# Ag and Food Interprets . . .

- **Technical service is the workhorse, but promotions also help sell**
- **Analysis and process control keep fertilizers on grade**
- **About the same as '57 is prediction for farm economy in '58**
- **Use of hydrogen in refining processes does not threaten ammonia**
- **More fats being added to feeds for higher energy rations**

## Sales Promotion For Chemicals

### Technical service is the workhorse, but other methods are frequently helpful

GREATER FARM PRODUCTION today is due in large measure to more and better chemicals now available. But along with these chemicals—fertilizers, weed and brush killers, insecticides—farmers require specific technical know-how to assure best results.

This double-barreled need for chemicals *plus* information is recognized today by most manufacturers of agricultural chemicals, as well as by firms supplying basic raw materials to the agricultural chemicals producers. As Dow Chemical puts it, "Availability is the crux of successful promotion. The finest product made is worthless unless it is widely available to the grower—and accompanied by full use-data."

Today, sales promotion is a vital part of almost any successful industrial operation. In the agricultural chemicals field several distinctive types of promotional activity have already appeared. The most widespread is technical assistance to the user—the farmer. There are several ways to detail instructions for specific needs:

- Direct personal service by technical representatives of the manufacturer, distributor and/or dealer.
- Technical information through media advertising and printed material (data sheets, research reports, case histories).

Monsanto's Spray-Rater, which helps farmer calibrate rate of spray, is a sample of some of the service-type premiums offered by agricultural chemical manufacturers

- Traveling experts (well-known agronomists or researchers who supply information at technical meetings, conferences, farm shows, and extension courses).
- Premiums or "sales gimmicks" (charts, nomographs, and slide rules, for calculating mixing ratios; simple gadgets for measuring chemicals or determining application rates).
- Seasonal "spot advertising" on a local basis (radio, newspapers, and regional publications).

### *Technical Service Favored*

It is generally acknowledged by farm-chemicals manufacturers that the cornerstone of their technical know-how lies in laboratories and experimental farms. Technical service representatives are the prime channels for getting detailed information to the user. In fact, this type of activity appears to be about the only consistent promotional effort for most of the larger companies.

Some of these maintain not only extensive research facilities at "home base," but also field stations scattered over the country. This arrangement permits good coverage of various cropping regions and climatic conditions, thus providing directly useful data for more customers.

The big firms—basically chemical manufacturers—possess more research and development background upon which their technical service representatives can draw. But smaller, regional concerns, using local people for technical liaison, can sometimes provide more intensive personal knowledge of local conditions. Chemical Insecticide Corp., for example, has nine technical service men, each of whom covers his own native area on the eastern seaboard, working with the company's distributors.

Where extensive technical facilities are available, additional services can be performed. For example, Monsanto is offering to blenders and other customers use of its electronic computer for formulating fertilizer analyses to satisfy unusual soil conditions. And Dow has an "agricultural-chemical development" staff to interpret and supplement research data for distributors, dealers, and growers. This group boasts a sizable field force posted over the nation, plus a staff at the head office in Midland, Mich. The staff follows up research work with further field trials, stages demonstrations, conducts liaison with agricultural colleges, collects and interprets use recommendations (it does not merely furnish bald technical data), and serves as a general clearing-house for technical information.

### *"Gimmicks" and Premiums*

The cost of such efforts is high—Dow figures it reinvests 8% of its profits in research and development—but companies providing these services feel them well worth while. They call gimmicks a drain on funds which can be put to better advantage in research and development for the grower's greater long-range benefit. Where they do offer novelty premiums, pressure from unusual competitive or agricultural situations on a local scale is usually the reason.

NBC's farm star, Red Foley, helps Dow Chemical sell agricultural chemicals

There are, however, some "service-type premiums" which seem both functional and practical. For instance, Monsanto has its Spray-Rater, a plastic container which the grower attaches to his spray-rig boom to show how many gallons of liquid mixture the rig is applying per acre. Also, the company is preparing to introduce a Spray-Saver. This will be a calibrated polyethylene container to enable growers to judge exactly the correct amount of spray for various degrees of brush control. Shell Chemical is readying a soil thermometer as a giveaway to users of its soil fumigants.

### *Technical Experts Helpful*

Another way to get vital information across—particularly news of scientific developments which may alter routines or add operations, and thus must be "sold" to the user—is through personal participation of respected experts. Recent awareness of the nematode problem in its several forms has been heightened by a series of "nematology workshops" sponsored throughout the country by Shell. In these sessions, groups of research workers in this field present their latest findings. At the recent two-day meeting in Orlando, for instance, 24 agricultural scientists discussed damage the pests cause and suggested control measures. Attending were more than a thousand Florida farmers, citrus growers, nurserymen, county agents, and technical people from agricultural chemical companies.

