Ag and Food Interprets . . .

- U. S. fertilizer exports hang up new record
- Viruses join force with man against insects
- Big volume of antibiotics in feed; plant disease control promising
- Weather data help predict crop maturity, insect and disease attacks
- Private companies offering multiple-peril crop insurance
- Disagreement continues over food additives legislation

Fertilizer Exports

Foreign aid program is factor as nitrogen shipments to Far East hang up a new record. further rise forecast

MOST STRIKING FEATURE of 1955 chemical trade was the expansion in fertilizer material exports, a movement that was still under way during the first two months of the current year. Historically, fertilizer exports in excess of $75 million by the United States in any year is unusual. For the past year such shipments undoubtedly surpassed the $61.9 million total recorded for 1954; possibly the $91.6 million high mark set in 1949.

It is not necessary to delve very deeply to discover the factors responsible for this expansion. Korea, greatly in need of larger food production, was enabled through our foreign aid program to acquire much needed tonnages of nitrogen and phosphate materials. The extent of this assistance through the International Cooperation Administration will be seen in Korea's purchases of some $20 million worth of ammonium sulfate, other nitrogenous products, and superphosphates on two occasions in late 1955, followed by further bids requested by Jan. 12, 1956, for similar materials involving a total of $19.5 million.

Expansion in Potash

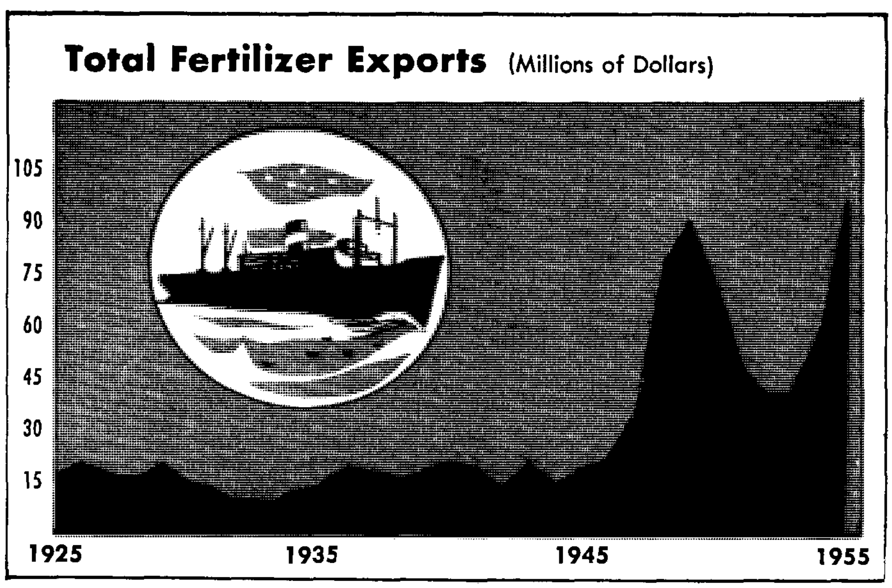
There was an increase last year as well in exports of potash, and this was due, as one large exporter explained, to the entrance of the American producers into the Japanese market. Brazil was a larger buyer of American fertilizers as trade barriers became less restrictive. India continued to import these materials to supplement domestic production, but purchases from nondollar sources obtain preference owing to the high cost of American products. However, Pakistan bought 20,000 tons of ammonium sulfate here for December 1955 shipment. Small amounts went to Central and South America.

Capacity Operations in Steel

The impact of all this has been greatest by far upon ammonium sulfate, stocks of which attained an all-time high point just under 200,000 tons toward the end of 1955 because of capacity operations in the steel industry. This is equivalent to more than two months' production. Ordinarily, surpluses of coke-oven sulfate are not available for export, but in this instance prices acceptable to Korea moved a surplus when it appeared.

Synthetic Sulfate

How much of the Far Eastern business is shared by coke-oven sulfate and the synthetic product is a question which cannot be answered by the export statistics. Both types are included in the shipment totals. A large New York factor in the business says that as a rule the Far East markets for ammonium sulfate are limited to white,



crystalline synthetic material. In the Business and Defense Services Administration in Washington it was thought that, judging from the high production rate for the synthetic ammonium sulfate, the exports have consisted to a large extent of the synthetic material.

From the same quarter the opinion is ventured that the record exports have not alleviated greatly the oversupply situation in the nitrogen product. In discussing the recent Korean government bid, however, the Philadelphia firm of Woodward & Dickerson is quoted in a news story as estimating that major steel producers accounted for 64,000 metric tons of the total 134,000 tons offered by United States sellers. The steel industry's sulfate, of course, is derived from the coke oven.

American Offers

Bids on the Korean requirements last January did not indicate any softening in the market for nitrogen fertilizers, even if the basic capacity for these materials is overbuilt. There were 13 domestic bidders for the Korean business, plus Japan and Canada. Prices ranged on a metric ton basis from $47.025 to $65.20, f.o.b., or on a short ton basis from $41.90 to $58, f.o.b. Japan's offer was higher than most American suppliers at $60.45 per metric ton, f.o.b.

Freight Rates Considered

Our freight rates have to be considered in such comparisons. To Korean ports it is $20 per ton, and half of the tonnage has to be moved in American vessels. German firms were bidders on calcium ammonium nitrate requirements; Japan and one American company made the offer on ammonium nitrate; Germany was the bidder on ammonium sulfate nitrate; while Japan bid for all of the urea business totaling 30,000 tons. The offer on the urea was $123 per metric ton, f.o.b.

