U. S. Department of Commerce
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Bureau of the Census
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United States Census of Agriculture: 1954

Volume III
SPECIAL REPORTS

Part 7

Popular Report—The American Farmer in 1954

Prepared under the supervision of
RAY HURLEY
Chief, Agriculture Division

FARMERS • STATUS • BROAD CHARACTERISTICS •

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PREFACE

Volume III, Special Reports, comprises a group of special studies and compilations based upon the results of the 1954 Census of Agriculture and related surveys. Part 7, Popular Report—The American Farmer in 1954, presents some aspects of present-day American agriculture that do not seem to be so widely understood, and gives an account of some of the changes that have brought agriculture where it is today. It is intended to be a general, easy-to-read, nonstatistical publication on the status and broad characteristics of United States farmers.

The material for this report comes mainly from the United States Census, including the 1954 Census of Agriculture. Most of the photographs were supplied by the United States Department of Agriculture. The planning, compilation of statistics, and the preparation of publications of the 1954 Census of Agriculture were under the supervision of Ray Hurley, Chief, Agriculture Division, Bureau of the Census. This report was prepared principally by Gove Hambidge.

DECEMBER 1956.

UNITED STATES CENSUS OF AGRICULTURE: 1954

REPORTS

Volume I.—Counties and State Economic Areas. Statistics for counties include number of farms, acreage, value, and farm operators; farms by color and tenure of operator; facilities and equipment; use of commercial fertilizer; farm labor; farm expenditures; livestock and livestock products; specified crops harvested; farms classified by type of farm and by economic class; and value of products sold by source.

Data for State economic areas include farms and farm characteristics by tenure of operator, by type of farm, and by economic class. Volume I is published in 33 parts.

Volume II.—General Report. Statistics by Subjects, United States Census of Agriculture, 1954. Summary data and analyses of the data for States, for Geographic Divisions, and for the United States by subjects.

Volume III.—Special Reports

Part 1.—Multiple-Unit Operations. This report will be similar to Part 2 of Volume V of the reports for the 1950 Census of Agriculture. It will present statistics for approximately 900 counties and State economic areas in 12 Southern States and Missouri for the number and characteristics of multiple-unit operations and farms in multiple units.

Part 2.—Ranking Agricultural Counties. This special report will present statistics for selected items of inventory and agricultural production for the leading counties in the United States.

Part 3.—Alaska, Hawaii, Puerto Rico, District of Columbia, and U. S. Possessions. These areas were not included in the 1954 Census of Agriculture. The available current data from various Government sources will be compiled and published in this report.

Part 4.—Agriculture, 1954, a Graphic Summary. This report will present graphically some of the significant facts regarding agriculture and agricultural production as revealed by the 1954 Census of Agriculture.

Part 5.—Farm-Mortgage Debt. This will be a cooperative study by the Agricultural Research Service of the U. S. Department of Agriculture and the Bureau of the Census. It will present, by States, data based on the 1954 Census of Agriculture and a special mail survey conducted in January 1956, on the number of mortgaged farms, the amount of mortgage debt, and the amount of debt held by principal lending agencies.

Part 6.—Irrigation in Humid Areas. This cooperative report by the Agricultural Research Service of the U. S. Department of Agriculture and the Bureau of the Census will present data obtained by a mail survey of operators of irrigated farms in 28 States on the source of water, method of applying water, number of pumps used, acres of crops irrigated in 1954 and 1955, the number of times each crop was irrigated, and the cost of irrigation equipment and the irrigation system.

Part 7.—Popular Report—The American Farmer in 1954. This report is planned to be a general, easy-to-read publication for the general public on the status and broad characteristics of United States agriculture. It will seek to delineate such aspects of agriculture as the geographic distribution and differences by size of farm for such items as farm acreage, principal crops, and important kinds of livestock, farm facilities, farm equipment, use of fertilizer, soil conservation practices, farm tenure, and farm income.

Part 8.—Size of Operation by Type of Farm. This will be a cooperative special report to be prepared in cooperation with the Agricultural Research Service of the U. S. Department of Agriculture. This report will contain data for 119 economic subregions (essentially general type-of-farming areas) showing the general characteristics for each type of farm by economic class. It will provide data for a current analysis of the differences that exist among groups of farms of the same type. It will furnish statistical basis for a realistic examination of production of such commodities as wheat, cotton, and dairy products in connection with actual or proposed governmental policies and programs.

