghill's address before the Society of Industrial Microbiology. Dr. Coghill reviewed the accomplishments of the antibiotic decade as an introduction to the Symposium on Mycological Production of Penicillin.

Dr. Coghill estimated that the fantastic growth of the antibiotics industry has resulted in a capital investment for production facilities of about $200 million. However, he warned that the future for that industry is not complacently secure, despite its mushroom growth. However, he emphasized that the future is probably secure for those companies which are willing to invest research money for the future.

Basic Research Lags Application of Growth Regulators

The economic uses of growth regulators have outdistanced the basic knowledge concerning the reactions of plants to them. This statement was one of the themes of E. J. Kraus, the discoverer of 2,4-D.

He stressed the importance which has been subsequently attached to basic research studies in plant physiology and structure. The relationship between structure and function in the growing plant is, according to Dr. Kraus, the area which holds the greatest promise for future research on growth regulators. He criticized much of the current research in the field, which follows the empirical approach, applying new untried chemicals to growing plants, and observing the results. He acknowledged that although this "trying out method" may have found many uses for growth regulators, more critical experimentation would probably speed up their applied use. "As a matter of fact," he said, "the economic uses of these compounds have, in many cases provided suggestions for basic research to be done."

The basic studies which he thinks are needed concern the individual tissue systems of the plant, rather than such tissue systems as roots, stem, and leaves. Biochemical studies of these tissue systems, although tedious, would provide a basic frame of reference for creative research in the development of new herbicides. He advised botanists to turn to a more general use of microchemical techniques to solve these problems.

At present the closest approach to this study of the response of tissue systems to chemicals is the observation of the histological changes of the plant initiated by the chemical treatment. He believes that eventually botanists and chemists should team up to find out the chemical reactions occurring in these systems.

Dr. Kraus predicted that when this research has been done the time will come when "any vital plant process, together with the associated physiological, histological or morphological changes that any plant may express, may, as time goes on be brought under control through the use of growth regulating substances."

An example of the type of basic research which Dr. Kraus called for was presented at the meeting. A plant hormone which encouraged normal cellular development was described by R. H. Roberts and B. H. Struckmeyer of the University of Wisconsin.

The hormone was isolated in the course of research investigating the blossoming of plants. It was found to be present at the time blossoming starts. The growth regulator, which has not yet been completely identified chemically, has the property of reducing the abnormal cell growth caused by other regulators of the 2,4-D type. It has the effect of inhibiting the injurious effects of the herbicide.

This is believed to be the first instance of the isolation of a growth regulator which has the effect of maintaining normal cellular development.

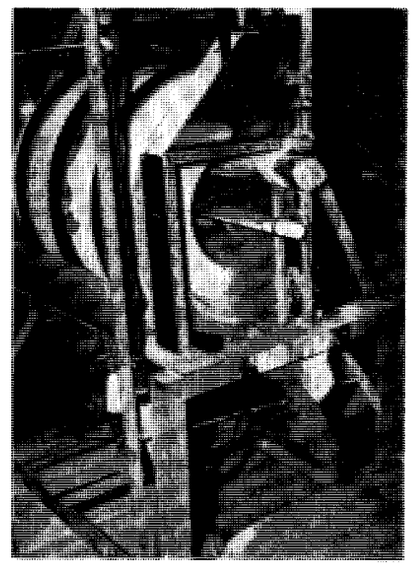
TVA Demonstrates Continuous Ammoniator to Fertilizer Industry

MEMBERS OF THE FERTILIZER INDUSTRY were treated to a demonstration of a pilot-scale continuous ammoniator for superphosphate at Wilson Dam, Ala., by the Tennessee Valley Authority on Sept. 15. The continuous ammoniator was developed by TVA in a study of methods of ammoniating superphosphate and superphosphate mixtures without serious reversion of P_2O_5 and loss of ammonia.

The demonstration, arranged with the help of the National Fertilizer Association, consisted of two runs, one producing a 6-12-12 analysis and another producing a 10-10-10 analysis.

Although still in the pilot plant stage, results seem promising. Advantages of the equipment are that nitrogen can be used in the least expensive forms to fertilizer manufacturers—liquid anhydrous ammonia or ammonia solutions; a high degree of ammoniation; and a not-excessive loss of ammonia. Continuous operation means no loss of time in charging and discharging as is the case with a batch ammoniator, and possible reduction of labor. In some cases granulation of the charge appears to be feasible during the ammoniating process, thus obviating the need for special granulation equipment. Water vapor released during the process is swept out by an air current, eliminating condensation and wetting of the incoming charge.

The ammoniator consists of a revolving drum with retaining rings at each end, a superphosphate feed into the cylinder, a discharge for removing the ammoniated product; and a means of removing the water vapor. Anhydrous ammonia or an ammoniating solution is fed through a slotted tube placed under the bed of solids, which prevents excessive loss of ammonia. Provision can also be made for incorporating sulfuric acid under the bed of materials in the ammoniator. The ammonia tube is almost as long as the cylinder and means are provided to distribute the ammoniating medium into the various sections of the charge in predetermined proportions. The TVA people said that in most of the work the greater portion of the medium emerged along the midpoint of the tube with lesser portions at either end.



Photograph of the TVA pilot scale continuous ammoniator