American chemical companies were bidders on the triple superphosphate needs totaling 10,000 metric tons maximum, and Japanese and American interests both sought the business in calcium superphosphate involving 30,000 metric tons.

Fertilizer Exports

(January–September, Short Tons)

	1955	1954
Ammonia (anhydrous	33,060	28,272
Ammonium nitrate (fertilizer grade)	37,554	2,405
Ammonium phosphate (fertilizer grades)	65,539	60,133
Ammonium sulfate, coke oven and synthetic)	353,468	149,623
Lime	64,080	50,641
Potash (100% K_2O)	100,421	45,758
Sodium nitrate	9,571	25,045
Superphosphate:		
Normal[a]	35,229	45,309
Concentrated	40,682	18,258

[a] Includes enriched and wet-base goods.
SOURCE: Bureau of the Census, Bureau of Mines.

Future Prospects

The general view almost without exception is that our expanded business in fertilizer exports will continue for an indefinite period, or as long as the foreign aid program remains a basic policy. There is no question, says a market factor, but that India, Korea, Pakistan, Southeast Asia, and the Near East will be increasingly supplied by imports. Our capacity for nitrogen is such that we will have to export substantially for the next two or three years.

The same trade authority says that while European production of nitrogen in increasing, their position is more or less in balance and they have not been as competitive in the world markets as they were two or three years ago.

While the production of phosphatic materials and potassium salts is increasing throughout the world, they are in even better supply balance than nitrogen.

Two circumstances point to increased fertilizer export business in 1956–57: our over-supply position in nitrogen which may remain with us three to five years; and increasing world demands for fertilizer, more or less forcing manufacturers here into the world markets.

The Adverse Factors

A government man's view is that foreign fertilizer markets will be strongly influenced by demands for crops that are normally fertilized, but that over-all world demand does not appear likely to remain as high as in the past. One reason is that an increasing number of countries are becoming self-sufficient. Another is that surpluses are appearing in the crops fertilized. In this connection there are now rice surpluses in most of Asia's rice-exporting countries and this may reduce fertilizer demand for that crop.

Exports of Nitrogenous Fertilizer Materials

(Short Tons)

	1955	1954
January	49,440	25,205
February	97,057	40,160
March	59,568	16,766
April	76,515	13,291
May	48,403	6,966
June	33,511	23,762
July	31,567	24,293
August	40,228	39,477
September	76,340	29,881
October	82,376	20,585
November	86,294	32,820
December	—	45,465

SOURCE: Bureau of the Census.

Anhydrous Not Likely to Take Part in Exports

Owing to the absence of receiving facilities abroad, it is not likely that anhydrous ammonia will have a part in our fertilizer export movement. It is more likely, some believe, that ammonium nitrate will figure more prominently in this business. Only small amounts were shipped in 1954, but the aid program stepped up its exports considerably. It is a cheaper delivered source of nitrogen than ammonium sulfate, and it was introduced to the Korean farmer probably against his preferences. Both ammonium nitrate and urea will find favor there as low-cost nitrogen sources, exporters believe.

European Advantage

Competition at the moment facing American manufacturers abroad is not pronounced, but increased activity can be expected from Europeans as we reach further and further into world markets. Our competitors in South America still maintain the advantage of easy credit terms which they offer to buyers, and which they insure as to risk with their governments. European producers might be more competitive in the Far East right now were it not for the nitrogen supplies they are sending to Communist China. Japan cannot supply the entire Far East because of insufficient plant capacity, and we can assume that these markets will be left to American interests for some time to come.

Virus vs. Insect

Viruses, often a nuisance to man, join forces with him against insects

WHILE LARGE NUMBERS OF SCIENTISTS work to synthesize potent chemicals for the selective destruction of insect pests, a smaller but no less active group is busy on another tack—which might be called nature's route. Some members of this group prefer to pit insect against insect, or insect against arachnid. An increasing number are turning to bacteria, protozoa, fungi, or viruses as the pesticides of choice in certain situations.

Viruses in particular have attracted interest in recent years. The advantages of virus control are several, and they are significant when a highly pathogenic virus is found for a specific insect pest. First, they are effective. A single application of even a dilute virus suspension goes a long way; viruses multiply and are transmitted from one insect to another with great rapidity. Second, and closely related, the cost in many cases is so low as to be almost negligible. In the control of insect outbreaks in forests, in which thousands of square miles may be affected, biological attack may sometimes be the only one economically possible. Third, they are relatively specific, generally having no harmful effect on beneficial insects or other forms of animal life. (A few viruses, however, have been found to attack several closely related insect species.)

The virus diseases are disseminated by spraying infested foliage with an aqueous extract of diseased insect tissues, or in some cases by direct introduction of a virus into a disease-free population. Greatest effectiveness occurs at high host densities, but even in less serious outbreaks a virus may keep insect populations below the level of economic damage.

One of the most successful of all virus control programs has been that initiated in California as a defense against the alfalfa caterpillar. Field tests in 1948–49 at the California Agricultural Experiment Station demonstrated the efficacy of a polyhedrosis virus as a control measure. Subsequent treatment on a commercial scale involved several thousand acres. One major commercial grower scooped up virus-killed caterpillars with a bulldozer, squashed them to get a virus concentrate, and—after diluting—sprayed the suspension to rid 2500 acres of alfalfa caterpillars.