Part 9.—Farmers and Farm Production in the United States. The purpose of this report is to present an analysis of the characteristics of farmers and farm production for the most important types of farms as shown by data for the 1954 Census of Agriculture. The analysis deals with the relative importance, pattern of resource use, some measures of efficiency, and problems of adjustment and change for the principal types of farms. The report was prepared in cooperation with the Agricultural Research Service of the U. S. Department of Agriculture.

The list of chapters (published separately only) and title for each chapter are as follows:

Chapter I—*Wheat Producers and Wheat Production*
II—*Cotton Producers and Cotton Production*
III—*Tobacco and Peanut Producers and Production*
IV—*Poultry Producers and Poultry Production*
V—*Dairy Producers and Dairy Production*
VI—*Western Stock Ranches and Livestock Farms*
VII—*Cash-Grain and Livestock Producers in the Corn Belt*
VIII—*Part-Time Farming*
IX—*Agricultural Producers and Production in the United States—A General View*

Part 10.—Use of Fertilizer and Lime. The purpose of this report is to present in one publication most of the detailed data compiled for the 1954 Census of Agriculture regarding the use of fertilizer and lime. The report presents data for counties, State economic areas, and generalized type-of-farming areas regarding the quantity used, acreage on which used, and expenditures for fertilizer and lime. The Agricultural Research Service cooperated with the Bureau of the Census in the preparation of this report.

Part 11.—Farmers' Expenditures. This report presents detailed data on expenditures for a large number of items used for farm production in 1955, and on the living expenditures of farm operators' families. The data were collected and compiled cooperatively by the Agricultural Marketing Service of the U. S. Department of Agriculture and the Bureau of the Census.

Part 12.—Methods and Procedures. This report contains an outline and a description of the methods and procedures used in taking and compiling the 1954 Census of Agriculture.

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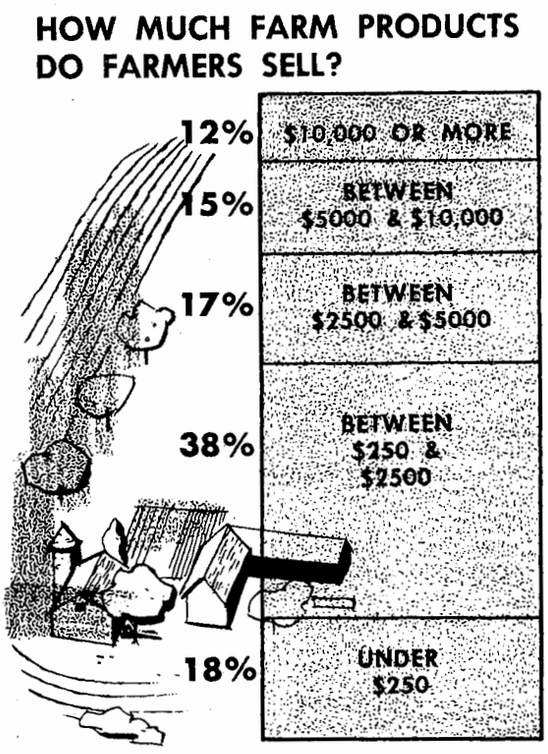
POPULAR REPORT—THE AMERICAN FARMER IN 1954

GOVE HAMBIDGE

INTRODUCTION

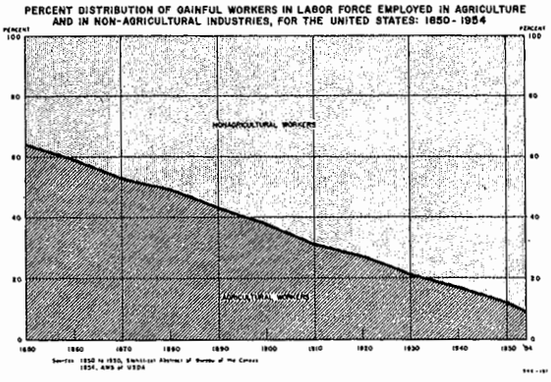
Farms and farmers differ



The 4.7 million Census farms in the United States include an immense range in the different kinds and sizes of farms operating under a very wide range of economic and social conditions. Some farms are only 1 acre in size; others have a physical plant containing as much as 100,000 acres; some have annual sales of $200; others have Paul Bunyan operations with sales of as much as $1 million; some are small enterprises operated by farmers who work at nonfarm jobs; others provide full-time employment for the farmer, his family, and hired employees; some are farms devoted to the production of a single product; others are devoted to the production of a number of important farm products; some farmers control resources with a value of only a few thousands of dollars; others manage resources totaling more than a million dollars. Moreover, the operators of our 4.7 million farms and their families represent individual human beings, all differing in their abilities, experiences, ambitions, strivings, and problems.

