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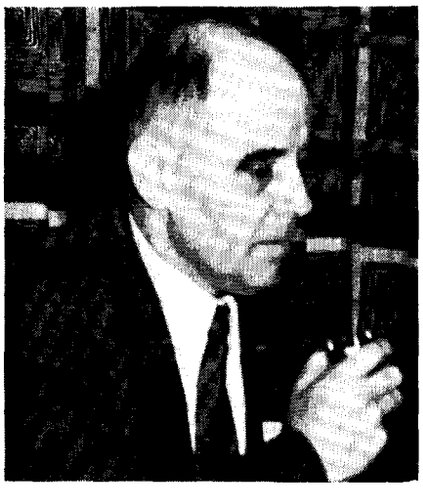
Need for Lower Fertilizer Production Costs Cited

Granulation, nitrophosphates, continuous processing pave way to reduced costs

WASHINTON, D. C.—Tomorrow's fertilizer may well come from plants that are integrated continuous process units consuming raw materials from captive sources and producing several hundred thousand tons per year of high-analysis granulated fertilizer. Such a development might be implied as an outgrowth of the present period of rapid technological transition pictured by R. B. Filbert of Battelle Memorial Institute and National Fertilizer Association's E. C. Kapusta at the national meeting of the American Institute of Chemical Engineers here March 7 to 10.



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Two factors—an increase in food consumption of perhaps not more than 20% in the next 20 years and the competition with fertilizer of insecticides, herbicides, and more productive plant strains in increasing food production—were cited by Mr. Filbert in appraising the need of fertilizer manufacturers to lower production costs if they are to maintain or expand their market. To keep their competitive position, they must offer better products at lower prices. And since costs of raw materials and distribution make up 90% of the cost of fertilizer, he added, it is in these areas that cost reduction can be most effective. Greatest room for improvement lies in production of phosphate materials and mixed fertilizer. Manufacture of the latter, stated Dr. Kapusta, is still more of an art than a science in many cases.

Although great strides can be made in the development and expansion of superphosphate production by continuous processes, Dr. Kapusta predicted that normal superphosphate will continue as one of the main sources of superphosphate for many years, especially in the Southeast, because of simplicity of operation and low investment costs. Current emphasis, however, is on products with high plant food contents, such as enriched superphosphates made by treating rock phosphate with phosphoric and sulfuric acids and fertilizer grade ammonium phosphate made by neutralizing phosphoric acid and phosphoric-sulfuric acid mixtures with ammonia. Increased production of such materials seems assured.

Raw material costs can be considerably reduced by use of such processes as granulation which eliminate the need for fillers or conditioners. Data presented by Mr. Filbert indicates that savings as great as $4.00 per ton are possible through use of a granulation process. Granulated products, in addition, lower distribution costs by permitting cheaper and smaller bags to be used. Their better flow characteristics reduce handling charges. Approximately 10% of mixed fertilizer production may be in the form of granular materials by the end of the present fertilizer year.

For multicomponent fertilizers of high nitrogen concentration, nitraphosphate processes also present a means of reducing material costs—perhaps an additional $4.00 per ton for a 10-10-10 formula. With one plant now operating and another nearing completion in the Southeast, reports indicate other plants of this type can be expected in the near future.

Continuous operation is a major advantage offered by the nitraphosphate process, and continuous operation, no matter what the concentration of the product, can result in savings of 40 cents or more per ton in processing costs, according to Battelle estimates. TVA's simple continuous ammoniator, described by L. D. Yates, shows promise of being the successor to traditional dry blending for incorporating neutralizing ammonia in superphosphates and mixed fertilizers. Integrated production, which would make it possible for the fertilizer industry to sell such products as ammonia, acids, and salts directly to the chemical industry, could afford in diversification a greater flexiblity and less dependence on the fertilizer market alone.

Edwin C. Kapusta of the National Fertilizer Association predicted that normal super will continue for many years as the main superphosphate source

New Process Developments. Pilot plant development of a continuous process for production of high analysis granular fertilizers was described by S. J. Martenet of E. Rauh & Sons Fertilizer Co. The process consists of introducing ammonium nitrate solution, superphosphates, and potassium compounds into a paddle mixer to produce a slurry. This slurry is fed to a second paddle mixer for

conditioning, then is air-cooled, granulated in a revolving cylinder, and screened. Oversize material is recycled to the conditioning mixer and the product is passed through a rotary louvre dryer that is externally heated to between 350° to 500° F., where moisture is reduced to less than 2%. The output is dry and homogeneous and can be stored or bagged without caking.

Another pilot plant operation discussed, by J. J. Dorsey, was Commercial Solvents Corp.'s Stengal process for reacting preheated ammonia and nitric acid in a packed reactor to form ammonium nitrate. The process, now in commercial operation at Sterlington, La., produces a dry material without requiring dryers, coolers, crystallizers, or a prilling tower. Operation, therefore, is independent of weather conditions. Molten ammonium nitrate leaves the reaction system with a moisture level as low as 0.1% after being separated from steam formed in the reaction in a cyclone separator. The molten material is solidified as a continuous sheet on a water-cooled stainless steel belt, then passed through a series of breakers, dried, cooled, classified, and coated.