Life size photograph of European pine sawfly larvae killed by a virus sprayed in the pine needles

Great success also has attended efforts in Canada toward virus control of the European spruce sawfly, accidentally introduced from Europe and, by the mid-30's, heavily infesting up to 20,000 square miles of spruce forest in eastern Canada. In the course of efforts to curb the outbreak by importing parasitic insects from Europe, the virus apparently was introduced—also by accident—with shipments of parasites. The Canadian Department of Agriculture encouraged spread of the virus and developed methods of recovering and disseminating it for effective control. In some 18 years of study, no evidence of increasing resistance to the disease has appeared; progeny of spruce sawflies which escape one epizootic of the disease appear as susceptible to the virus as insects of the original population.

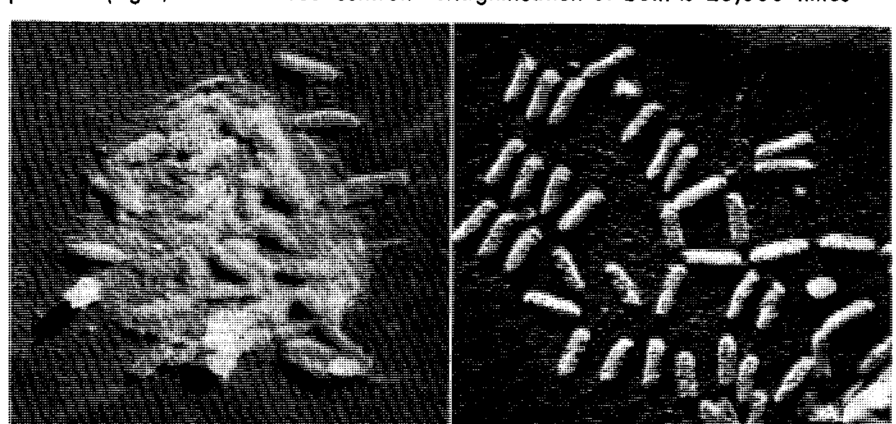
An extremely pathogenic virus for another pest, the European pine sawfly, has given particularly effective biological control in both Canada and the United States. The pine sawfly had entered the United States at about the same time the spruce sawfly invaded Canada, and by 1938 had attained outbreak proportions in New Jersey. It has since spread to Ohio, Michigan, Indiana, Illinois, Iowa, and other states. First reported in Canada in 1939, it had spread by 1949 through most of southwestern Ontario. While virus disease had been one of the chief means of controlling the insect in Europe, no evidence of the disease was found by entomologists in Canada or the United States. Fortunately, Swedish scientists were able to supply virus to the Canadians, who used it successfully and passed it along to the United States.

Early U. S. work with the pine sawfly virus was done in New Jersey in 1951–52 and in Illinois in 1952. In 1953, gratifying results were obtained when the U. S. Forest Service cooperated in applying a small amount of the virus to a sawfly-infested plantation near Bristol, Ind., and in 1954 over 200 acres of plantation pines were virus-sprayed by airplane. Rate of application was one gallon per acre of a spray containing 1 million virus polyhedra per cubic centimeter.

Counts on the 23rd day after application showed mortality rates ranging from 45 to 100%, with an average kill of 89%! (Average infestation in the area had been 132 larvae per tree—sufficient to cause almost complete defoliation in an untreated check area. Defoliation was negligible among the virus-sprayed trees.)

Announcements of effective viruses are beginning to appear with greater frequency. Quite recently, a group in the Agricultural Research Council at Cambridge, England, announced experiments with a virus isolated several years earlier in Switzerland and found to be deadly to the larva of the common clothes moth. It is believed

Electron micrographs of a polyhedron (left) dissolved in weak alkali and virus particles (right) used for insect control. Magnification of both is 25,000 times



capable of eliminating damage by moth larvae when sprayed or dusted into clothing or furnishings. One drawback to virus control of the clothes moth is the small size of the larva; only minute amounts of virus are produced in each larva, and attempts to propagate the virus in a larger insect have so far failed.

USDA Used Virus against Virginia Pine Sawfly

Within the past few months, also, USDA entomologists at Beltsville reported finding a polyhedral virus disease fatal to the Virginia pine sawfly. In a controlled population field trial, a dosage of 5 billion polyhedra per tree gave more than 97% mortality of exposed larvae within two weeks. Good results were obtained also in a larger trial with a natural field population sprayed at the rate of 500 million polyhedra per tree; partial success was obtained in airplane spraying of a three-acre pine stand at 20 million polyhedra per acre.

Cabbage white butterflies are known to be destroyed by two viruses of the granulosis type, and the virus research unit at Cambridge is building up a supply of virus for use against this pest. Caterpillars are being propagated during the winter under artificial lighting and heating; over 8000 larvae had been infected up to mid-December and the virus extracted from them stored for use this spring.

A polyhedrosis virus has been isolated from diseased caterpillars of the wattle bagworm, serious pest of the wattle crop in South Africa, and experiments looking toward virus control are under way. A granulosis virus similar to that affecting caterpillars of the cabbage white butterfly has been isolated from diseased nettle grubs in Ceylon, where tea bushes are subject to grub attack. Field trials are planned for this virus, also.