In other programs, both Shell and Monsanto have brought Joe M. Bohlen and George M. Beal, Iowa State researchers in rural sociology, before various farm and agricultural groups. The Bohlen and Beal studies, covering the steps through which farmers progress in accepting new ideas, are helping the industry improve its merchandising techniques.

### *Nontechnical Promotion, Too*

For general promotion, Dow sponsors country star Red Foley on his weekly nationwide radio show. This, of course, reaches the general public as well as the farm population. The program offers chiefly entertainment, with little information of specific utility, but the Dow name is publicized satisfyingly.

Practical information tailored to timely local needs is directed specifically to the farmer in newspaper and magazine advertising, spot radio, direct mail, and use-literature. Most firms—large and small, national and regional—utilize these communication channels for direct technical promotion. But they feel that the greatest value at all levels (farmers, dealers, and distributors) is gained by showing actual results in field demonstrations and "plot tests."

"Secondary promotion" is usually covered by manufacturers' sending their research and other technical people to confer with dealers' or distributors' salesmen on specific problems. Dow, however, has moved one step toward a practice long used in other industries: simultaneous regional sales meetings. By leased wire, "head office" ideas are broadcast to widely dispersed groups; following the headquarters broadcast, regional sales managers then get down to local details.

At this level, Monsanto is taking

distributors and dealers in as "partners in profit" on fully integrated sales programs for certain packaged lines. And International Minerals & Chemicals gives customers plush treatment by flying them on plant tours and "fence mending" trips in its own plane.

### *"New Look" in Advertising*

For companies which do little product marketing as such, but concentrate on basic manufacture, considerable effort goes toward selling the idea rather than the specific product. Nitrogen Division of Allied carries a big advertising program promoting merely the use of mixed fertilizer. This company figures that if more mixed fertilizer is sold—not necessarily just its own—it will benefit through higher sales of ammonia and other components to fertilizer makers and formulators.

Many of the bigger advertisers feel that the day of the testimonial advertisement is gone. Much of the advertising in agricultural journals today conveys specific messages and is functional. Says Shell: "It must be based on technical data and must answer a real problem." But being read by farmers, who are individuals, such advertisements "are at the same time consumer ads and have higher-quality layouts than industrial ads."

All agricultural chemicals firms seem to use point-of-purchase promotion. Most use display racks carrying leaflets and other printed matter. Some now personalize their efforts with character creations. Nitrogen Division has its urea-loving "Mike, the Soil Microbe," in cartoon and balloon form. "Sam, the Silent Salesman" is Monsanto's paperboard personality. This life-size, full-color cutout is cheerfully displaying brand-name products and smilingly giving out pamphlets all over the country.

Despite the progress that has been made, sales promotion of agricultural chemicals is still comparatively "primitive" compared with that of other farm products. Monsanto explains that there has historically been too little profit incentive in agricultural chemicals for really hard-hitting promotion. Unit purchases are small and infrequent, compared with those of feeds, fuels, and lubricants, and they are practically insignificant alongside equipment purchases.

Most basic manufacturers, therefore, are seeking improved profit margins through specialty items marketed under their own labels. To establish these will require increasingly productive promotional efforts.

# Fertilizer Grade Tolerances

## Keeping fertilizer on grade, without deficiency or overrun, is task of analysis and process control

Within the past two decades the fertilizer industry has made impressive technological advances. The high analysis, granulated plant food of today is a big improvement over what was available just a few years ago. But process and product upgrading have brought further control problems, some of them as yet unsolved.

Quality control has always been a problem in making fertilizers. However, today it is perhaps a bigger problem than ever before, partly because sampling and analysis methods have not kept pace with development of new processes and products in the plant food industry.

Some analysts, however, while agreeing that mixed fertilizers do present control problems, think that sampling and analysis methods should not take all the blame. The fertilizer itself is also at fault, they maintain, since mixed goods are by nature heterogeneous and tend to segregate.

When present methods of sampling and analysis were developed, formulating a mixed fertilizer was fairly simple. The desired amounts of nitrogen, phosphorus, and potassium salts, all in dry form, were weighed out, mixed, and then bagged. Provided that the scale was accurate and mixing was thorough, the final product was fairly uniform and met the intended analysis.

Today's processes are much more complicated. Chemical reactions are involved rather than just straight mixing. The need to measure materials in both dry and liquid form adds more problems and sources of error.