The Census of Agriculture provides numerous and detailed summaries of cold facts indicating the differences and likenesses of our millions of farms and farmers. The purpose of this booklet is to give life and warmth to these Census agricultural facts by describing eight farmers and farms. These descriptions, based on the millions of cold facts drawn from a nationwide Census, do not relate to any actual, individual farmer or existing farm. There are tens of thousands of farmers and farms that differ from those described.

The farmer's place in the world.



Farmers and farming have a place in the world that is very special. (Other occupants of that special place are those who harvest fish from the sea.) The stone, steel, and other materials that make our cities, railroads, highways, ships, airplanes, and automobiles are all important in this civilization of ours. The energy from electricity, coal, oil, and gasoline required to run our factories and our means of transport are likewise important. But more important than all of these is life itself—the life of the human beings who create the civilization and for whom its material and spiritual values exist. Life too requires fuel for its fires. The fuel is provided by food, which also furnishes a long array of complex substances needed to maintain the extraordinary mechanism of our bodies and minds—a mechanism far more marvelous and intricate than any atomic pile.

To obtain this energy and these substances, each of us consumes on the average some 1,528 pounds of food a year, or a little over four pounds a day, day in and day out. With the United States population now about 170 million this means that as a people we require some 250 billion pounds of food a year. It is provided for us by those who harvest the crops from the soil and the sea. Their place is truly a special one; they are the maintainers of life.

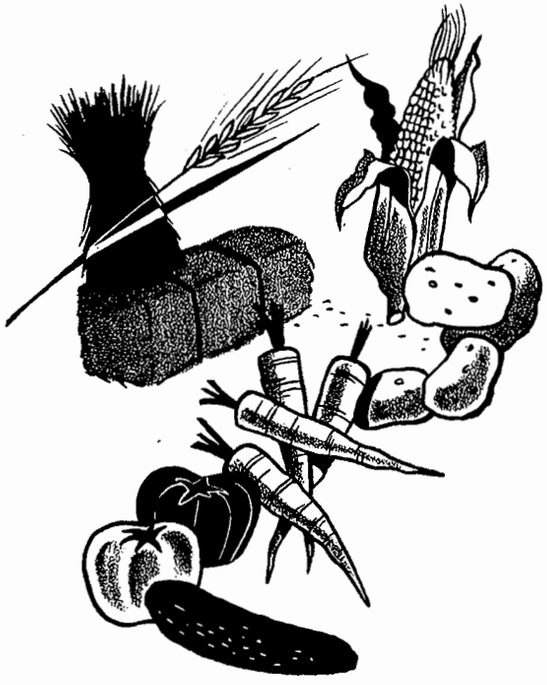
Their place has not diminished in significance in our modern economy, but it has diminished a great deal in magnitude. Anyone in the United States now over the age of 65 or 70 has lived during a period when almost every other person was a farmer. At the turn of the century, half the population was tied to the land to produce food for themselves and the other half working in other pursuits. Within the lifetime of many of us, that proportion has gradually been reduced, decade by decade, until now the farm population is about one-eighth of the total; and in 1954 only 8.5 million agricultural workers were required to produce the food supply for 164 million people.

Farming is not what it used to be.

This is as it should be. These workers had to be released from farming to do all the other things that make modern civilization possible.

So radically and rapidly has agriculture changed even within a single lifetime that it is difficult for us to realize what has happened. Farming obviously is not what it used to be, yet few people are more than vaguely aware of the nature and the extent of the transformation. We still tend to think of it in terms that no longer apply to modern conditions.

These are stubborn problems.