There is even hope that the American cotton bollworm will succumb to virus disease. USDA scientists at Beltsville have completed field tests with a polyhedrosis of this pest, which —under the name of corn earworm— is also a serious grain pest. Similarly, two polyhedral viruses have been isolated at Cambridge from diseased cotton bollworms sent from Uganda, and control experiments are being arranged with entomologists on the scene in Uganda.

The commercial use of viruses or other biological agents to control insect pests might well mean replacement of at least part of the chemical insecticides growers would otherwise use. The virus hardly poses a threat, however, to the general use of chemical insecticides. A more likely role for virus disease is that of supplementing or complementing chemical control measures. Many insect pathologists are convinced that the basic information already in hand is sufficient to justify commercial interest, and that growers' acceptance of microbial control measures awaits commercial availability of the disease-producing sprays.

Logically such products should be obtainable through the same distribution channels as are chemical insecticides. Are agricultural chemical manufacturers overlooking an opportunity for potential profit?

Farmer's Antibiotics

Big volume going into feed supplements, but use against plant disease, meat spoilage shows promise

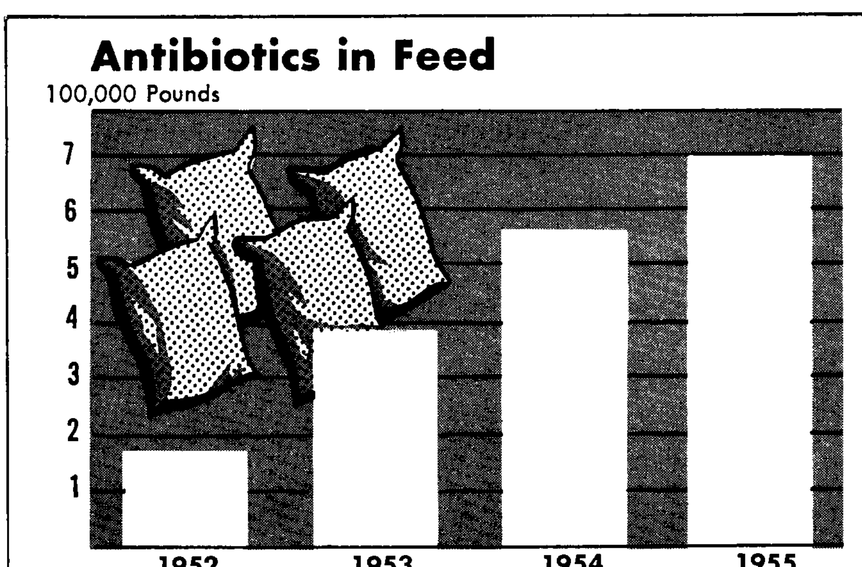
SALES OF ANTIBIOTICS for feed supplements in 1953 amounted to 391,000 pounds; and last year this had jumped to 700,000 pounds—a business amounting to something like $46 million a year. Other outlets for antibiotics in agriculture are developing. Formulations are already on the market for combating certain plant diseases, and the Food and Drug Administration has approved use of chlortetracycline (Aureomycin) to retard spoilage of dressed poultry.

Tests have shown that antibiotic-fed poultry grow 10 to 15% faster and require less feed. Practically all commercial poultry feeds today contain antibiotic supplements. Most commonly used are penicillin, oxytetracycline (terramycin), and chlortetracycline with penicillin most widely used because of its lower price.

Addition of antibiotics to swine feeds results in an average growth increase of 10 to 20% and an increase in feed efficiency of as much as 5%. Oxytetracycline and chlortetracycline are apparently superior to other antibiotics in promoting swine growth, but penicillin is also being used. According to one commercial source, approximately 75% of all swine are receiving antibiotic rations. Oxytetracycline and chlortetracycline have been shown to stimulate growth rate of calves from 10 to 30% during the first 16 weeks of life. Most of the growth improvement appears before the calves are eight weeks old.

Plant disease losses, now costing the American farmer an estimated $2.8 billion annually, may be measurably reduced by use of antibiotics. Antibiotics are the first group of chemical substances offering promise for control of plant bacterial diseases. It is too early and prices are too high to predict wide-scale use in this application but limited commercial testing has been encouraging. Pfizer with Agrimycin, Squibb with Phytomycin, Merck with Agri-Strep, Cyanamid with Acco Streptomycin, and Upjohn with Actidione are pioneering in the field. Eli Lilly has undertaken plant pathology research with an eye to eventual marketing of crop protection products.

Agrimycin contains 15% streptomycin in the sulfate form and 1.5% oxytetracycline as active ingredients. In vitro tests have shown that inclusion of the oxytetracycline prevents or retards development of streptomycin-resistant strains of bacteria. Agri-Strep contains 37% streptomycin sulfate. Phy-



tomycin is a 20% aqueous solution of streptomycin as streptomycin nitrate.

The streptomycin formulations are being recommended principally for plant diseases caused by bacterial agents. Most satisfactory results have been obtained against fire blight to apples and pears, halo blight of beans, bacterial spot of tomatoes and peppers, bacterial rot of potatoes, and wild fire and blue mold of tobacco. As a result of improved disease control, yield increases have been reported after streptomycin-oxytetracycline treatment of tomatoes, peppers, and potatoes. Best response was with tomatoes where increases as much as 50% over untreated plants have been observed.

