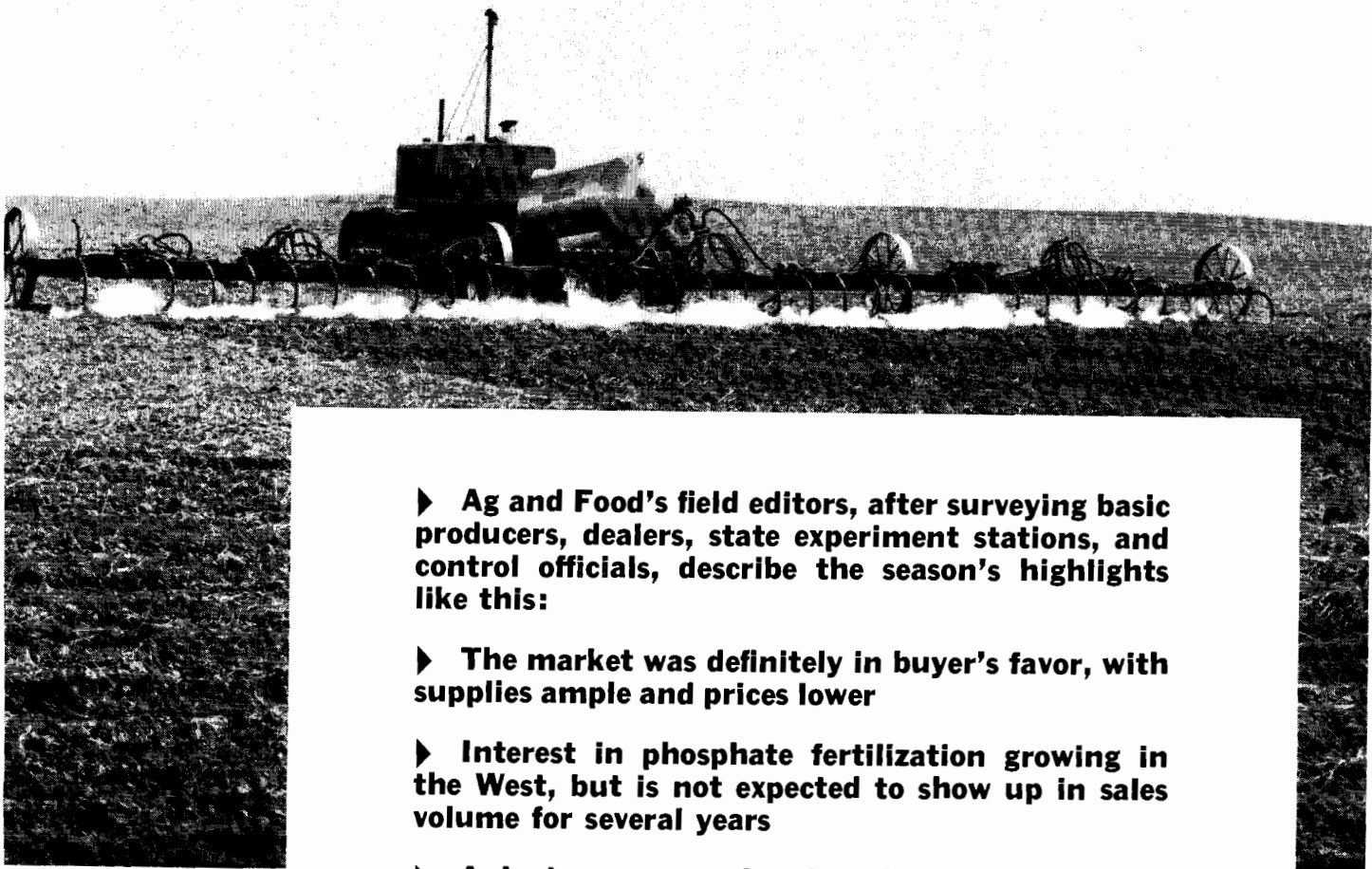


# The Fertilizer Season



▶ **Ag and Food's field editors, after surveying basic producers, dealers, state experiment stations, and control officials, describe the season's highlights like this:**

▶ **The market was definitely in buyer's favor, with supplies ample and prices lower**

▶ **Interest in phosphate fertilization growing in the West, but is not expected to show up in sales volume for several years**

▶ **Anhydrous ammonia taking back seat to granulated and liquid materials in the Midwest**

▶ **Urea found to be catching on quickly in South, Midwest, and Northeast, partly because of liquid popularity**

▶ **Early buying campaigns felt to have been ineffective this year, with unfavorable weather largely responsible**

▶ **Future of diammonium phosphate and urea-forms seen as promising**

## Late Start Clouds Western Picture; Profits to Drop, Tonnage About Same

THIS YEAR is unique in the western fertilizer industry in that no seasonal shortages had occurred as of mid-April. Despite somewhat lower sales till then, however, many felt 1956 tonnages would be equal to or perhaps only slightly less than last year's record highs. Major reasons given for slow sales were weather, which delayed the season in many parts of the West, and uncertainty over the government's farm program. Most, therefore, expected a noticeable sales increase in May, June, and possibly July, compared to previous years. A possible deterrent was moving and applying a lot of fertilizer in a compressed season.