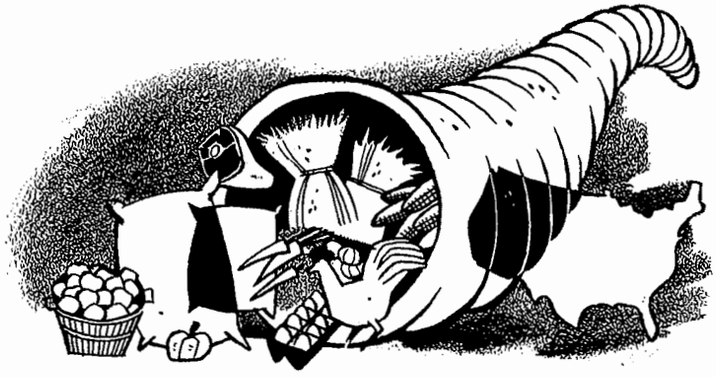
But it is important that we should understand; for if the proportion of our people now engaged in farming is far smaller than it used to be, which means that providing food is now far less of a burden for society as a whole than it used to be, nevertheless adequate and efficient food production is still the most fundamental need for further advances in civilization and for life itself. And in spite of all the revolutionary changes in agriculture, at least as revolutionary as those that have occurred in industry, and in spite of the long forward strides agriculture has made, efficient production adequate for our needs and those of the rest of the world is not easy to attain. Stubborn problems that seem to be inherent in the business of producing food for mankind still remain, and solving these problems is a continuing process requiring continuous attention on the part not only of farmers but of all who consume the food they provide.

Census harvests the facts.

This booklet presents some aspects of present-day American agriculture that do not seem to be so widely understood as they should be and gives an account of some of the changes that have brought agriculture where it is today. The material for the booklet comes mainly from the United States Census, including the 1954 Census of Agriculture. Every five years the Census Bureau sends a small army of men and women called enumerators out over the United States to garner a harvest of facts and figures. These people visit every farm in every county, asking questions designed to obtain the facts a nation needs to know about an activity as basic as agriculture. (Not all the information comes from this complete farm coverage. For some material, scientifically selected samples are used.) The answers to most of these questions are in quantitative terms, that is, in figures; and millions of these digits are subsequently poured into the machines in the central office of the Census Bureau and into the brains of the statisticians who are responsible for analyzing them and putting them into meaningful order.

Cold facts.

The masses of statistics resulting from the agricultural Census resemble an iceberg in a double sense: they seem cold to the average person, and much of their substance is below the surface where it cannot be seen without special searching. After all, the Census enumerators gather their statistics in the first instance from several million farmers who are not abstractions but individual human beings with ambitions and strivings and disappointments and difficulties. To give life and warmth to the facts, this booklet includes some recognizable landscapes and figures in the picture of present-day American agriculture—farmers who though fictional, not actual, might be considered to typify some of the outstanding characteristics of our agriculture. The first farmer is a wheat grower, whom we will call Dan West, living in the central part of the State of Kansas.



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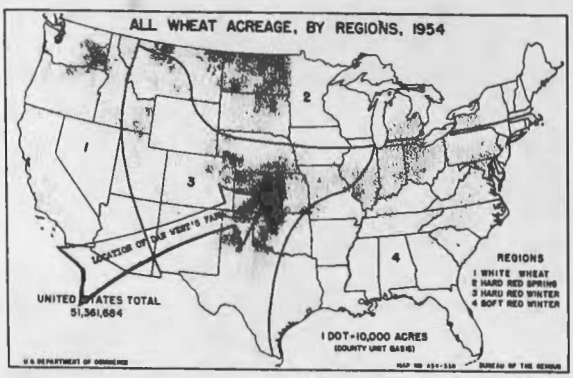
CHAPTER 1—BREAD

Dan West and daily bread.



Central Kansas where Dan West lives is part of the Great Plains. It used to be a sea of waving grass. Now on a hot summer day you look out over a sea of wheat, which is another kind of grass, and there is nothing else as far as the horizon but the golden wheat, bending under the wind's touch, and a road as straight as taut wire, and gaunt poles stuck in the ground at regular intervals to hold up the telephone and electric lines.

A precarious business.

It is from Dan West and other farmers in the wheat business that you get your daily bread. This deep dark soil, slowly evolved under generations of grass, grows wonderful wheat; and the dry climate where Dan West lives makes the grain hard and thrifty, packing it with an intense concentration of that glutenous protein which makes good bread because it stretches and stretches like a piece of fine thin rubber when the fermenting yeast blows a million tiny air bubbles in the loaf. Wheat with that kind of quality of protein fetches a premium with the flour millers and the bread bakers, and it should; for growing wheat in the place where Dan West lives is a precarious business in spite of all the advances that have been made by science. The rainfall here is supposedly 15 to 25 inches a year, but from one year to the next it may vary by 50 or 75 percent, and in the drier area west of where Dan lives it is even more fickle. This hard red winter wheat Dan grows is as good grain as you will find anywhere in the world, but the growing of it is not without uncertainty and anxiety. Even a good year may bring an ill wind. For if Dan and his fellow wheat farmers produce a bumper crop, the effect in lower prices might conceivably be almost as bad as a crop failure.