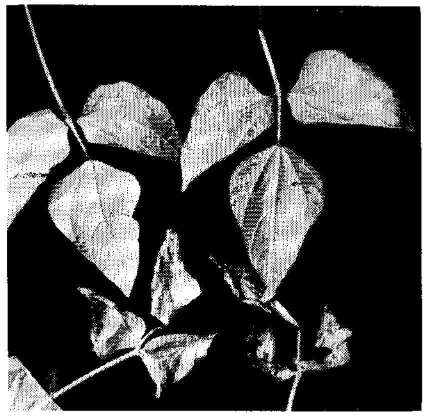
Glycerol Improves Sprays

Work in Merck laboratories last year on bean blight turned up this interesting situation: Addition of 1% glycerol to streptomycin sprays caused several-fold increase in the concentration of nonleachable antibiotic absorbed by the bean leaves. Tomato, pepper, tobacco plants, and quince flowers also absorbed more streptomycin when used in the presence of the small amount of glycerol. Informed opinion now is that other sprays may be improved by addition of glycerol.

Acti-dione, or cycloheximide, is being recommended for control of certain plant fungus diseases. This was the first commercially promising antifungal antibiotic. Actispray (a formulation of Acti-dione) is said to destroy cherry leaf spot fungus even after the organism has been established on the leaf for periods up to 96 hours. The FDA has approved its use on bearing trees up to 4 days before harvest. Distributor of the Acti-dione products is Food Machinery's Niagara Chemical Division.

Recent studies have shown that streptomycin may become an important fungicide in control of many downy mildews and related diseases. Other antifungal antibiotics are showing promise. Squibb's nystatin with its low toxicity is potentially a very important product in this field. And last fall a new antibiotic called fillipin was reported by University of Illinois and Upjohn workers to be active against plant fungi.

Cost is the big factor retarding the use of antibiotics for plant disease control on a wide-scale. As an example, cost of 100 gallons of Agrimycin at 100 p.p.m. (sufficient to spray one acre of a vegetable crop) is approximately $7.20. And Acti-dione for turf disease costs 30 to 40 cents per 1000 square feet per application depending



Additional protection afforded by adding glycerol to streptomycin sprays made the difference between two healthy leaves and two withered ones

on disease being controlled. It takes a good selling job to interest the farmer in expensive crop protection chemicals and yet each year his estimated outlay for fungicides alone is nearly $35 million.

New dust mixtures of streptomycin are said to cut cost of pear and walnut disease control from $50 (for spray treatment) to $5 per acre. University of California Experiment Station workers last summer used pyrophyllite clays as streptomycin carriers and found that in degree of control these dusts compared favorably with wettable form and with copper-lime dust. On fireblight of apples or pears 30 to 40 pounds per acre of the 1000 p.p.m. streptomycin-pyrophyllite dusts in each of four applications during the season is being recommended.

Food May Be Biggest Market

Antibiotics are getting their first foothold in the food preservation field. One company spokesman considers this as one of the biggest nonpharmaceutical outlets for antibiotics in the future. Late last year the Food and Drug Administration for the first time approved the application of an antibiotic to food for human consumption. The FDA approval applied to Cyanamid's Acronize process whereby a formulation of chlortetracycline is used as a poultry dip to retard spoilage. Concentration is low, and all activity is destroyed by cooking.

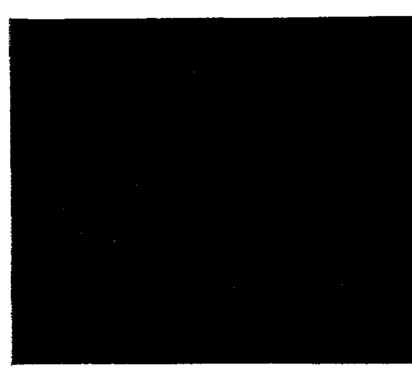
Under a closely supervised franchise arrangement with Cyanamid the antibiotic is being applied by poultry processors at a cost to them of about one-third of a cent per pound. Results have been excellent and poultry so treated retains longer its natural fresh taste and appearance because growth of spoilage bacteria has been stopped or retarded.

Other formulations adaptable to processes and practices in the red meat and fish industries are being developed. An Acronize process for beef is now commercially available in South America. Pfizer people report that oxytetracycline injected prior to slaughter makes it possible to keep pork, beef, and lamb fresh for several days without refrigeration. Pfizer experiments were conducted at a commercial packing house in Cuba.

Few people in the industry believe the market for antibiotic feed supplements is near the saturation point. On the contrary, most are convinced many animals are not yet getting their antibiotic ration; perhaps more important is the feeling that the level of antibiotic content in the feeds may profitably be raised. One experiment station worker points out that use of antibiotic rations for small animals including sheep, rabbits, and mink is virtually an undeveloped field. The same applies to horses.