The Chemico modification of the commercial urea process, by which carbon dioxide and liquid ammonia are reacted in an autoclave, was detailed by L. H. Cook, Chemical Construction Corp. Chemico's process utilizes a carbon dioxide absorption system for separating ammonia and carbon dioxide formed in decomposing unconverted ammonium carbamate. Carbon dioxide is absorbed in monoethyleneamine, which later can be regenerated and the carbon dioxide recycled to the autoclave. Ammonia can be recovered and liquefied for recycling or, if the plant is located adjacent to an existing fertilizer plant which uses ammonia as a raw material, sent on for use there. An ammonia excess of 200% is used, resulting in a reported 76% conversion of carbamate to urea per pass.

Plant Researchers Discuss Antibiotics

THE POTOMAC SECTION of the American Phytopathological Society is composed principally of research workers from the University of Maryland and the USDA's Agricultural Research Station at Beltsville, Md. Beltsville is considered by many to be the center for the present research work on the control of plant disease with antibiotics. It was particularly appropriate that the recent meeting of the section was concerned with the applications of antibiotics in the control of plant disease.

Frederick C. Visor of Chas. Pfizer & Co. presented the research workers with an industrial evaluation of the present research status of the antibiotic development. He told them, "The use of antibiotics against plant disease looks extremely promising at this time." Several materials such as streptomycin, penicillin, and Terramycin are now produced in commercial grades and are being considered as commercial products.

The research review indicated that streptomycin and formulations of streptomycin have shown commercial possibilities for the control of fire blight of fruit trees, bacterial spot of tomatoes and peppers, walnut blight, halo blight of beans, and other disease of economic importance.

The increasing research on the agricultural use of antibiotics has raised two principal problems which remain to be resolved. Although these compounds have proved to be effective control for bacteria diseases of plants in the laboratory, the development of bacterial strains resistant to antibiotics has been observed in laboratory tests. Recent research seems to indicate that the problem of resistance can be surmounted by combinations of streptomycin with chlorotetracycline.

The residue problem, or carryover, is another question which has been considered. Visor told the group that assays thus far reported have all failed to find any detectable antibiotic in fruit of trees treated with antibiotic sprays.

Henry Welch of the FDA also addressed the phytopathologists on the attitude of the Food and Drug Administration toward antibiotic treatment of plant disease. He told them that the FDA will not regulate the use of antibiotics for plant disease, (see page 333).

Industry

American Can Begins Construction of New Laboratory

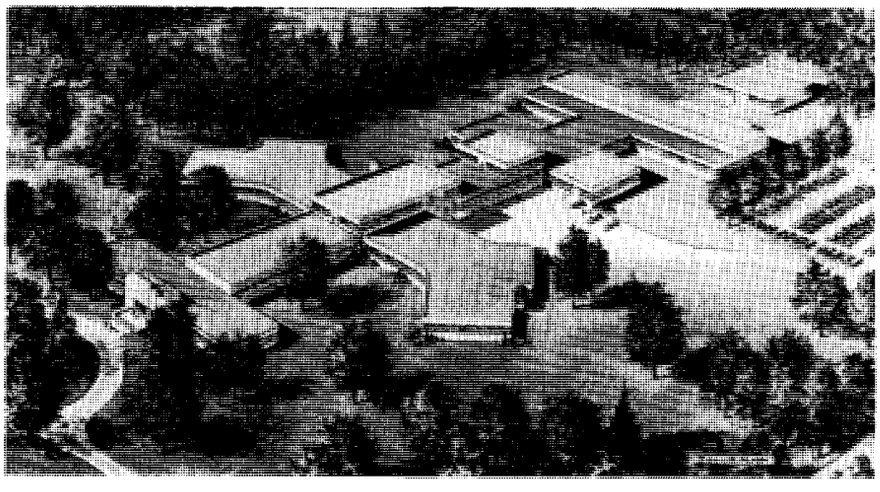
American Can Co. has broken ground on a 40-acre tract in Barrington, Ill., for its new research and development center. About 12 months will be required to build and equip the center. Robert W. Pilcher, the company's director of research, will head the laboratory.

Present laboratories at Maywood, Ill. will continue to be occupied as headquarters of the technical service division.

According to the plans (see sketch at the bottom of this page), the laboratory will be of buff brick and limestone, with half-glass walls and tile interiors. With the exception of the biochemical laboratories, cafeteria, and conference rooms, offices and laboratories will be on one floor. The basement, under half of the structure, will house heating, ventilating, and air-conditioning equipment, as well as constant temperature rooms. The plans provide for about 102,000 square feet of floor space, eventually to be enlarged to 140,000 square feet.

Research activities of the company are directed toward problems in canning technology, biochemistry, bacteriology, and heat transfer, as related to the improvement of canned foods and beverages. The project directed toward elimination of dependence on tin as a can-making raw material will also be carried out at the new location.

Sketch of American Can Co. research center now being built at Barrington, Ill.



Coronet Phosphate Moves to Norfolk; Rydell Named President

Smith-Douglas Co., Inc., has announced that offices of its recently purchased Coronet Phosphate division will be transferred from New York City to Norfolk, Va., about April 1. The Coronet offices have been in New York since Smith-Douglas purchased the phosphate mining company in September 1952.

Simultaneously with the transfer announcement, it was revealed that Ru-