Conservation.

Every year Dan leaves part of his cropland fallow—that is, he does not seed it but cultivates the soil every so often to keep down weeds. Farther west in Kansas, the wheat farmers leave about half their cropland idle each year because the rainfall is so scanty that it is not safe in any year to try to produce wheat on more than half the land. This system of cultivated fallow that saves up moisture, helps prevent wind erosion, and takes some of the risk out of wheat growing in dry areas, was developed through research in the agricultural experiment stations, and it is one of the many results of research that make it possible for Dan to be the able farm operator he is—or to stay in business, in fact.

Research and the enemies of production.

An even more striking result is the successful battle against wheat diseases. It was not so many years ago that wheat farmers were completely at the mercy of such deadly diseases as wheat stem rust, for example. The almost invisible spores of the rust fungus would steal over an area on the wind currents, alight on the wheat plants over thousands of acres, and kill them as effectively as an atom bomb can snuff out a city. Now, as a result of years of cooperative research

in the United States and Canada, including the work of plant explorers who sought disease-resistant (and likewise drought-resistant) breeding material the world over, wheat growers have varieties that can stand up against this enemy without succumbing. And you can be sure of your daily bread. But the fight is a never-ending one. Men like Dan West produce generous crops only because the plant breeders are continuously on the job creating varieties of wheat that will resist the ever-changing strains of the stem rust, which itself continually produces new strains like the many-headed monster of mythology that grew a new head as fast as you cut off the old one.

This work of the plant breeders, important as it is, is only one small aspect of the complicated mass of research relating to agriculture that constantly goes on in our Federal and State experiment stations and in private industry. According to Professor Theodore Schultz (*The Economic Organization of Agriculture, 1953*) the Federal and State governments in the United States spent over 106.5 million dollars on agricultural research in 1951, and in 1950 they spent some 73 million dollars on cooperative extension work largely devoted to bringing the techniques developed by research to the farmers of this country. Schultz calculates that the savings resulting from this research and extension work in agriculture amounted in the single year 1950 to a great deal more than all the expenditures of the Federal and State governments for this kind of work in the 40 years between 1910 and 1950. The research and extension work in those 40 years cost 7 billion dollars. He calculates the savings in 1950, brought by the application of improved techniques, at somewhere between 9.6 and 16 billion dollars—a return on the investment, he comments, many times as large as the returns on normal business investments elsewhere in the economy.

Machinery does the work.

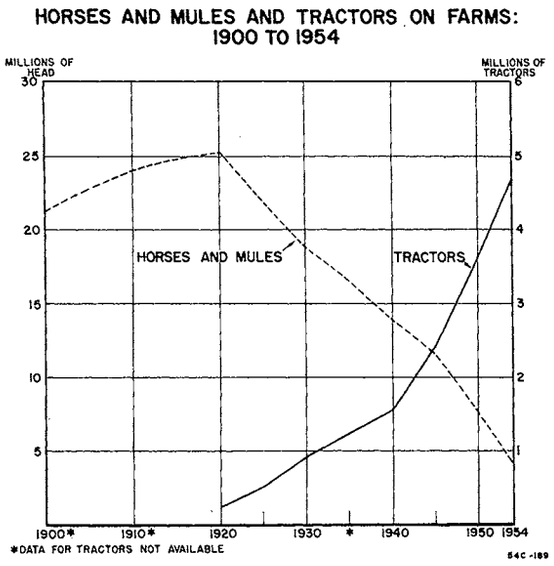
Though Dan West may not realize it consciously, not only his adaptation of soil-management practices to climate and his use of superior disease-resistant wheat varieties but his whole farm operation is based on the results of research and experiment just as truly as is production in, say, a modern automobile plant. The most important factor in this complex business, and the most important one in shaping the character of present-day American agriculture, is machinery.