First quarter tonnages for California, which appeared in early May, however, showed only a 0.8% drop (to 280,853 tons) compared to 1955. Since that state dominates western fertilizer sales, this strengthens the idea that 1956 will be very close to 1955. Also noteworthy in California's first quarter tonnages were the apparently continued trends toward aqua ammonia, up 33% to 39,758 tons and neutral fertilizer solutions, up 51% to 8117 tons.

Profits per ton will likely be down this year. While anhydrous ammonia has held firm at the producer level, urea prices have slipped in the West, and diammonium phosphate (21-53-0), which started at \$135 per ton in bulk this year is now at \$120. The only western DAP producers are Colorado Fuel & Iron and Shell, which just entered the picture and will make perhaps 5000 tons this year. Fertilizer grade (white) phosphoric acid has dropped to \$81.75 a ton f.o.b. plant, which puts it at \$1.50 per  $P_2O_5$  unit, compared to \$1.40 to \$1.50 per unit delivered for triple and normal superphosphate.

Ammonium sulfate has been in trouble, primarily because of price, and in California's first quarter dropped 25% to 45,702 tons. Aqua ammonia, for instance, is said to have taken considerable sulfate business around Sacramento, Calif., on a price basis, and in the Imperial Valley sulfate is moving for only 50 to 75 cents a ton above distributors' cost. Sulfate prices dropped \$3.00 a ton in early April, and Shell took it off fair trade.

Stimulated by rough competition, especially in nitrogen, fertilizer distribution in the West is showing definite signs of change this year. The eventual result appears to be a set-up with but one distribution step between producer and grower. This pattern

seems more clear cut in liquids (including anhydrous) than in solids, where some feel a producer-distributor-dealer arrangement will be here for some time to come. Last fall, for instance, Shell took over the distribution function of one of its long-time California distributors and this spring it did so with another, this time in Washington. Calspray, preparing for the start-up of its fertilizer plant later this year, recently made a nonexclusive, one-step arrangement with Agricultural Ammonia Services.

Decreasing margins in the West are prompting basic ammonia producers more and more to help their dealers and distributors by building storage capacity, giving aid with credit problems, and similar measures. Reportedly, in fact, only two distributors of ammonia-based liquid products on the West Coast, who move more than 5000 tons per year, are operating without such help.

One theoretician believes the very long range future for liquids is bulk delivery to farmers, who would do the rest of the job themselves. An isolated instance of this appears in California's San Joaquin Valley, where a distributor is getting "dump" anhydrous ammonia from the Midwest, freight equalized to meet western producers' prices. Local farmers reportedly take it directly from the tank car for \$105 to \$110 per ton. Demurrage (\$5.00 a day after 48 hours) could take the fun out of this, but the producer might well have a trip-lease deal on cars, in which case he would lose their use for a few days, but not pay demurrage.

### Credit More Liberal

Credit on both liquids and solids is more liberal in the West this year. Field warehousing and delayed billing are also coming on strongly and, in the general opinion, are becoming indispensable. Most feel that these practices need not necessarily weaken the distribution structure if handled sensibly. If they are handled poorly, however, shaky distributors and dealers, when offered unwarranted credit, can get into business with adverse results.

Some have absorbed the recent 6% increase in railroad freight rates and others have passed it on, but the total effect is expected to be negligible compared to price adjustments in general. This applies particularly to imports from the eastern U. S., an endeavor in which one broker says,

"Those who are shipping the farthest are giving the most." In any case, such imports only accounted for an estimated 5% of western fertilizer tonnage in 1955.

Phosphates were slow earlier this year, and full warehouses were reported here and there. While interest in phosphate fertilization is growing in the West, it is not expected to be reflected in sales for several years. Potash appears to have held up pretty well, but is not yet a big item, although lysimeter work at the University of California at Riverside indicates that virgin California soil can lose 20% of its potash in 20 years of cropping. This would indicate that plenty of potash exists in California soils but also that it won't last forever. Of the potash removed by vegetable cropping in the state, an estimated 50% is being replaced by fertilization, and 15% is replaced on fruits and nuts.

No added nitrogen capacity hit the western fertilizer market this year excepting possibly an unspecified amount of ammonia from Hercules' 50,000 ton-per-year plant at Pinole, Calif. Hercules, which had already been in the market with ammonia, ammonium nitrate, and sulfate, is moving much of its explosives capacity from Pinole to Bacchus, Utah, which presumably would release some Pinole ammonia for the West Coast market. On the other hand, Bacchus might well use ammonia from U. S. Steel's 70,000 ton-per-year plant at Geneva, due to start up in December, in which case the net effect, if any, on the western market would be small.

The full effect of Brea Chemicals'

Ammonium sulfate goes on by air at rangeland experimental plots near Petaluma, Calif. About 100,000 acres were fertilized last fall



new ammonium nitrate plant at Brea, Calif., was felt for the first time this spring, but this represents diversion of part of Brea's ammonia capacity. The same will be true of Shell's urea plant at Ventura, Calif., which should start up in September. Stauffer shipped the first pellets from its new plant at Vernon, Calif., in February, and Cal-spray expects all units of its new ammonia and Complex fertilizer plant to be operating by this fall.