Uniformity is particularly hard to obtain in a granular fertilizer. Often there is loss of nitrogen through failure of chemical reactions to go to completion, or because the wrong kind of reaction takes place. Recycling fines to get more uniform particle size causes individual pellets to have widely varying compositions, since fines usually have a larger percentage of potassium salt than do larger granules. A sample taken from one part of a stockpile or bag may give an analysis quite different from that of a sample from some other part, even though the production run as a whole meets the desired plant food content.

### *But Is It Serious?*

Just how serious is the quality control problem? Unfortunately, there really is no satisfactory over-all yardstick available to answer this question. But one indication of control effectiveness is the number of violations found by the state control officials who check on fertilizer guarantees.

The general trend of state reports on fertilizer deficiencies shows a steady decline in violations over the years. A state chemist 25 years ago might find 30% of the samples deficient in one or more elements. Today, the figure is quite different, usually

Methods of sampling often take the blame for materials that are not on grade

between 2% and 5%. But even with this marked reduction in deficiencies just about everybody in the industry agrees that the entire area of fertilizer sampling, analysis, and composition needs at least a minor overhaul. One thing the average deficiency figures do not show is that in many cases high-analysis plant foods make up more than their share of total deficiencies. And they fail to show also to what extent manufacturers overformulate to avoid falling below guarantees.

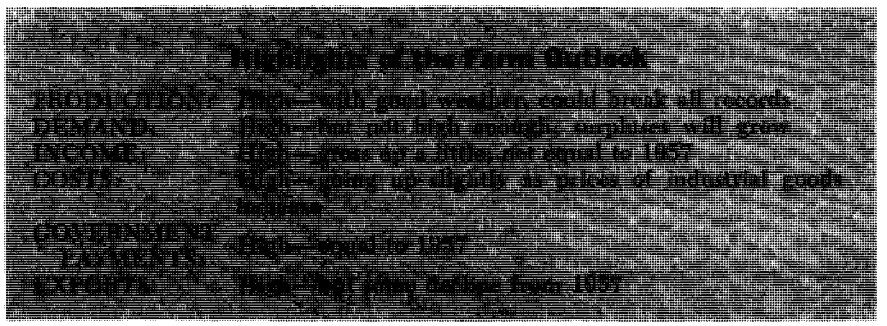
Despite the continuing existence of analytical problems, fertilizer quality control has made some progress in recent years, especially in the area of process control. Making plant foods, a task that was once entirely an art, is now much more nearly a science.

Many new plants, and many old ones, too, use continuous processes equipped with the latest control instruments. Electronic computers, although still quite new to the fertilizer industry, are being pressed into service to handle the many variables involved in picking suitable raw materials and process conditions for successful formulation. One equipment company now offers punched card proportioning that just about does away with human error in batch weighing. With formulations coded on punched cards, the system automatically handles any number of bulk materials through the various stages of weighing, discharge, mixing, and conveying away for bagging.

This year, Spencer and Monsanto set up pilot plants to help their customers with formulating problems. Among the benefits of their programs will be better quality control in making fertilizers. And a number of firms are turning to increased use of statistical analysis methods to improve the effectiveness of their control programs.

### *Best Equipped Firms Had Worst Records*

But as the fertilizer industry makes improvements in sampling, analysis, instrumentation, and materials handling, one incident suggests that perhaps even the steps taken in the direction of progress will bear some "analysis." Control officials in one state investigated the companies that had poor records in meeting guaranteed analyses. Officials were surprised to find that often the companies with the worst records had the best equipment. The conclusion reached was that automatic handling of mixed goods may cause more segregation of components than do less efficient handling methods.




# Farm Outlook—1958

## Farm production is expected to reach another all-time high in 1958; surpluses will also soar

STATISTICAL CURVES that describe the health of U. S. agriculture are beginning to look pretty flat. As the curves level at 1956 highs, economists predict most income and expense factors will continue to move straight across the charts for at least another three years.

So even are these indicators of agricultural activity for the near future that the only two that show rising trends on the charts—production and surpluses—stand out like sore thumbs. The experts say this imbalance between supply and demand, created by continued over-production, will not respond to controls until U. S. population begins to leap or until more food can be sold abroad.

Thus, surpluses seem destined to remain the major problem of U. S. farmers well into the 1960's (AG AND FOOD, February, page 88).

### *Reduce Production or Increase Consumption*

Neither the U. S. farmer nor the Soil Bank has been able to control farm output. Technology continues to push production up. And the Soil Bank has held back production acreage only 5% since 1955—from 354 to 338 million acres.