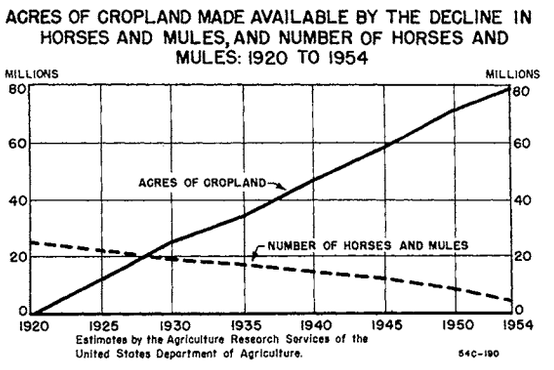
When most people were farmers a man needed little more than a good piece of land, enough seed, some simple tools, reasonable weather, strong muscles, patience, and an observant eye to produce the bread for his family and perhaps a little more. Today the requirements are far more elaborate. Dan West must have land, of course, since food still comes from Mother Earth; she is necessary in about the same sense as air is necessary to an airplane; it cannot fly in a vacuum, though you can produce food hydroponically nowadays with only water and fertilizer and no soil. As for muscle, Dan may not need much more of that than the pilot needs to run the plane. Petroleum products and some very complicated machinery do the work. What Dan does need is knowledge, skill, managerial ability, and money.

Dan West is a large-scale farmer, owning 1,200 acres of land, of which some 875 acres are cropland—500 acres in wheat, 295 in hay and pasture, 45 in grain sorghum (which substitutes for corn in this dry country), and 35 or so in cultivated fallow. Normally there are some 75 head of beef cattle on the farm, including 4 or 5 dual-purpose cows (good for meat and milk), a few hogs and sheep, and a flock of

70 to 80 chickens. The milk and pork and lamb and eggs are produced mainly for the family's own use—a practice that has been declining, however, as commercial farms become specialized and concentrate more exclusively on production for market. The beef cattle add materially to Dan's income, and in addition to grazing on pasture they are turned loose in the wheat fields for a while when the plants are young, lush, and high in feed value.

Work animals disappearing.





One tractor or 60 horses.

Dan's farm is so thoroughly mechanized that in spite of the size of the operation, he and his son Don are able to do practically all the work themselves, with a little hired help during the busiest seasons. There is not a single work animal on the farm, or for that matter on any of the other wheat farms nearby. But in the days when the plowing and harvesting were done by horses, it was not unusual to see 12 or more (as many as 30 in some parts of the wheat country) harnessed in a complicated multiple hitch. In those days harvesting crews swarmed over the countryside at harvest time, and the womenfolk were kept busy getting three big meals a day for them. Now the fuel for all this work does not come out of a hot kitchen or hayfield or oat bin. It comes from the gasoline tank and electric power line. The shift from animal to machine power is not yet quite complete in American agriculture, but it has made long strides in a short time.

The change has not only altered the character of farm work; it has also freed a large amount of land from the production of fuel for work animals and made it available for the production of food and fiber. But this is only a side-effect of the machine revolution, though an important one, partly responsible for the development of surpluses. More significant and dramatic is the increase it has brought in the work capacity of farmers. The severe shortage of agricultural labor in the two world wars, against the urgent need for increased production, had much to do with speeding up this development.

Dan has a large, heavy-duty tractor which he uses for preparing the soil for seeding and for harvesting his wheat. In work capacity it could easily take the place of 50 to 60 horses. The tractor takes up much less room than 60 horses and requires no stable chores. There are also two other tractors on the farm, one a small general-purpose machine used for all kinds of light work. The development of light, flexible, rubber-tired tractors during the last 30 years or so is what made machine-farming possible on even the smallest farms. In 1954, there were 4.7 million tractors on the 4.8 million farms of America, doing work once done entirely by animal and human muscles.

Dan has a large truck for hauling, a light half-ton pickup, and two passenger automobiles. The part played by trucks in American agriculture today is strikingly indicated by the fact that the eighth of the population on farms owns more than a fourth of all the trucks in the United States. (There were 2.7 million on United States farms in 1954—about a half million more than in 1950.)

Airplanes and farms.

It is also a fact that more airplanes are now used for seeding, dusting, spraying, and other agricultural operations than are employed by all the country's airlines put together for carrying passengers and freight—though the planes used in agriculture are, of course, smaller.

In preparing some 500 acres for wheat each fall, Dan uses mainly big plows, each of which disks a ten-foot wide strip of soil at a time. This disk, which is actually a plow, also does the work of a harrow, and if a seedbox is attached the plowing, harrowing, and planting can all be done in a single operation. The wheatland disk is a good machine for cultivating summer fallow, too. During the past few years hydraulic, mechanical, pneumatic, and electric lifting devices have been developed for plows and cultivators so that merely by shifting levers the man in the driver's seat can regulate the depth at which each unit in a complicated gang of implements will operate.