### Phosphate Interest Growing

Growing western interest in phosphate fertilization, particularly in California, seems due partly to gradual soil depletion, partly to increasing knowledge of phosphate placement. Broadcast application, which had been standard for solid phosphates, has been giving way rapidly to banding, which puts the relatively immobile phosphates near the plant. However, vegetable experiments in California's Imperial Valley have shown that broadcast is satisfactory after all when furrows are established after application. Broadcast material is scooped up and mixed intimately with the top of the furrow, where the plant grows, and is thus closer to the root system than if it had been banded at the edge of the furrow. And broadcast can cover perhaps 120 acres per day, compared to 40 acres by banding.

Also in the Imperial Valley, a number of vegetables have responded to phosphate application and the University of California at Riverside is working intensively on vegetable plots intentionally depleted of phosphorus.

On these plots, leafy vegetables have responded most to phosphates as a rule and fruits, such as cantaloupe, have responded least. Lettuce has responded particularly well, the

most striking result being considerably earlier maturity. Taking vegetables as a whole, UCR has found no apparent relationship between the amount of phosphorus removed by a crop and its response to phosphate application. Lettuce, for instance, removes about 10 pounds of  $P_2O_5$  per acre but has responded to application rates as high as 180 pounds.

UCR plans also to look into applying several seasons' supply of phosphate on vegetables at one time. This practice has been recommended for several years on calcareous soils of eastern and central Washington, where 120 pounds per acre of  $P_2O_5$  applied at one time on beans appears to support three seasons' growth. The phosphate form used here seems unimportant so long as it's soluble; tie-up and leaching losses are negligible. Also, 40 pounds per acre of triple superphosphate applied in 1951 on California citrus has compared favorably with application of 10 pounds per acre in 1951 and in each of the succeeding three years. Which is best has not yet been determined.

Also on citrus, phosphorus has accumulated to excess in many old orchards through long-continued use of mixed fertilizers and manure, and this excess apparently is depressing utilization of trace elements like zinc and copper. A similar case was found on celery in Southern California, where excess phosphorus depressed boron utilization, but this is the only other one known in the state. Data obtained in Washington, on the other hand, have indicated that heavy phosphorus application does not induce zinc deficiency.

California avocado has produced more fruit when some nitrogen was withheld experimentally, suggesting that the nitrogen application level for

best fruit production is lower than that for best vegetative growth. While high nitrogen usage has been indicated on citrus, it has been believed by some to be necessitated partly by leaching and volatilization losses. Some confirmation of this comes from lysimeter work at Riverside, where nitrogen losses equivalent to 60 pounds per acre occurred on mustard cover crops because of microbial conversion and volatilization.

In Montana, which farms close to 9 million dryland acres, there are a number of indications that nitrogen should be applied to small grain at about the time the heads begin to form instead of early in the season. The thesis is that this would allow more efficient use of available rainfall, which comes in May, June, and July, resulting in heavier nitrogen usage and higher yields.

If this idea proves out, it will mean airplane application. Alternatively, perhaps the answer would be something like urea-formaldehyde, which could be applied early and would release its nitrogen over a period of time. In fact, the Montana station will try a small amount of urea-formaldehyde this season for the purpose. Opinion is that up to 10 years' experimentation would be needed to put it on a recommendation basis.

Last year, Oregon State College verified its work of a year earlier on nitrogen fertilizer of soft, white wheat, which millers and bakers prefer to contain 8 to 10% protein. Tests on 47 Columbia Basin farms showed that about half produced wheat containing less than 8% protein when unfertilized. Nitrogen fertilization, on the other hand, increased both yield and protein content, and nitrogen rates for best yield also produced wheat containing the desired 8 to 10% protein.

## Price Cutting Prevalent in Northeast; Granulars and Pellets Gain Ground

IT WOULD BE IDLE to deny that fertilizer prices lacked stability this season in the New England and Middle Atlantic States and one does not have to look far for the reason. This was a fertilizer year with virtually no shortages. Supplies of all types were plentiful with the possible exception of high analysis Ammo-Phos, and the result was a very unstable market in the Northeast during 1955-56 with price cutting quite prevalent.

A well supplied market can have its advantages. One of the largest Eastern manufacturers estimates for example that his sales for the season

ending with June will be 30% better than they were in 1954-55. But that should not be taken as representative of the industry. Another manufacturer and distributor in the same area says his tonnage will be down about 15%, while others report "up slightly," "2 to 3% less than a year ago," and "10% less." Sales of nitrogen materials particularly were good in Virginia, Maryland, and Delaware, where vegetable crops for canning are important.

Interesting trends are under way in the Northeast affecting specific types of fertilizer. Again we hear that low-analysis materials including low-nitro-

gen mixed goods are on the decline. Nitrate of soda also is losing out in some areas probably because of its comparatively high unit cost. The older types of pulverized fertilizers at the same time continue to give ground to the granular and pelletized materials. In this connection, A. B. Verdery of Olin Mathieson Chemical says that due to early season discounts dealers often take their supplies in December and January, and with the pulverized type this is impossible owing to its tendency to cake readily in storage. Granular and pelletized fertilizers are easier to handle in the new mechanized farm equipment.