Now USDA officials, who met recently for the 35th Annual Agricultural Outlook Conference in Washington, say the end of the drought means farm output in 1957 and 1958 will exceed the high of 1956. With fewer acres scheduled for reserves next year, they predict that only the most dismal weather could keep production from breaking all previous records.

Although there is some talk of controls based on quantities instead of acreage, most officials expect little change in government programs in 1958. Neither can they sanction the idea of drastic cuts in production when, before long, the world will need every bit of food it can produce. The only solution to the surplus problem they do accept is increased consumption.

In the long run, they argue, foreign food markets are the most expandable of the outlets that can be opened to U. S. agricultural surpluses. Research into nonfood uses of farm products has thus far produced little hope for large scale outlets as industrial raw materials. Synthetic fibers continue to bite into cotton and wool markets. Similarly, inedible fats and oils are being displaced by petroleum products in detergents, paints, varnishes, and protective coatings.

Faced with this evidence that disposal programs are fighting a losing battle, the Outlook conferees agreed food demands will probably grow to use up surpluses long before sufficient industrial uses are developed. Supporting their conclusion is the fact that exports have been the most effective mover of surpluses to date.

### *Progress through Exports*

The importance of increasing markets abroad, conferees say, dictates U. S. policies conducive to world wide distribution as fast as "have-not" nations can improve their economic status sufficiently to buy more U. S. surplus foods. They emphasize that the U. S. must be ready to offer them food promptly and at prices they can afford.

Some progress in cutting down surpluses through exports was made this year. However, such high rates—$4.7 billion, equal to production from 60 million acres—are not likely to continue in 1958. Since all nations had better farm production in 1957, reduced U. S. exports seem inevitable. Also, signs of scare buying, prompted abroad by political tensions, are not evident today.

Cotton, wheat, and rice surpluses

were reduced by high exports in 1957. Both volume and value of shipments rose 35 to 40% above 1956 figures. Surpluses of these commodities, though, are still large and will increase. In 1958, amounts to be exported appear well above postwar averages, but not as high as this year's.

Soybeans, feed grains, tobacco, livestock, and fruits should move well in foreign markets next year, but surpluses of these commodities also will grow.

Particularly heavy in the agricultural stockpile are feed grains. Sooner or later, USDA officials say, farmers will either have to reduce their output of grains, or feed larger amounts to animals.

Surpluses of grains reached 47 million tons in 1956. Another 10 million tons will be added from 1957 crops. The huge supplies have been depressing prices for several years, and further price declines are slated in 1958–59.

Oversupplies of grains undoubtedly will stimulate farmers to raise more livestock. However, the danger here lies in producing more meat and dairy products than can be sold at a profit.