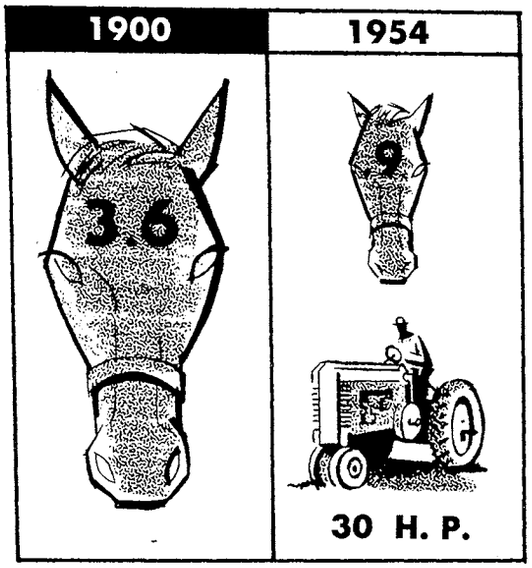
A farm horse worked on the average about five hours a day. A tractor equipped with lights can work around the clock if necessary. The flexibility, power, and speed of modern machines are important factors in directly increasing production per acre as well as per worker; for in agriculture the ability to carry out a given operation, such as plowing, planting, harvesting, or spraying, expeditiously and at exactly the right time can mean a great deal in making the most of good weather, soil, and crop conditions.

Comes the harvest.

For the wheat farmer, the harvest is the culmination of the year's effort. Dan West uses his self-propelled combine for this operation and generally rents a second one. This machine takes the place of the reaper or header that cut the standing wheat, the binder that tied it into bundles, and the threshing machine that removed the kernels and winnowed out the chaff. Clanking and whirring over the grain fields like some voracious mechanical monster, it does all these things at one time, and in addition pours the clean kernels into bags or into a truck, and either returns the straw to the field to be disked in or places it in windrows for loading or baling. So the need for harvesting crews and horses and an array of separate machines is eliminated, and the grain comes out cleaner and is likely to be of a higher grade than with the old methods.

The first combines were large and cumbersome. Dan's machine cuts a swath 12 feet wide, or 24 feet for the two machines. With these two machines he figures on harvesting his wheat crop in less than 10 days.

More power at their command.



Small combines have now been developed which give the small-scale farmer the advantage of this device, and the machine has also been adapted for use with many other crops besides wheat—notably oats, rye, barley, flax, clovers, alfalfa, grain sorghum, rice, soybeans, and dry beans and peas.

American farmers today probably have more power at their command than has ever been available anywhere for agricultural production, even in ancient empires with myriads of slaves. One result has been that as the work capacity of each farmer increased, so did his need and desire to farm a larger acreage to make effective use of his machines. So the size of farms in this country has been growing. And, by the same token, the big farms, such as that of Dan West, on which machines can be employed to the maximum advantage, have been increasing in number and taking over a larger share of total production. Only one farmer out of 36 in the United States runs an enterprise large enough to market at least $25,000 worth of products annually. But in 1954, this 2.8 percent had more than 22 percent of the farmland, accounted for 31 percent of the value of all farm products sold, produced 22 percent of the wheat and 38 percent of the cotton, and sold 27 percent of the cattle and calves and 33 percent of all poultry and poultry products.

A family enterprise.

But in spite of the steady increase in farm size, it is a striking fact that the family farm is still by all odds the predominant type throughout American agriculture, even in the case of the big operations. Dan West's 1,200 acres is a family farm, and so are most of the other big farms in the region. There is in fact very little corporation farming in the United States and the number of farms run by hired managers is comparatively small. Throughout all the changes that have revolutionized our agriculture, farming has kept its original character as a family enterprise. In fact, this character seems to be more firmly entrenched than ever, in the sense that the proportion of families owning rather than renting their farms has been increasing in recent years, and likewise the proportion of farms free of mortgage debt. In Kansas, for example, the number of farms operated by tenants dropped from a little over 70 thousand in 1940 to about 35 thousand in 1954, and the amount of farm-mortgage loans outstanding January 1, 1955, was 27 percent below the figure for 1940.

It takes a lot more money nowadays.