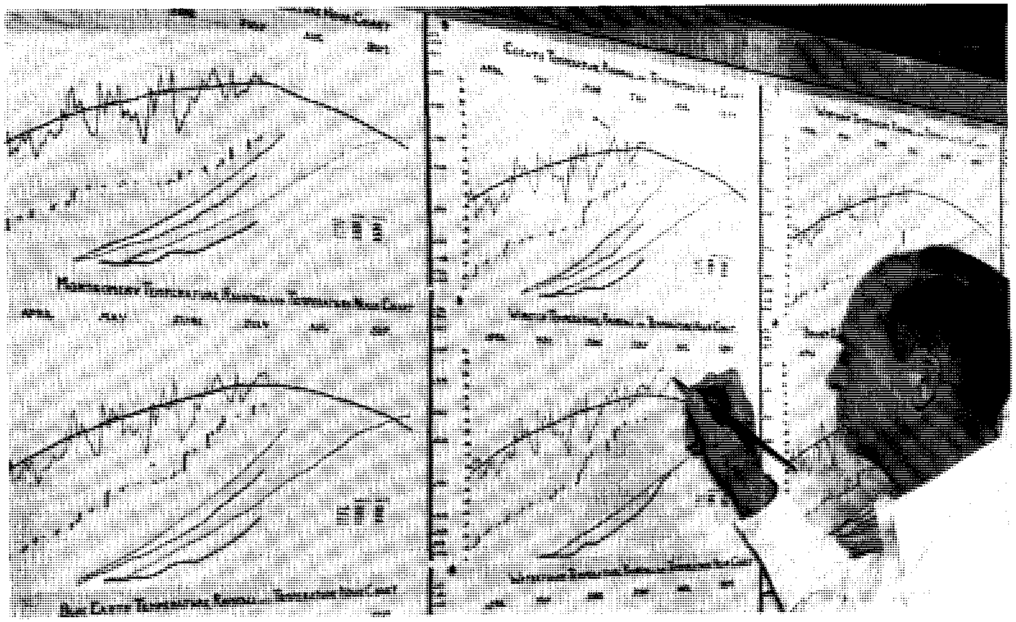
In the plant protection field the potential market is tremendous. One market research department is estimating potential market for chemicals to control existing bacterial disease problems to be $34 million. The antifungal antibiotics have an even larger potential.

Antibiotics will continue to expand in the food preservation field as adequate data are amassed for government approval. Eventually, meat, fish, cheese, and vegetable processors may be big customers for shelf life-extending antibiotic formulations.



MODERN AGRICULTURE is unable as yet either to control weather or to predict it precisely, but it is learning to adapt itself to weather's effects. To date, the most immediately practical work appears to lie in two major fields: predicting harvesting dates and predicting plant insect and disease attacks.

Canners and other crop processors would like particularly to be able to predict how long after planting a crop will be ready to harvest. With such predictions in hand, plantings



Crop processors keep close tabs on weather in producing their raw materials

could be scheduled so as to ensure an uninterrupted, relatively constant flow of raw vegetables to the processing plant, ensuring in turn more efficient plant operation and procurement of labor, containers, and transportation.

Heat Unit System Used to Schedule Planting

One way in which this can be done to a degree—the heat unit system—is used each year in the U. S. to schedule the planting of several hundred thousand acres of peas, sweet corn, and other vegetables. First presaged by the French scientist, Reaumur, in the 1730's, the heat unit system is based on the idea that any given crop accumulates heat units above a certain base line temperature (below which it will not progress toward maturity) and that the number of heat units it needs between planting and maturity is relatively constant and independent of other factors affecting plant growth.

While the heat unit system has variations, the principle can be illustrated by its use on peas as developed by Charles B. Sayre of the New York experiment station. In Sayre's method, the mean temperature for a given day, minus 40° F. (the base temperature for peas), gives the heat units in degree-days accumulated that day by the pea crop at hand. And peas in Sayre's locale, depending on their variety, need roughly 1400 such heat units between planting and maturity. Using long term (10 years or more) average temperatures for the area, this heat unit requirement is translated in advance into the number of days after planting the peas should be ready to harvest.

While the heat unit system has proved a very useful planting tool to crop processors, it seldom gives a precise prediction and can give highly inaccurate predictions. Research aimed at a better method was begun about 1947 by C. W. Thornthwaite at Johns Hopkins Laboratory of Climatology established by Johns Hopkins University and Seabrook Farms at Seabrook, N. J.

Thornthwaite studied water among other things, and found that when soil moisture supply is such that plants can get all they need, their transpiration of water to the air and consumption of carbon dioxide from the air respond in the same way to various climatic factors. He learned also that with optimum soil moisture supply, the water usage of many different plants is essentially the same and depends more on climate than on the type of plant. Finally, it appeared that a plant's water usage is an index of its rate of development.

The upshot was a standard unit representing the amount of development that occurs in a plant when it transpires a unit amount of water. While many questions remain unanswered, this approach has proved more successful than the heat units system for scheduling plantings at Seabrook Farms and has also proved quite useful for scheduling supplementary irrigation. In use for several years now at Seabrook, it has solved many labor and harvesting problems, resulting in a much more efficient farming program.

Weather, Bugs, and Disease

Leading the struggle to correlate plant disease and insect outbreaks with the weather are USDA's Plant Disease Survey and Cooperative Economic Insect Survey (AG AND FOOD, May 1955, page 377). In brief, these agencies use data from the U. S. Weather Bureau and cooperating agricultural agencies to work out plant insect and disease situation reports and predictions which are circulated on a nationwide basis.

On the regional level, J. W. Apple at the University of Wisconsin has used a heat unit system for several years to keep tabs on the corn borer. Beginning in February or March, and using daily mean temperatures and a base of 50° F., degree-days are accumulated and correlated with the various stages of the corn borer's life cycle. Data collected from 1946 through 1951, for example, showed that on the average the first eggs appeared 180 degree-days after the first moths appeared. Such data are used by a dozen or so people in the area who set out light traps to detect night activity of the moths, when the first eggs are laid, and so on. Thus these observers need not watch the corn borer situation closely throughout the critical period which is several weeks long, but only when activity is predicted by the heat unit data to be imminent.