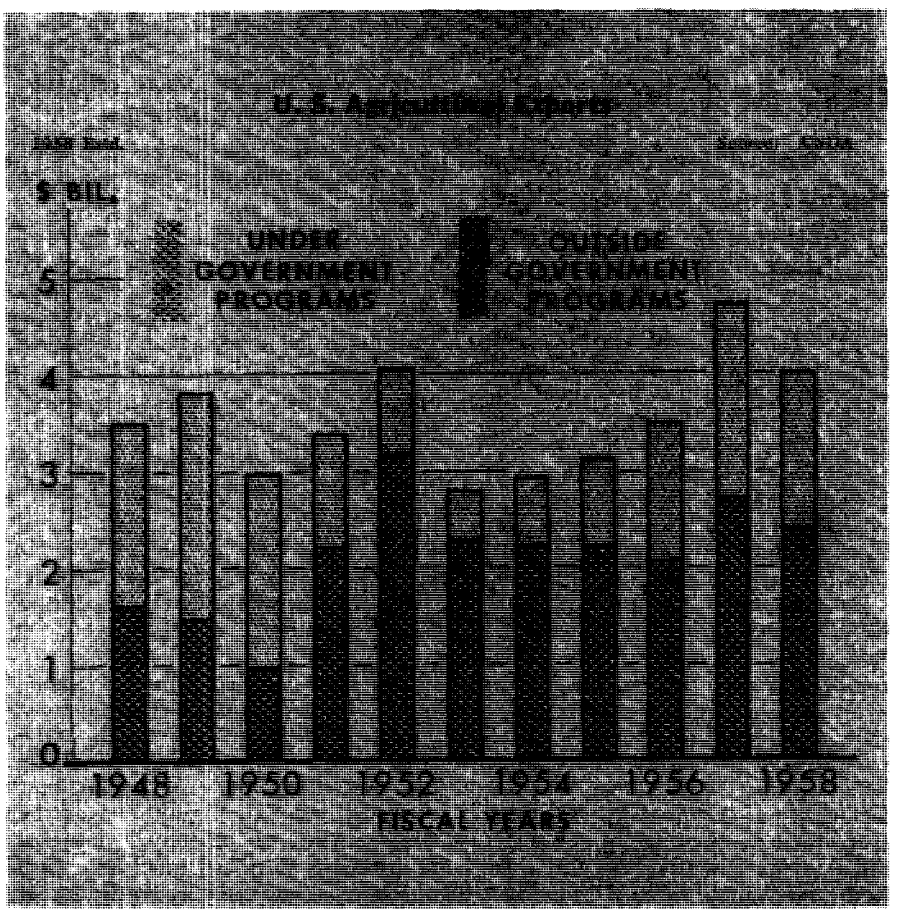
### *Farm Income and Costs*

Farmers' gross income improved somewhat this year over 1956, mostly through high Soil Bank payments which totaled $700 million. Other government payments, including incentives for wool, added another $100 million to receipts. This income, however, was reduced slightly by increased production costs which have been creeping upward since 1953.

Final net income to farmers in 1957 will better that of 1956 by about 2%. Though small, the increase maintains the upswing from declines started in 1952 (Ag and Food, February, page 88). For the first three quarters of this year, net income is reported at an annual rate near $12.1 billion.

Gross income in 1958, the experts say, will rise slightly over that of 1957. Acreage reserve payments from the Soil Bank may be smaller, with conservation reserves increased to keep total Soil Bank payments equal to those of 1957. Net income is expected to remain at about the 1957 level, repeating the 1956–57 performance.

Farms continue to grow in size; farm populations continue to decline. These trends are not likely to change, as many farms are still too small to make best use of modern technology. Value of farms in 1958 also will probably stay high, though a little below 1957 levels.




# Ammonia and the Oil Industry

## Trend to use of hydrogen in basic refining processes is no threat to continued ammonia output

Hydrogen needs in petroleum refining processes are slated to rise sharply in the next few years. Immediately this poses serious questions for agricultural interests: has petroleum company ammonia capacity reached its peak? Will oil firms prefer to divert hydrogen into basic petroleum refinery processes rather than into ammonia production?

No, according to a survey just completed by Ag and Food. Petroleum firms do not intend to abandon or curtail ammonia activity. The petroleum industry has ample raw materials to expand ammonia production, and will undoubtedly do so if demand appears sufficient and ammonia prices are favorable.

### *Petroleum Firms Have 30% of $NH_3$ Capacity*

Today petroleum companies claim roughly 30% of the nation's anhydrous ammonia capacity. True, the ammonia market now suffers from oversupply—and probably will for the next three to five years. Hence, capacity will likely remain static for the near future. But once demand starts to rise, it looks like a safe bet that petroleum firms will add more capacity.

One oil company reasons this way: most petroleum firms that now make ammonia have entered the field in recent years. It is probable that their plans to expand present plants, or add others, have not yet been fully crystallized. Meanwhile, an engineering firm tells Ag and Food, there has been no slackening in ammonia plant bids that could not have been expected on the basis of present ammonia market conditions.

Hydrogen, as ammonia, has a market value of $450 per ton. This is a very desirable price. What is not desirable is to enter the high-inventory agricultural ammonia business (which accounts for most ammonia sales) at a time when established producers are operating at 70% capacity. This means that oil upgrading processes, which present no inventory or sales

problems, are promising outlets for hydrogen—although the gas here has a lower value than in an ammonia plant which operates at capacity.

The major sources of petroleum hydrogen are natural gas, refinery gas, and reformer hydrogen. Recent petroleum company expansions into ammonia manufacture have depended more on natural gas than on the refinery or reformer as a hydrogen source for ammonia. Fuel oil is a possibility for increased attention in the future, since it can be adapted easily to facilities which now use refinery hydrogen or natural gas. Residual coke is another potential source for hydrogen production. On the other hand, refinery hydrogen seems likely to decline as an ammonia raw material.

### *Desulfurization—Major Hydrogen Consumer*

Hydrogen is and will be used in many petroleum refining processes. These include:

- Processes to remove sulfur, nitrogen, and other contaminants from gasoline and other petroleum products
- Processes to saturate olefins
- Hydrocracking processes to convert heavy fractions to lower molecular weight aromatics for gasoline and chemicals.

Desulfurization is now the major hydrogen consumer. Sulfur removal units are being installed in increasing numbers to improve lubricating oil quality and also to make better Diesel and home heating fuels. Increased use of high sulfur crudes in refineries explains the interest in hydrogenation processes. Looking to the future, hydrogen is considered a must if marketable products are ever to be made from oil shale and tar sands.