The same view concerning granular materials is expressed by J. E. Totman, president, Summers Fertilizer Co., Baltimore. He also finds that fertiliz-



First fertilizer made with Allied Chemical's urea formaldehyde solution is examined by Joseph B. Martin (left) of the company's sales department and L. Graham Campbell, manager of the fertilizer department of Chamberlin & Barclay, Cranbury, N. J., where N-Dure, as the U-F is tradenamed, was first used

ers which heretofore carried varying amounts of organic material are less popular because of their high cost and that low-analysis goods are on the decline due to a better supply of concentrated raw materials. These permit manufacture of double strength goods at substantially lower cost.

#### **Early Sales Drives**

There have always been mixed feelings in the industry concerning the value of fall or early season sales campaigns, and 1956 is not different in that respect. You will find people who assert it is quite effective in relieving the spring delivery pressure, and you will hear that it has no effect whatever. This season its potential value was probably offset by falling farm prices and other uncertainties.

As to the soil bank program, most

of those questioned view this legislation favorably. Ultimately, it is felt, it should result in absorbing some of the tonnage that will be lost to acreage reductions and smaller purchases. However, no benefits are possible from the program at this time.

#### **By-passing the Dealer**

Direct selling by producers in certain areas is definitely on the increase. With the tendency toward fewer farmers producing more, farms are naturally increasing in acreage. As one eastern fertilizer sales manager puts it: farming is big business; when a farmer needs from 50 to 200 tons of fertilizer on a farm, there will always be producers who will by-pass the dealers.

General feeling in the Northeast is that the number of "brick and mortar"-

type dealers is on the decline. But many fertilizer companies are making dealer contracts with the farmer. This type of consumer-dealer is certainly on the increase.

#### **Ammonia Balance**

Consensus of opinion in this area is that current surplus of ammonia may last for another five years. But, according to the president of a large mixed goods company, "we are not finding the alleged surplus a matter of serious competition." He points out that direct application of ammonia as yet has not been extensively developed in his selling areas.

The fertilizer company official goes on to say that when ammonia plants now under construction or in the blue print stage get into production, he would anticipate a 30% surplus. However, this surplus could easily be brought into balance if producers would decide to operate their plants at 70% of capacity.

Price-conscious farmers are so far not interested in large scale application of the urea-formaldehyde products. And producer promotion has been directed to use on turf and ornamentals. But the Northeast, with its abundance of small plots, will undoubtedly be the first to take advantage of any price cuts that may be forthcoming for these slow release nitrogen products.

Reports the vice president of one of the basic producers of urea-forms: "A great many manufacturers have taken in small tonnages of urea-form for experimental use and by the end of this growing season there should be more than a sharp rise in urea-form sales when the final results are in."

Other comments from the field emphasize that the urea forms are significant this season only as specialty fertilizers. Specialty fertilizers represent less than 2% of the industry's annual make of all mixed goods.

Allied Chemical early this spring announced its new urea-formaldehyde solution for producing granular type fertilizers using standard ammoniation apparatus. The first fertilizer made using these solutions was formulated in a Cranbury, N. J., plant.

#### **Technical Outlook**

In the New England and Middle Atlantic states, the trend toward the decreasing use of low-analysis fertilizers is more pronounced today than ever before. In Maryland, for example, sales of low-analysis 3-12-6 fertilizer (once the leading grade sold in the state) have declined from about 76,000 tons in 1953 to 43,000 tons

in 1955. On the other hand, sales of 5-10-10 rose to about 94,000 tons last year, to become the leading grade of fertilizer in Maryland. Vermont reports that the trend in that state has been from 5-10-10 to 8-16-16 and from 7-7-7 to 10-10-10.

Several states report a decline in the use of phosphate in fertilizers to prevent an excessive build-up in the soil. In many areas, there has also been a decline in the popularity of powdered fertilizers in preference for the granular material. As another trend, agricultural experiment stations these days are making a special effort to recommend fewer different grades of fertilizer in order to simplify the farmer's buying problems.

### **Anhydrous Popular in New Jersey**

Use of anhydrous ammonia is increasing in various sections of the East, but perhaps not as rapidly as in the recent past. In New Jersey, anhydrous is becoming increasingly popular in the coastal areas, where problems of application are not as great in sandy soils as they are in soils containing stone and clay.

Maryland finds use of anhydrous ammonia increasing, but not at so rapid a rate as the use of nitrogen solutions. In Virginia, use of anhydrous appears to be approaching a peak, with nitrogen solutions and the more concentrated forms of solid nitrogen advancing more rapidly than ammonia. Pennsylvania reports a preference for nitrogen solutions and urea since these materials are more easily applied to the steep slopes and stony fields that are fairly common there.

Eastern farmers find that neutral-type fertilizer solutions are equal in crop producing value to solid fertilizers of the same analysis. One important problem at the moment is economic—the relative cost of these

materials compared to other fertilizers. There are also the problems of marketing and customer education.

Meanwhile, urea is catching on very quickly in the East as a direct-application material for side or top dressing. It is also being used in mixed fertilizer in solution and in the dry form. Growth is expected to be especially rapid in 1956. Urea is particularly popular.

An agronomist at the New Hampshire Agricultural Experiment Station reports: "For the first time last April, the price of urea per pound of nitrogen was equal to the price of nitrogen in ammonium nitrate. Again last August, the price of urea dropped, and now urea is cheaper per pound of nitrogen than ammonium nitrate on our retail market in New Hampshire. In the future, I predict urea will replace ammonium nitrate in many of the uses to which ammonium nitrate is now being put."

