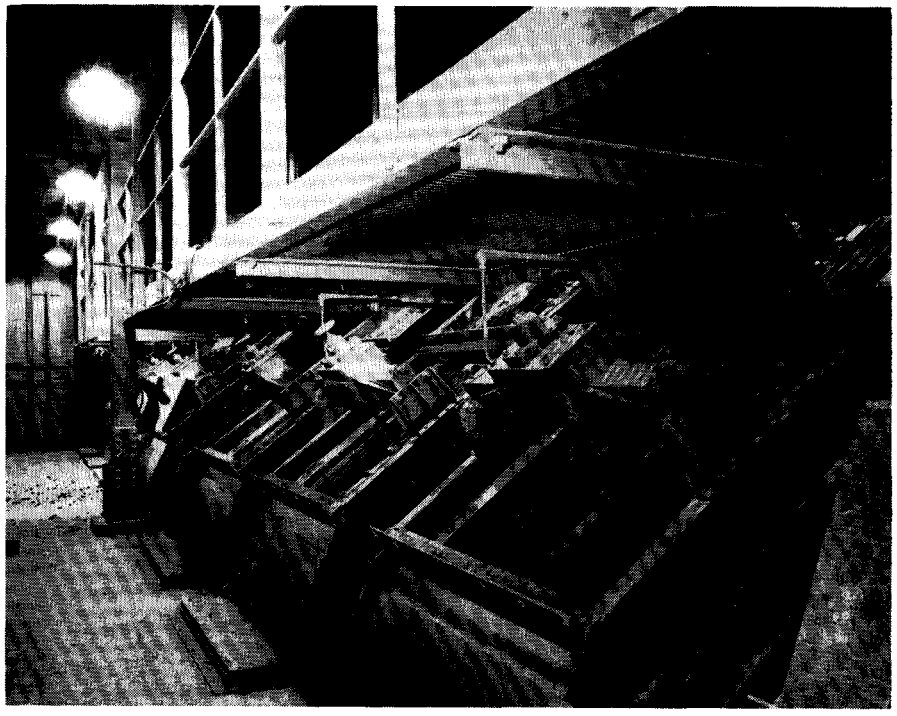
Ag and Food Interprets . . .

- **Fertilizer granulation increasing especially in Midwest**
- **World fertilizer production to double in 15 years**
- **Colombo plan boosts Asian agriculture**
- **Mexican fertilizer expansion needs foreign capital**
- **Pink bollworm spread retarded in 1954**
- **Washington opinion—flexible supports for '55 farmers**
- **Applications advantages make waxy maize flourish**
- **Joint push to boost farm products in coatings**

Fertilizer Granulation

Granulated fertilizers are going great guns; now include about 15% of total. Midwest currently most important sector



Granulation equipment is an important part of the Davison plant at Bartow, Fla. These screens in the Dorr granular process size the dried and pelletized products to exact specifications and return both oversize and undersize material

ONE OF THE MOST SIGNIFICANT and consistent trends in the fertilizer industry today is toward higher analysis products. Another trend, more general, is seen in the willingness to pay a little more for a product in an easy-to-use form. Both of these factors are favoring a movement toward granulated fertilizers. Virtually every major company in the business, as well as many small ones, has adopted granulation. Investment for special equipment for big plants may run as high as $200,000 but in some areas it now is almost a necessity to keep up with competition. Free flow, less dust, and less caking on storage are important factors in this move.

A granulated fertilizer is one in which the particles are fairly large and uniform with hard smooth surfaces so that the surface area is greatly decreased. In a true granulated plant food ingredients are well distributed so that composition of each particle is also uniform. True granulated fertilizer should be distinguished from granular-*type* material which is merely a mixture of ingredients having granular particles and is, therefore, liable to segregation.

Granulation is of course not confined to mixed goods. Superphosphate was the first fertilizer material granulated, and it is customary to granulate triple super, ammonium phosphates, nitrophosphates, and other products. Prilling ammonium nitrate or urea by allowing drops of the molten compound to harden into spheres while falling through an enclosed tower is a form of granulation, and so is the Stengel process for making flaked ammonium nitrate.

When Davison Chemical started marketing the first granulated mixed fertilizer back in 1936 it did not have an easy time of it. Granulated superphosphate was well accepted, but granulated mixed goods didn't move readily. But Davison stuck it out and has been happy to see granulation adopted by practically all of the major companies in the country—mostly within the last five years. European acceptance was faster, and there granulation is more prevalent than in the United States. In Britain perhaps 90% of the fertilizer is granulated; the percentage is likewise high in France, Germany, and other continental countries.

Best estimates in this country say that a strong 15% of the mixed goods is now

granulated. Acceptance came first in the East (except the Southeast), but now the greatest activity in installing granulation facilities is in the Midwest, especially in the Corn Belt. Iowa probably uses the greatest proportion of granulated plant food.

In the Southeast there are very few mixing plants using granulation equipment east of the Mississippi except in the New Orleans area, although there are some people in the industry who expect granulation eventually to take hold in the Southeast. The southern fertilizer industry has been well established for a long time and most mixing plants in the area have been written off company books for years, making it difficult for a new plant to compete.