However, these increased needs for hydrogen are not likely to have any serious effect on ammonia production. There are ample amounts of hydrogen for ammonia manufacture. In many oil companies, one source explains, there is more than enough hydrogen available for both refinery hydrogenations and petrochemical processing.

Therefore, as long as ammonia production provides a means to upgrade a petroleum stock—in this case hydrogen—oil companies will continue to expand into the fertilizer industry. Supply and demand, long range, will be the determining factors—supply and demand in the fertilizer industry, not the petroleum field.

A major advantage of adding fats to feeds is that it cuts down on dusting, which is not only a nuisance but results in loss of material. Here an operator is bagging a feed that contains fat. Note freedom from dust

# Fats in Feeds

## Trend toward higher energy feeds promotes use of increasing percentages of added fats

Use of supplementary fats in animal feeds is relatively new. Yet in the short span of five years, by-product tallows and greases from the meat packing and rendering industries have found a major market in feeds. In 1952, about 10 million pounds of these tallows and greases went into feeds. A year later, the figure had shot up to about 200 million pounds, a 20-fold increase. Estimates for 1957: about 320 million pounds. These are industry figures; lower ones published by the Bureau of Census have been questioned by the trade.

Today, an estimated 50% of all manufactured poultry feeds and 25% of all livestock feeds contain supplementary fat, according to the American Meat Institute Foundation. Usually added to the extent of 2 to 8%, fat offers big advantages. It:

- makes the feed more palatable
- enhances its digestibility
- increases the animal's growth and its weight gain per pound of feed
- reduces the dustiness of the feed (giving, in turn, greater ease in handling in the mill, less loss through dusting, and greater convenience in handling and shipping in bulk)
- improves the feed's appearance, giving it a brighter, richer color
- decreases wear on mixing and handling equipment, through lubricating action
- increases ease of pelleting
- with the help of antioxidants, protects fat-soluble vitamins during feed storage.

The sudden rise in the acceptance of fats in feeds was touched off by a combination of circumstances. One was the mounting surplus of tallows and greases and the resulting low cost of these materials. Another was the development of effective, low-cost antioxidants to retard rancidity. Still another was the growing realization of

the nutritional value of fats in feeds. Studies by the American Meat Institute Foundation, the USDA, and others demonstrated the usefulness of stabilized fats in rations for poultry, dogs, and cattle.

By 1952, the surplus of tallows and greases in this country had reached about 780 million pounds. And this over-supply was increasing. Big reason was the growth of synthetic detergents and the reduction in demand for fats in making soap. Consumption of inedible tallows and greases in soap making had dropped from 1.5 billion pounds in 1947 to 1.1 billion in 1952. Furthermore, by-product fat production was being pushed up by the growing demand for meat.

Faced with rising surpluses, fat producers sought new markets. Fats in feeds looked especially promising. However, an ordinary fat added to a feed may gradually turn rancid, and animals may refuse to eat it. But if rancidity is retarded by an antioxidant, the problem is largely solved.

Today, the antioxidants most widely used in fats for feeds are butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT). These not only prevent rancidity but also help to preserve the vitamin A and carotene in feeds. If stabilized with about 0.01 to 0.02% BHA or BHT, the fat remains fresh for a year or more. An unstabilized fat might turn rancid in a matter of weeks.

The preferred antioxidant depends on the type of fat involved. BHT, for example, effectively retards rancidity in white grease. However, for stabilizing yellow grease, the recommended antioxidant mixture consists of BHA, propyl gallate, and citric acid. For stabilizing animal fat added to alfalfa, the relatively new antioxidant Santoquin shows particular promise.

### Poultry Feeds

Stabilized fats in feeds won their first big acceptance in poultry feeds. One reason is that poultry rations can be much more easily controlled than those of livestock. With chickens, it is much easier to determine whether the fat is really doing any good.

Illinois' Agricultural Experiment Station reports that, when broilers receive feed containing about 7% animal fat, their rate of weight gain is increased by 20%. With this ration, also containing about 25% protein, broilers are able to gain one pound on only 1.93 pounds of feed. Today, the usual level of fat in commercial broiler feeds is about 3%.

USDA scientists report that turkeys gain additional weight per pound of feed on rations containing 8% stabilized fat. The extra growth response may last for six to 10 weeks, depending on the type of turkey. At the end of a 10-week feeding test, broad-breasted white poults receiving feed containing 8% stabilized fat weighed 5.6 pounds after eating only 13.4 pounds of feed. Those receiving feed with no additional fat weighed, on the average, only 5.1 pounds after eating 15.1 pounds of feed. In commercial turkey feeds, fat is usually added to the extent of 4 to 5%.