The outlook for diammonium phosphate and ammonium nitrate appear to be good, provided these materials can compete pricewise with other fertilizers. Diammonium phosphate is being used widely to increase the nutrient concentration of mixed fertilizers. Ammonium nitrate is popular as a side dressing and top dressing.

### **Complex Fertilizers Gaining**

The nutrient concentration of fertilizers used in the East is steadily increasing. How far this trend will go will depend on the cost of the high-analysis material compared to less concentrated grades and the extent to which the problems involved in manufacture can be solved. As one experiment station comments: "Until we learn a great deal more about the need for special grades, the increase in the number of complex high-analysis fertilizers will not be very great."

Prospects are not good for fertilizer-pesticide combinations. This is particularly true in the Northeast States

The F-P mixtures are becoming popular in Virginia for peanuts. But, it is recognized that much of this material, although compounded and labeled as peanut fertilizer is being used for, and in conjunction with, the production of other crops. Demand had been quite high and it is expected to reach a point that the fertilizer control board may find it advisable to permit the incorporation of pesticides into mixtures intended for use with other crops.

Although no particular reasons can be presented, the use of pasture fertilizers is on the up-swing. Some experiment station people feel that the growth is not as rapid as it should be. Reason here, they say, may be failure on their part to give it adequate publicity.

### **Problems—Mostly Income**

Sales volume and low farm income concern ag specialists in Massachusetts, New Jersey, Maryland, and Rhode Island. Pennsylvania people sum up the situation quite aptly as follows: "The combination of declining agricultural prices and increased competition as a result of increased productive capacity will require more efforts on the part of industry to develop additional markets in areas of low usage. The greatest potential market is the farmer who had had little or no fertilizer and who has not responded to the educational program of research and extension personnel. The big problem is how to make these farmers conscious of the nutrient status of their soils."

## **Sales in Midwest Drop; Ammonia Losing Ground to Solids and Liquids**

**M**IDWESTERN fertilizer sales are off.

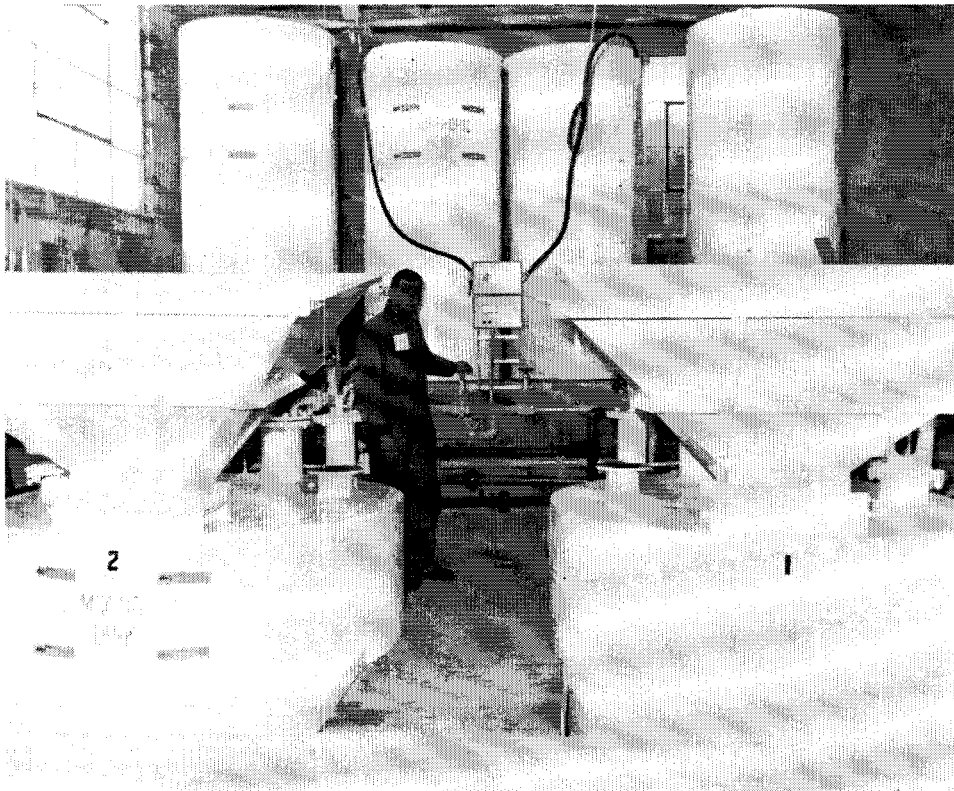
Except for increases in items such as urea and liquid fertilizers, this year's outlook is not very encouraging. Estimates of sales decrease range from 3 to 30%. But it seems the best guess is that over-all sales will be down 10 to 15% from last year's. Even the most optimistic producer expects his sales to merely equal last year's, but no more. Only if there is a sudden flurry of buying in the closing weeks of the planting season is there any hope of a good season.

But why the drop? Prices to dealers and to farmers were generally lower. A lot was done by individual companies and by the industry as a whole to try to move fertilizer during the off-season. A definite advancement has been made during the past few years in creating a greater long-term appreciation of fertilizer by the farmer. And yet, with all these advantages to the grower, there is a reluctance to buy.