Another example is the prediction of bacterial wilt of sweet corn by a method developed by C. M. Haenseler of Rutgers and N. E. Stevens of USDA. Flea beetles, the principal carriers of this bacterial wilt, survive in large numbers during mild winters, and their degree of survival correlates well with the sum of the mean monthly temperatures during December, January, and February. In New Jersey, if this sum is less than 90, bacterial wilt of sweet corn is not likely to be serious the following summer; if it is more than 100, wilt is very apt to be serious. In March, 1955, following three seasons of severe infestation, the Cornell extension service predicted solely on the basis of this system that wilt in New York would be greatly reduced last summer. The prediction proved absolutely correct. With such predictions available, farmers are in a much better position to consider planting wilt-resistant varieties or to plan chemical spray programs.

Similar work is being done with tobacco blue mold, late blight of potatoes, citrus mites, and others. As in forecasting crop maturity, many questions remain unanswered, but even the relatively meager information available today puts the farmer in a much better position on problems over which he formerly had little or no control. He can now plan certain chemical control programs in advance and thus be fully prepared for the rapid action needed to combat certain plant pests and diseases. On the other hand, he can avoid routine use of chemicals that are wasted if the pest or disease does not materialize.

Crop Insurance

Private firms will offer multiple-peril crop insurance to give farmers greater financial stability

FOR THE FIRST TIME in history, some 15 to 20 major fire insurance companies this year will offer multiple-peril crop insurance to American farmers. This insurance protects growers against severe financial loss should his crops suddenly be hit by drought, flood, insect infestation, plant disease, tornado, hurricane, freeze, frost, excessive heat, and other natural perils.

A very limited form of crop insurance has already been available for some time. In general, however, farmers could only receive crop insurance against fire, hail, or wind damage. Last year, more than 100 companies received a total of over $50 million in premiums for this type of insurance. In the future, an increasing number of these companies will also be providing vastly expanded crop coverage.

Private companies, traditionally opposed to offering this type of high-risk insurance, are now entering the field with considerable caution. To gain necessary actuarial experience, private firms will be providing this multiple-peril insurance in only 52 counties in a total of 7 states, mainly in the West and South. Insurable crops have been restricted to corn, soybeans, and tobacco.

The new private plan runs parallel to that of the U. S. Government, which entered the crop insurance field in 1938 and now provides coverage for 352,973 farmers in 794 counties. In offering multiple-peril crop coverage, private firms will be attempting to attract farmers not already covered by the government program. Only about 25% of the farmers eligible for federal crop insurance are participating in the government program. In their determined selling efforts in the months ahead, private firms are likely to extend considerably the acceptance of crop insurance as a necessary element of farm management.

In some circles, the entry of private firms into this field is viewed as a deliberate move to force the Government out of the crop insurance business, or at least to prevent an expansion of government operations in this area. The Washington administration has clearly encouraged the Government's withdrawal from activities that might otherwise be handled by private concerns. Last October, Secretary of Agriculture Benson told the National Association of Mutual Insurance Companies that, if private firms can step in and do the job, he is entirely in favor of the Government bowing out of the crop insurance field.

General opinion, however, is that the Government is likely to remain in this field for some time to come. It will continue to play a necessary and important role, particularly in insuring the marginal and submarginal farms in sections of the country subjected to recurrent disasters—farms that private firms may refuse to handle because of excessively high risk.

Manufacturers of fertilizers and pesticides are viewing the entire development of crop insurance with keen interest. Anything—insurance included—that will sustain the buying power of farmers is a boost to the sales of agricultural chemicals. This is particularly true in the case of small farmers having little or no financial reserves. Even if the crops of an insured farmer are completely wiped out, he is still assured of enough income to start over again the next year with adequate purchases of seed, fertilizer, and other essentials.

The Government's crop insurance organization has been a consistent supporter of fertilizer and pesticide use, as well as other methods of good crop management. Similarly, private insurance firms are also expected to encourage the use of agricultural chemicals, particularly pesticides, if only to reduce the number of claims for crop damage. The fact that companies will offer crop insurance more cheaply to farmers who are good risks will be a special incentive for growers to reduce losses through proper farm management.

Impact on Agricultural Chemicals

Insurance programs will also encourage the selling of agricultural chemicals on credit. Dealers are much more apt to sell on credit if they know that a farmer's crops and thus his income are protected by insurance. Similarly, banks are more apt to extend loans to farmers adequately covered by insurance.

Early Attempts Prove Disastrous

Actually, all-risk crop insurance is no newcomer to the American scene. Back in 1899, a company offered such insurance and promptly went bankrupt when large numbers of its policyholders were struck by drought. In 1920, another firm made a try at crop insurance, lost $1.7 million in the first year, and likewise went bankrupt. All early U. S. ventures into private all-risk crop insurance failed, mainly because of adverse weather, sharply declining farm prices, inadequate farmer support, and lack of necessary actuarial experience.

In the drought-ridden 1930's, U. S. farmers, particularly wheat growers, suffered a succession of bad years. By the thousands, they were losing their farms and going on relief. A public clamor went up for government action.