### Cattle Feeds

Fats are also becoming increasingly popular in feeding cattle. In feeds for beef cattle, usually about 3% fat is added. The animal, as a result, gets about 0.8 to 1.0 pounds of stabilized fat a day.

In studies at Stanford Research Institute, addition of 2.3% tallow to grain feed for cattle resulted in greater weight gain, better feed efficiency, and reduced cost of producing the weight gain. Boosting the percentage of tallow to 4.5% gave a slight increase in feed efficiency, but this benefit was cancelled out by the greater cost, says SRI.

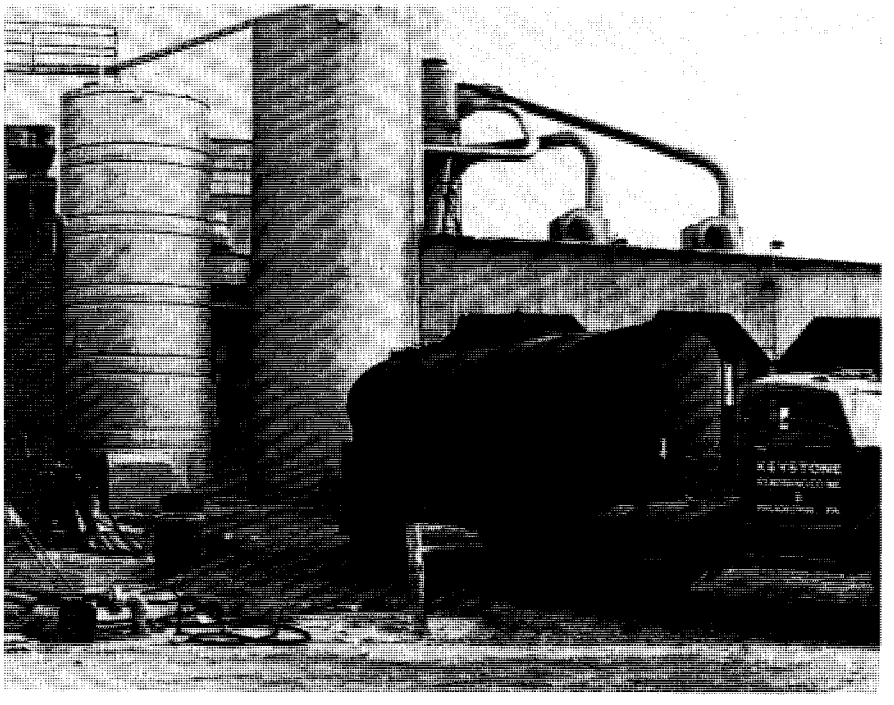
Fat, a high-calorie food, contains about two and a half times as much energy per unit of weight as corn. But whether it is actually practical to replace corn with fat depends on many factors, particularly cost. In general, the cost of fat must be less than three times that of corn to be competitive. One reason why fats in poultry feeds gained quick acceptance in the East and Midwest was the nearness of these areas to major sources of relatively cheap hog fat.