Many reasons are being advanced for the lower sales figures. Lower farm incomes are beginning to show

up in fertilizer sales. Generally, the continuing midwestern drought is having an effect. Uncertainty about the government's farm program is another cause. Not to be overlooked is the perennial problem of price cutting. According to several sources, price cutting has been worse over the past season than at any time in the past few years. In many portions of the North Central States, fertilizer dealers are very frankly not interested in pushing their products. All this in the Middle West, which has shown promise as being the market of greatest potential growth during the next few years.

A strong emphasis on fall marketing and on early season fertilization



Interior view of Davison Chemical's liquid fertilizer plant in Indiana

did not pay off this year. As a matter of fact, it was rather ineffective. However, it is difficult to estimate what the movement might have been had not the effort been made. In some areas, where a good spring movement exists, the strain is just as great as in the past.

#### **Anhydrous Down**

Anhydrous ammonia for direct application has taken the worst beating thus far. In the entire area, anhydrous sales are either definitely down, or increases are very definitely slowing. For example, anhydrous ammonia furnished 21% of last year's total straight goods nitrogen in Nebraska. This compares with 27% a year earlier. Only in Indiana and South Dakota is the sales movement in anhydrous growing in proportion to other types of nitrogen fertilizer.

Greatest drop in ammonia sales for direct application has occurred in the North Central States. In Minnesota, anhydrous ammonia is in serious trouble. This may be due to an over-expansion of facilities. Perhaps if a sound program is developed, usage will again increase. However, nitrogen solutions (40.6 and 40.8%) are moving into areas formerly held by anhydrous, and are now outselling anhydrous ammonia. A considerable increase in anhydrous sales in Michigan during 1954 has not been matched in the past year. It is not

certain if the failure to increase further is due to seasonal conditions, or if there is a drop in farmer's interest in using ammonia. In any event, consensus is that the future of anhydrous is not very bright in Michigan.

As ammonia for direct application goes down in terms of volume and in terms of a decreasing rate of growth, other fertilizer forms are enjoying a notable growth. Ammonium nitrate seems to be in the strongest position. General outlook; very good. In areas where there has been a slight decline, its use should level off with some price adjustments. The worst that can be said for ammonium nitrate sales is that they may have already reached their peak. But this opinion is shared by a minority.

Together with a favorable outlook for ammonium nitrate is a good picture for diammonium phosphate. Its greatest importance is in localized areas near production centers. Diammonium phosphate is a low tonnage product, according to one industry spokesman. It is currently selling at a very reasonable price, but since it is a high analysis product and sells at a relatively high price per ton of material, some farmers are reluctant to go along with it. Therefore, says the contact, it will take a considerable amount of educational and promotional work to increase its tonnage greatly.

DAP's position is good for an additional reason. In spite of a

relatively higher price, there is a continuing trend toward high analysis fertilizer throughout the Midwest. In Indiana in 1954, one half of 1-4-4 ratio fertilizer sold was 3-12-12. In 1955, the proportion was down to 35% and the remainder was of higher analysis. While Wisconsin farmers have not increased their fertilizer tonnage very much, the plant food units have increased because of high analysis material. Missouri's total fertilizer tonnage is down, but an increase in the amount of plant food units is evident.

#### **Urea Fertilizers**

In the Midwest, urea is going well. The only drawback is tight supply, and new producers are selling all they make. Considerable interest in urea, particularly in solutions and spray applications, is prevalent. Says one manufacturer: "If urea's price can get more in line, it will be the strongest, solid nitrogen competitor of anhydrous ammonia." Considering its current volume of use, even a slight increase in urea will appear significant. However, it will probably take a few more years of education and promotion to raise consumption to the level of other solid nitrogen use.

Urea lends itself especially well to liquid fertilizers, which are steadily gaining in popularity. Throughout the Midwestern States, and in spite of cost competition, liquids are moving almost entirely because of ease of handling. Tonnage is as yet small. This may never rise to any great proportion because of the inflexibility in grades that can be made, and because of storage difficulties. But for the next year or two, they may be expected to have an increase in volume. Beyond that, it will depend a good deal on price and on the progress which is made in manufacture of suitable equipment for their application.

#### **Problems Continue**

Problems, old and new, continue to plague the fertilizer industry. First, obviously, is the problem of sliding sales. Unanimous opinion is that the best way to stop the skid is to continue to enlarge the long-range program of farmer education. An effective program of education should have at least two aims: education of retail dealers so they know what they are selling as well as doing, and for the dealers as well as for the manufacturers to sell the farmer a good basic soil fertility program. As it is, more farmers currently know more about fertilizer and the role that it plays in economic farm production

than in the past. A definite advancement has been made during the past few years in creating a greater awareness of the value of fertilizer by the farmer. But there is still a long way to go in convincing the grower of fertilizer's vital role.

What about the soil bank program? Farmers have, to a great extent, adopted a wait-and-see attitude. If and when the program is put into effect, estimates are that fertilizer consumption will neither increase nor decrease. Because of education, farmers will tend to use more fertilizer if their acreage is diminished. In this way, any losses which may be suffered because of smaller acreage will be obviated by increased fertilization. But for this season, government indecision in establishing a definite farm program has prompted many growers to go slowly.

