plaint against the chemical industry. It was made to emphasize the extent of problems growing out of a shortage of technically trained agricultural specialists.

The chemical industry, in recruiting the annually increasing number of agronomists, plant pathologists, entomologists, and related scientists it needs, does not feel the shortage so acutely as it does the shortage of chemists and chemical engineers, because it can usually get its pick. But the shortage then shows up in other phases of agriculture. And it is in these other phases of agriculture that manufacturers of fertilizers, pesticides, and feed supplements will eventually suffer the effects of shortage.

The use of chemicals in agriculture will suffer if experiment station, extension, and educational activities are hampered by lack of scientific specialists. Chemical companies in the agricultural field depend heavily on experiment stations, not only for fundamental research, but also for important work of translating advances in science into practice. Extension services are in key positions of influence.

The Association of Land-Grant Colleges and Universities estimates that 15,000 new graduates with land-grant college agricultural education are needed each year. There are only 8500 Of the 15,000 needed, 3000 are needed by industry. This includes the machinery and equipment, food processing, feed, and dairy industries, in addition to the fertilizer and pesticide industries.

Another 3000 are needed for education—also of vital importance to any industry selling to agriculture. Nonindustrial research could use 1000 agricultural graduates, and the remaining demand is distributed among agricultural business (nonmanufacturing), conservation, services, communications, and of course, farming. All of these play a part in advancing scientific agriculture.

Chemical Companies Offer Much

It is not too difficult to see why the chemical industry often has first choice from each year's crop of agricultural graduates. To an able, ambitious young man, a position with a chemical company offers a higher starting salary and better opportunities for advancement than most other jobs.

Generally, chemical companies hire agricultural graduates for either sales or research, but some, like International Minerals & Chemical, also employ agricultural engineers, and sometimes agronomists (also chemical engineers) as fertilizer plant superintendents.

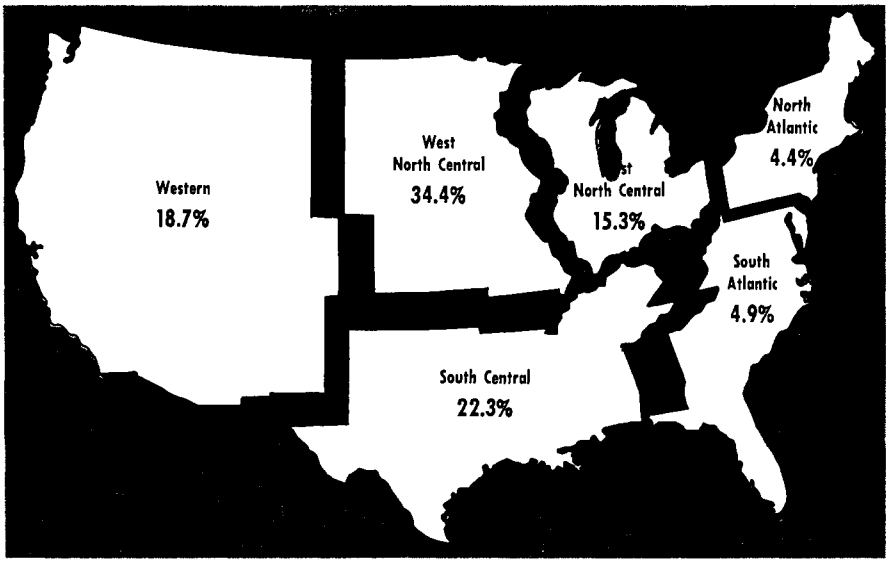
In most chemical companies starting salaries are slightly lower for agricultural graduates than for chemical engineers. Although restriction of experience to agricultural science may retard promotion to the very top posts in a chemical company's research organization it has an advantage for advancement in sales departments of fertilizer and agricultural chemical makers. Here the agricultural graduate is at least on an equal footing with chemical graduates—and may be in a more favorable position.

Not all agricultural graduates would be happy working for a chemical company. Many of them get a satisfaction from teaching, experiment station, or extension jobs. Then too, many hope some day to have their own farms.

More Students Must Be Encouraged

It is to industry's interest to help more students to get agricultural education at college. A number of fertilizer and pesticide companies already offer financial aid to students through scholarships, but most go to graduate students. There is a big need to encourage more high school students in agriculture at the universities. Then too, many undergraduates marry and leave college. Scholarships would make it easier for them to continue.

The agricultural sciences must compete with other fields for students. One midwestern professor of soils says: "With the great diversity of subjects now presented in high schools, it is easy for even the brilliant to slide into some of the less difficult courses than it is to take the mathematics and physical science courses necessary to prepare him for technical work in agriculture. Also, the great amount of publicity about agricultural surpluses has probably led a number of young people to believe too much has already been done in improving agriculture. More publicity about possible food shortages in the future might help interest more young people in scientific agriculture."



National production of cattle and calves on a live weight basis by regions

Geography of Meat Packing

Slaughtering centers grow near areas of high population and stock production

THE GRADUAL but consistent western movement of the meat packing industry, dramatized by Wilson & Co.'s recent announcement that it is discontinuing Chicago slaughtering operations, also focuses attention on the growth of medium and small sized independent meat processors since World War II. An important reason for the shift—to establish operations in a more advantageous geographical location—is one of the primary reasons why smaller operators are enjoying rapid growth.

By transferring its slaughtering activities to other Midwest locations, Wilson hopes to benefit from:

- A growing western population.
- Savings in mounting transportation costs.
- Ability of more farmers to truck livestock instead of depending on railroads.
- Smaller financial outlay by expansion of facilities in Iowa, Minnesota, and Nebraska, compared with the huge investment necessary to rehabilitate old facilities in Chicago.