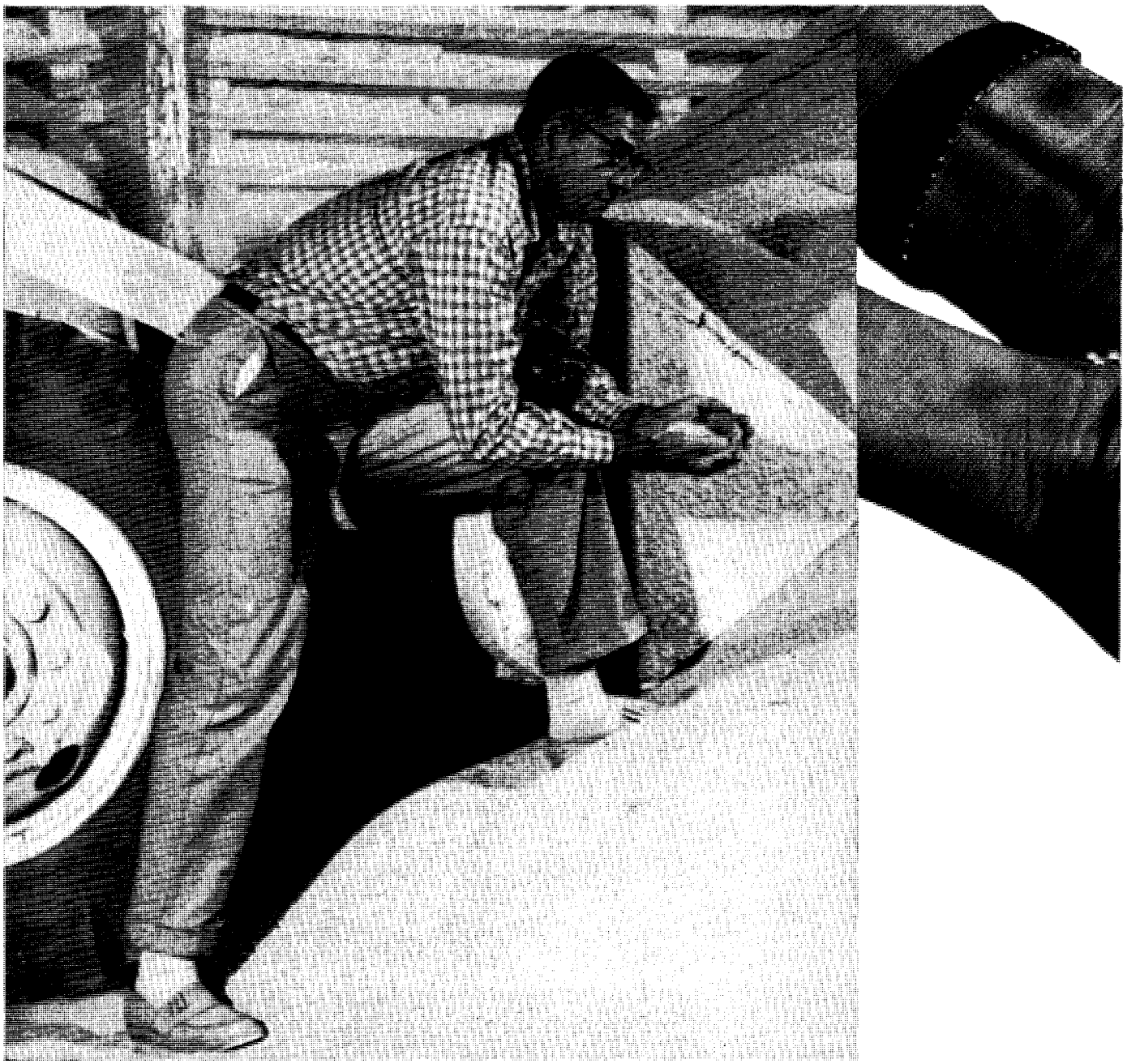
All indications are that the future will see increasing use of fats in feeds. Higher percentages of fats will be added. Particularly among poultry and hogs, the trend is definitely toward the use of higher energy feeds.

Some researchers say that levels up to 18% fat are economical in poultry feeds, although percentages up to only about 10% can readily be handled in existing mixing equipment. Recently, a large commercial feed manufacturer developed a way of pelleting a poultry feed containing 8% added fat. (Formerly, because of excessive softening of the pellets, the upper limit was about 3%.)

Because of increasing meat production and efficient fat recovery, tallows and greases are likely to continue in good supply. Hence expectations are that fats will remain attractively priced, and their use in feeds will continue to grow.

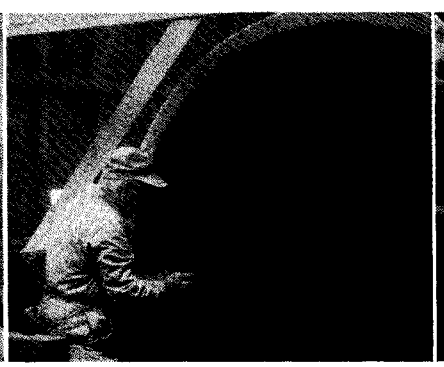
A rendering company's truck unloads fat at a feed mill. Use of fats is becoming increasingly popular in feeds for poultry and cattle





"Step into the pile anywhere," says Don Peterson, General Manager of the Ashkum Fertilizer Company, "and you'll find every handful of Bumper Crop fertilizer a top sample." Strong demand for the company's granular fertilizers in East Central Illinois and West Central Indiana keeps the plant busy the year round.

Plant Superintendent Chuck Durham watches production closely when plant is "on stream." Good materials here make a good product.



A stop at the granulator shows Clint Serene the mix is right. Full-time local residents provide a highly efficient labor force.

Final check shows uniform pellets coming off the belt. Granulation like this holds recycle to a minimum . . . reduces dust problems, too.