Tying in with the soil bank program is the over-all problem of declining farm income. With diminishing income, competitive pricing in most parts takes the form of price cutting.

This is a practice which hurts everyone involved—manufacturer, dealer, and farmer. On the technical side, severe competition may cause curtailment of research and services such as soil testing and farm visits by company agronomists. Such services are offered by larger companies, but not by smaller operators.

One of the most difficult technical problems coming up rapidly is the mixing of the multitude of grades with pesticides and/or trace elements. Fertilizer-pesticide mixtures are a problem for manufacturers, but are in great demand by midwestern farmers because of the excellent results obtained with them. The growth promoting-pest killing mixtures are on the increase throughout the area. In the corn belt, the mixtures should see a decided increase. A new interpretation of the law in Michigan now makes possible the mixture of certain pesticides with fertilizers. A rapid increase in use of fertilizer-pesticide mixtures is predicted for Kentucky strawberries. In the same state, a

slower increase is seen in tobacco growing.

The problem of trace elements can become one of the most difficult ones facing the industry during the next few years. There is no doubt that the demand for minor elements in fertilizer will increase. With increasing use, an increase in the number of mixtures will be necessary. For example, tests at the University of Wisconsin show that corn grown in zinc-deficient soil cannot recover from metal deficiency with soil or spray application. The zinc must be added in starter or broadcast fertilizer. Similar response has been obtained with copper. And zinc- and copper-deficient areas are fairly widespread in Wisconsin and some adjoining states.

Solutions to any and all of these problems will bring the industry closer to the time when the Midwest's potential as a market will be more fully realized.

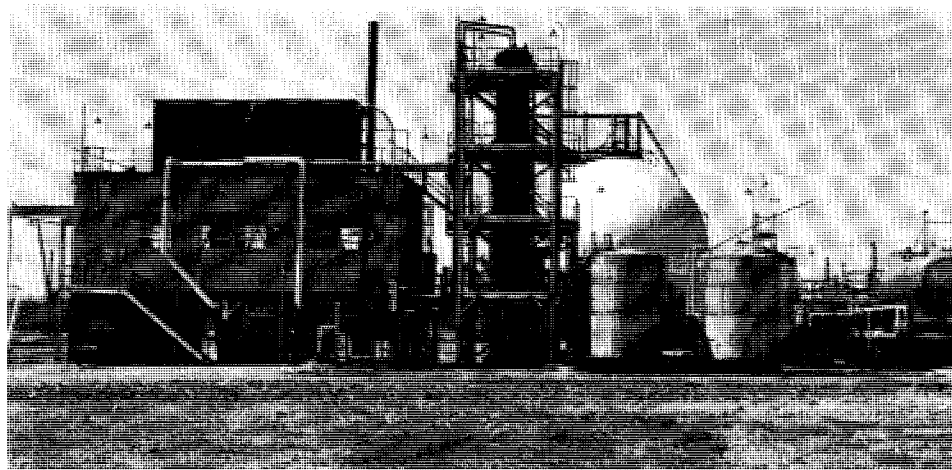
## Volume in South Near Normal, But Prices and Profits Definitely Lower

FERTILIZER SALES throughout the South ranged from normal to slightly below normal volume this season, but prices and profits were definitely lower than last year. In most areas price cutting prevailed. Some dealers say they did not make a cent on solid fertilizers, although there was less complaining about profits on anhydrous ammonia.

From North Carolina to Texas, sales came all at one time—when the farmer was ready to put down his material. A few dealers tried strong early season selling campaigns. One large Florida operator indicated his campaign was effective in relieving strain at the height of the season. But opinions on this subject differ widely. "People in my area won't book, buy, order, or make their needs known until they are ready to apply," says a Mississippi supplier.

It's still a buyer's market. No shortages occurred at any time during the season. Dealers have been anticipating their requirements and seem to have adequate supplies on hand. Low potash grades are the only materials declining in popularity, principally in North Carolina.

Experts say the government's soil bank program won't help future sales. It will probably take acreage out of production and increase the amount of fertilizer used on those left in cultivation. But the net result is smaller



Ketona Chemical's nitrogen solutions plant has annual capacity of 40,000 tons

fertilizer usage. Increase in plant food consumption per acre is not expected to make up for acreage taken out of production.

Definite progress has been made during the past few years in creating a long-term appreciation of fertilizers by farmers, particularly in the "newer" consumption areas. Advancements in placement techniques and equipment are increasing demands for anhydrous and ammonium phosphates.

Markets promising greatest growth during the next two years are lawns, vegetables, pastures, rangeland, and

forests. (Growth of pasture fertilization has been only slightly more rapid during the past year than previously.) Some say the most difficult problem facing the fertilizer industry during the next two years will be that of satisfying stockholders with reasonable profits.

Water transportation generally has not affected sales of ammonium nitrate or nitrogen solutions throughout the United States. But water movement of anhydrous ammonia, triple superphosphate, and ammonium sulfate is increasing competition on these prod-

ucts in the Mississippi Valley, the Gulf Coast, and South Atlantic seaboard. Producers who have plants located where they can utilize water movement are aggressively soliciting business at destinations which can be served advantageously. Greatly increased water movement of triple superphosphate from producing plants to inland points is expected next year. Recent increases in freight rates, together with the differential between 30-ton and 15-ton minimum carlots, has definitely encouraged shipment of all fertilizer materials by truck. Railroads have lost practically all mixed fertilizer business to truckers, it is said, and even basic suppliers are tending to utilize truck shipments. During the past year movement of ammonium nitrate, urea, and other solid nitrogen products by private trucks has increased tremendously.