In 1938, Congress passed the Federal Crop Insurance Act as part of the Agricultural Adjustment Act. The Government set up a $100 million program that enabled growers to insure their crops against all natural hazards. Recognizing the dangers inherent in its own insurance experiment, the Government chose initially to insure only one crop—wheat. The plan provided that, in the event that a farmer's crop fell below either 50 or 75% of his average yield (depending on the type of policy), the Government would reimburse him for the difference between his actual production and the 50 or 75% level of coverage which he had elected.

Since the Government agreed to protect the grower for only a part of his loss, the first risk was the farmer's own risk. This minimized the possibility that a farmer, if 100% insured, might become careless about the use of good farming practices.

From the outset, government losses ran high. In fact, between 1938 and 1948, the government crop insurance plan lost some $73 million, mainly because of persistent bad weather, severe floods, and the insuring of a large percentage of high-risk farms. Faced with heavy deficits, the government program was temporarily suspended in 1944.

In an effort to make the government insurance program reasonably self-sustaining, it was drastically revised

Crop insurance will help to prevent pocketbook effect of damage such as this suffered by corn from root worm

in 1947. Originally, the plan was set up on a nationwide basis and, at its peak, was in operation in some 2500 counties. In 1947, the number of participating counties was reduced to 375, but by 1952 was increased to 874. As more than one crop program is in effect in some counties, the number of programs has risen since 1953, but the number of counties has fallen to 794.

Also on the increase has been the types of crops insured. Between 1939 and 1942, wheat was the only crop covered. Cotton was added in 1942; flax, corn, and tobacco in 1945; edible beans and multiple crops in 1948; citrus fruits in 1951; soybeans in 1955; and barley in 1956.

The Government and private companies believe that, through education and aggressive selling, farmers can be convinced of the importance of crop insurance. In the future, they say, farmers will no more think of planting a crop without insuring it than they now think of driving a car without accident insurance or owning a house without fire insurance. Insured farmers—no longer fearful that drought, windstorm, flood, or other perils may bring financial ruin—are not only more economically stable but are also better customers of agricultural chemicals.

U. S. Government Crop Insurance

Year	No. of Insured Producers	No. of County Programs
1948	169,129	374
1949	165,076	394
1950	306,685	624
1951	343,210	810
1952	340,686	874
1953	418,638	922
1954	368,236	884
1955	352,973	888

Food Additive Legislation

Compromise seen to have small chance of passing this session

With the 84th Congress well into its second session, the question of legislation to regulate chemical additives to food products comes up again. In the first session of this Congress, several measures were proposed, differing most sharply over the extent of the powers to be given FDA.

The approach to this question proposed by the Government would give FDA what amounts to virtually absolute control over what ingredients may be added to food, because the regulatory authority is not keyed to safety, nor is the appeal procedure regarded as being of practical value.

The injunctive approach, originally recommended by a large segment of the chemical industry and many food processors, would require a manufacturer to inform FDA that it intends to market an additive, and submit pretest data to FDA. If FDA is not satisfied that the product is safe, it must so notify the manufacturer, but the manufacturer may sell it after notice to FDA. However, FDA could then go to court and petition for an injunction and temporary restraining order against the manufacturer.

The unresolved disagreement over the two approaches was the status of food additives legislation as Congress adjourned last summer.

An attempt at compromise between these two positions was made in two identical bills introduced in January by Congressman Priest (D.–Tenn.) and Congressman O'Hara (R.–Minn.). Chief feature of this proposal is that manufacturers whose request for approval has been turned down by FDA can institute court action asking for a declaratory judgment. The characteristic that distinguishes a declaratory judgment from other judgments is that in case of an actual controversy the court will decide upon the rights of the parties, where as the function of the ordinary judgment is to provide a remedy after the right has in fact been breached. At hearings held last month, Judge Biggs of the federal circuit court in Wilmington, Del., representing the Judicial Conference, expressed opposition to this feature, explaining that such a procedure would overload the courts. In general, tbe courts do not like to be called upon to decide matters which already have been assigned to an existing and competent administrative authority.

It is thought by many that the courts' opposition to the declaratory judgment feature of the proposed legislation has effectively killed its chance of passing. This raises the possibility that some groups which now support it or the bills adhering to the injunction procedure, seeing no other alternative, will transfer their support to the licensing-power bills.

But the question of licensing or injunction is not the only nor the main issue in dispute. There are the questions of defining a new additive, the ad hoc advisory committees, and the grandfather clause (which would provide that the status of those additives already approved and in use not be affected unless in fact unsafe).

Closely tied in with the question of procedure is the matter of scientific advisory committees, a device included in the Miller Pesticides Amendment and invoked once since it has been in force. Bernard L. Oser, director of Food Research Laboratories, and a member of the first committee called in under the Miller Amendment, recently filed with the House committee a statement supporting scientific advisory committees. Dr. Oser favors advisory committees, because, he says, objectivity is further assured by the fact that the scientist members of the committee are exposed to the judgment of their "scientific peers." The scientific committee, argued Dr. Oser, does not supersede FDA authority nor relieve it of ultimate authority, but it does give FDA "moral support" and relieve embarrassment should a ruling later have to be reversed because of new facts. Dr. Oser also submits the argument that "a group of scientists is better able to understand and assess technical data and to judge the credibility of scientific witnesses than are juries of laymen or even judges, however distinguished they may be in their juristic capacity."

Commissioner Larrick of FDA has stated publicly that FDA will use the advisory committee approach whether or not such a provision is specifically written into the law. However, this does not satisfy proponents of the committee, because under such a procedure the committee members could be anonymous and their views would not become a matter of public record.