Granulated material is especially adapted for airplane application, much used in the rice and sugar cane areas of Texas, Lousiana, and Arkansas. In Texas 75% of the mixed fertilizer plants have some granulating equipment. Texas ships a good deal of granular to California, but generally speaking the western states have not taken to granulation.

In sections where granulation has become widespread it is usually the larger companies which first make the switch. High investment costs make it difficult for small mixers to get started; the smallest will probably never set up granulation plants.

Variety of Process

The fertilizer manufacturer considering going into granulation is confronted with a wide assortment of possible processes ranging from multimillion dollar installations for special high analysis materials to more modest set-ups which can be added to an existing plant to granulate ordinary dry mixed material. TVA is responsible for much work on many processes now in use. High analysis product processes, most of them including granulation, are licensed by Dorr-Oliver, Chemical & Industrial Corp., Chemical Construction, General Industrial Development, and others.

Old stand-by for granulating mixed goods of all grades has been Davison's process which has been widely licensed. Davison also has a newer process now licensed to a few companies. Costs vary. A large company such as International Minerals might install $200,000 worth of granulation equipment at one of its mixing plants, while a small manufacturer might spend $30,000. For a plant, including building and storage facilities, making 100,000 tons per year of granulated fertilizer by the recently developed Link Belt–Martenet process, an investment of $1,275,000 is required. Operating and raw material costs as well as quality of product depend upon the process selected. A poorly granulated product may not have uniform particle size or homogeneity and may contain considerable reverted P_2O_5.

In a number of processes granulation is accomplished by adding water or some liquid fertilizer material to the dry mix and continuing mixing either in the original mixer or in some piece of special equipment until the particles agglomerate into little balls. These may be dried in a rotary dryer, or, if ammoniation or some other process involving the reaction of liquid fertilizers with dry materials is used, heat of reaction may be utilized to eliminate outside heat for the dryer. Classification by screening to remove oversized and fine material is usually but not always practiced.

A different kind of granulation process consists of recycling a large proportion of the granular material in process through a slurry of the fertilizer mixture. Each particle acquires a new layer on each pass and its size is thereby built up. Fine seed material is continually fed in and product-size material is continually screened out of the system.

Modification of basic processes for particular conditions gives the impression that no two processes are alike. The process used has to be selected carefully. In some areas competition may dictate a well granulated product; in others a material of lower quality made by a cheaper process may suffice. Availability of cheap liquid ingredients indicates one type of process, their absence another, or may even preclude going into granulation altogether. If the plant is located near a community, noise and fumes may be a problem. Ammonium chloride given off in some ammoniation processes may be controlled, but scrubbers cost money.

Increased Consumption Seen

Growing farmer acceptance points to consumption of more and more granulated goods, although decreasing farm income may cause the farmer to balk a little at paying a premium for granulation. Most agree on granulating high analysis materials, whose high hygroscopic salt content makes them difficult to handle, but there is a difference of opinion regarding granulation of low analysis goods. Granulated material has an advantage in that it can be applied with precision to give more uniform crops permiting operation of harvesting equipment. Application by airplane and new equipment like the 100-foot spreader now in use in New York State depends upon granular material. Conditioners and surfactants are also used to obtain free flowing material but if the industry is ever to realize the dream of some day being able to store fertilizers indefinitely in bulk and to handle them with conventional equipment such as that now used in the grain industries it will probably be a result of improved granulated fertilizers.

World Fertilizer

Annual increase of 6% in production and consumption predicted. Eight million tons each of N, P_2O_5, and K_2O by 1960

WORLD PRODUCTION of nitrogen and potash has more than doubled in the past 15 years and phosphoric acid has increased by 75%. Such an increase can be expected to continue, according to the UN Food and Agriculture Organization. Production and consumption increases at the annual rate of 6% are predicted, to give a doubling every 15 years under stable political and economic conditions.

FAO, in its yearly report on the world fertilizer situation "Annual Review of World Production and Consumption of Fertilizers" predicts that by 1960 the world may produce and use approximately equal tonnages of N, P_2O_5, and K_2O, at the rate of about 8 million tons each.

World production of fertilizer elements (N, P_2O_5, and K_2O) in 1952–53 was about 17,800 tons, an increase of almost 6% over the figures for 1951–52. In 1954–55 world production of fertilizers is expected to increase about 4.5%; consumption may go up about 4.9% over 1953–54. Greatest increases this year are expected in nitrogen, production may go up about 6.3% and consumption forecast calls for an increase of 5.5% over 1953–54.

Production of phosphoric acid is expected to increase about 4% in 1953–54, with an increase of 3.6% in consumption forecast. Potash production and consumption are expected to increase 3.5% and 6.1% respectively. This expansion of phosphate production reflects the effects of recent phosphate mining schemes in Africa, Asia, and South America.

Ammonium sulfate and ammonium nitrate are the principal world sources of nitrogen, accounting for 32 and 22% of total production respectively. The report comments on the trend toward higher analysis fertilizers citing the increasing production of ammonium ni-