The number of regularly established fertilizer dealers (grain elevators, feed and seed stores, and cotton gins) maintaining a place of business is declining. "We believe that this decline is caused almost entirely by wildcat and back haul trucking of fertilizer materials of all kinds," said a spokesman for one of the largest basic producers in the South. This practice prevents fertilizer dealers from maintaining an attractive profit margin. It is one of the most serious problems facing the fertilizer industry, he indicated.

#### **Ammonia Surplus Here to Stay**

There is no question but that the nitrogen industry faces serious over-production problems, in view of existing fixed nitrogen capacity and new plants under construction. During the next several years domestic capacity for all forms of nitrogen will exceed by 35 to 50% the most optimistic estimates of combined agricultural and industrial demand. It may take 5 to 10 years before production capacity and demand balance out.

A substantial number of new fixed nitrogen producers have plants under construction or have announced firm plans to build such plants during the next 12 months.

Use of anhydrous ammonia continues to expand faster than other nitrogenous fertilizers, but its growth rate is slowing down. Marketing and distribution facilities have now reached a point where further rapid expansion such as that experienced in the last five years is unlikely. Large basic producers say they expect a continued steady growth in ammonia consumption more closely paralleling general increases in fertilizer usage.

Urea consumption increased strongly during the past few months in the Southwest, more as a result of un-

### **Fertilizer Consumption Declines in the 11 Southern States\***

(Short tons)

State	1952-53	1953-54	1954-55
Alabama	1,252,783	1,179,030	1,117,364
Arkansas	364,465	368,091	330,714
North Carolina	1,869,053	1,822,442	1,791,105
South Carolina	973,021	936,865	915,794
Florida	1,138,735	1,168,122	1,208,923
Georgia	1,367,663	1,346,831	1,272,992
Louisiana	313,982	314,424	310,788
Mississippi	729,149	727,920	645,152
Oklahoma	125,776	130,784	116,789
Tennessee	578,793	523,078	462,984
Texas	546,139	540,124	589,236
Total South	9,259,559	9,057,711	8,761,841
Total U. S.	20,982,134	20,834,934	20,518,180
% of U. S.	44.2	43.5	42.7

\* North Carolina retains its rank as the number one fertilizer consuming state. Other than the four leading southern states, only Indiana, California, and Ohio report sales exceeding 1 million tons. Large cotton producing states in the South have generally shown a consistent decline in fertilizer consumption.

usual sales pressure than by real farmer demand. Sales competition is severe, and urea prices have been very favorable to farmers. Ammonia continued to gain; ammonium nitrate appears to be suffering the most during past months. Whether or not animal feeds are going to become a significant outlet for urea depends mostly on prices of protein supplements.

The outlook for ammonium nitrate is generally good, in spite of what seems to be a temporarily slow movement. If, as expected, all nitrogen materials' consumption should increase during the coming year (greater use is anticipated on pasture land in particular), ammonium nitrate should capture a substantial portion of the expanding market.

#### **DAP Outlook Promising**

Diammonium phosphate has a definitely promising outlook, say even those who consider the experimental information available as limited. They also point to its physical condition as a bar to general acceptance for direct application, but DAP will likely find a major market in mixed fertilizer manufacturing.

The trend toward high-analysis goods will likely continue, but the pace may slacken. Arkansas Agricultural Experiment Station workers currently note a decided movement away from mixed fertilizers in favor of application of individual straight materials. However, as prices become more nearly comparable, this trend should reverse itself. In Georgia, farmers are showing preference for 4-12-12 and 5-10-10 grades, rather than 4-8-6 and 6-8-4 materials, but they aren't rushing for the higher

analysis materials like 14-14-14. Granulated and pelletized fertilizers continue to grow in popularity throughout many areas of the South.

#### **Little Interest in Solutions**

Neutral fertilizer solutions have not as yet been used to any significant extent in Arkansas. Farmer and fertilizer dealer interest has been increasing, but it is still weak. There are no known producers in Arkansas, only one in Oklahoma and Louisiana, and three in Texas. Limited experimental work at the University of Arkansas does not indicate any over-all advantage compared to conventional solid materials and anhydrous ammonia; cost is still a major obstacle.

In the South generally, solutions have not entered strongly except for nitrogen solutions which are being pushed with some success in North and South Carolina. Solutions of more than one nutrient are virtually nonexistent in these states.

Some agricultural workers in the South do not foresee a strong future for urea-formaldehyde fertilizers in general agricultural uses during the next few years, unless the price per unit of nitrogen becomes competitive with urea and ammonium nitrate. The biggest market seems to be in lawn fertilization in urban areas.

Increasing farmer demand may be anticipated for fertilizer-pesticide mixtures. Agricultural workers expect to see the fertilizer industry make a greater effort to meet this demand as pesticide formulations become available which will permit more uniform incorporation into fertilizers. Improvements in formulating and applying equipment should also contribute to a promising outlook.