Growth of the independent operators and the geographical shift of some of the majors, even before Wilson's decision, put slaughtering centers like Omaha in high livestock producing areas. Accord-

ing to USDA figures, the nation's first ranking grazing and pasture area is in the Great Plains States. In 1954, the belt running southward from North Dakota to Texas had 28% of the nation's cattle, 27% of the sheep, and 12% of the hogs.

Demand Grows in South and West

Production of livestock in southern areas is rising at a faster rate than anywhere else in the country, resulting in an increase in packing operations in the region. Cattle grown in the South Central states are usually slaughtered and sold locally. A growing demand for better quality beef in the area has forced some of the feeder stock that used to go North to stay on home grounds, and only a little is shipped to the West. The South and Southeast have developed more productive pastures and better adaptive cattle, and large acreages of cropland have been shifted to grassland.

Cash receipts from farm marketing of cattle and calves in the Middle South have increased 700% since 1925, compared with a national increase of 290% for the same period. At the start of this year, more than 5.3 million head of cattle were on Middle South farms, or 5.6% of the entire total in the United States. The number of cattle on farms there has increased 101%, almost twice the national average increase. An even larger rise was registered in production pounds of cattle and calves—up 154% compared with the national increase of 81%.

Pacific Packers Unable to Keep Up with Population

On the Pacific coast, a growing cattle industry has been unable to keep up with an even faster growing population. Last year, the region had 10% of the population, but only 6% of the nation's cattle. Packing operations in the West are also performed mostly by local companies. The top 10 packers of the United States do approximately 70% of the meat business east of the Rockies, and the independents have about 30%. On the West coast, these figures are reversed, although most of the majors have some facilities in the area. Los Angeles is one of the biggest beef and lamb slaughtering centers in the country. Almost every town of significant size in the West has at least one meat packing plant, the result of the way the meat packing industry grew in the western regions. Small packers began operation in isolated sections, compared to Chicago packers who are at the center of an extensive transportation system.

Livestock for slaughter in California is mostly shipped in from out of state, some from as far east as Omaha. One half of the cattle, sheep, and lambs are produced elsewhere, and 85% of the hogs are grown outside of state boundaries. The reason for the extensive importation is that California growers make more money growing crops than they would raising grain to feed stock.

Industrial shifting or expansion in the western areas will not affect wholesale and retail meat prices to any extent, because of the low profit margins in meat packing and the high percentage of cost going for transportation, labor, and middle-man expenses. Currently, meat slaughtered in the Midwest sells at about the same price in California as meat slaughtered on the Pacific coast.

East Has Big Deficit

The shift of the meat packing industry, together with growth of local independent processors, does not herald an end to the firm hold that the Chicago area has on the industry. Although losing some of the edge it had over other slaughtering centers for years, Chicago is assuming growing importance as a funnel for eastern markets. As far as receipts are concerned, any losses due to production switches like Wilson's are largely offset by increases in sales to the East. The Northeastern states are the big deficit into which meat pours, chiefly from the Midwest. With 28% of the population and an above average income per person, the stretch from Maryland to Maine has less than 10% of the country's lifestock.

Chicago's butchering reputation will probably be maintained for a long time, thanks to the Eastern market, and the Midwestern Corn Belt with its resulting high hog production. The eight states from Ohio to Minnesota produce three fifths of the nation's corn crop and about 69% of all the hogs. Chicago's stockyards led the nation's market for total hog receipts in the first seven months of 1955, and its rate of gain topped its competitors. Cattle slaughter at Omaha topped Chicago by about 200,000, but the Nebraska center ran second in hog slaughter by at least 370,000. Because of the city's continuing importance as a livestock market, Armour is spending $10 million to modernize its Chicago facilities.

Little Effect on By-Products

Changes in geographical locations of livestock slaughtering centers will probably not have much of an effect on by-product manufacture. Hides are the most important by-product, and most of the tanneries are in the East. With hides, fats, and glands for medicinal purposes, freight costs are of secondary importance.

Safety Progress

Fertilizer industry prescribes surgery for thorn in its side—an unenviable safety record

IT HAS BEEN SAID that blame for the fertilizer industry's unimpressive safety record rests not with the workers, who are generally the accident victims, but with management. Strong statements pointing to management's lack of interest and know-how in safety and even accusing some administrators of irresponsibility are still heard.

While the latter attitude is by no means typical, there is an element of truth in the statement. Because the fertilizer industry includes many relatively small plants, often family-owned and -supervised, systematic safety programs of broad scope have been slow to evolve and in some sections of the industry have still not appeared. Adding to the problem of insufficient management interest are the seasonal nature of the business, calling for rush operation during a few months, and the relatively unskilled—definitely unschooled—labor available.

This is the dark side of the picture. Fortunately, the industry's safety record has become a matter of great concern to many persons connected with fertilizer manufacture, and through both individual and concerted effort they are bringing safety-consciousness into the fertilizer plant.

Results of their efforts have been encouraging over-all, and in some instances have been spectacular. A special industry-wide safety program inaugurated by the North Carolina State Department of Labor, for example, led to a 47% reduction in on-the-job accidents in the state's fertilizer industry during a two-year drive completed in 1954.

Lending strong support to the North Carolina drive was the fertilizer section of the National Safety Council. Existent as an independent section of the council for only three years, the fertilizer section is one of the fastest-growing in the council, and has already moved near the top in membership. The section's growth reflects a powerful drive to arouse greater interest in safety and in the council's work—with its ultimate goal the elimination of all preventable accidents.

The section this year launched the "three-year plan," a step-by-step outline of attainable objectives designed for accomplishment over a three-year period. The goal for 1955 is a reduction of at least 10% in frequency rate and 20% in