Capital investment per farm: United States

1954	
Land and buildings	$20,406
Machinery	2,986
Livestock	2,352
Total	25,744
1920	
Land and buildings	$10,285
Machinery	558
Livestock	1,243
Total	12,085

Obviously it takes a lot more money to own a farm and the equipment necessary to run it nowadays than it used to take. In the case of Dan West the investment in land and buildings is close to $150,000; in machinery, close to $14,000; and in livestock, close to $6,500. The average for these items for that size of farm in Dan's area in 1954 was $170,000. While all farm costs have gone up over a period of several decades, the principal change has been the constant addition of increasing amounts for machinery of one kind or another, so that the trend has been toward a reduction in the relative amounts invested in the land and buildings as compared with mechanical equipment.

Tractors and trucks are not cheap. A large self-propelled combine costs over $5,000, which is the reason a good many farmers do not buy combines but have their harvesting work done on contract, the main disadvantage being that you can't always have it done just when you want to. In addition to these big items, Dan has a good deal of miscellaneous equipment. He does a careful maintenance job so that his equipment has a relatively long life, but it is expensive just the same.

Operating costs match investment.

Operating costs also are high to match the investment and the size of the business. In 1954, a farm the size of Dan West's averaged expenditures of $1,526 for gasoline and oil, $996 for machine hire, $1,682 for hired labor, $761 for commercial fertilizer (this is a new development; commercial fertilizers were not used in this region in the old days), and $1,690 for livestock feed—despite the fact that Dan raises a great deal of feed of his own. This is a total of $6,655 for this particular group of expenses. The list is far from complete; it does not include seed, livestock purchased, maintenance and repairs, depreciation, taxes, and interest on loans.

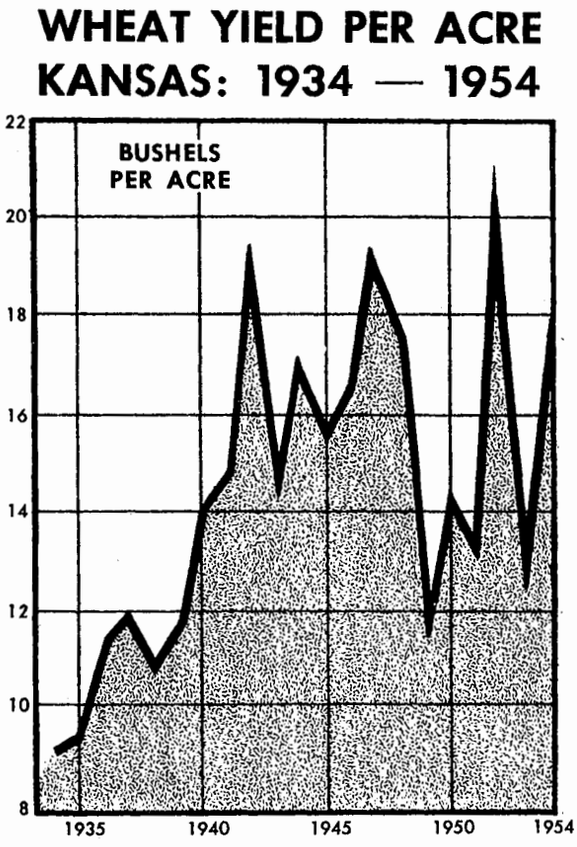
High as the listed costs are, however, they are relatively moderate on a crop-acre basis, amounting to $1.16 for machine hire, $1.77 for gasoline and oil, $1.95 for hired labor, and $0.88 for fertilizer—a total of $5.76 per acre. No wheat farmer, no matter what the size of his place, can get along without some of these expenses, and the smaller the farm the higher they run per acre and per dollar of sales. This of course is one of the economic reasons for large-scale operations.

Gross and net income.

Dan West's gross income in 1954 was $33,582. Of this, $27,112 came from the sale of crops, mainly wheat, which brought $24,889. The sale of livestock and livestock products brought $6,470. While it is not possible to figure Dan's net income on the basis of data collected by the Census, one might guess that it is probably not over $6,000. His income situation is probably like that on large-scale farms of all kinds the country over. In 1950, according to a comparative study made by the Census Bureau and the United States Department of Agriculture, the average value of products sold from these large farms (the gross income) was $54,860, and the average net income of farm-operator families in the group was calculated to be $8,880, which is 16 percent of the gross income. On the same basis, Dan's net income would be $5,373.

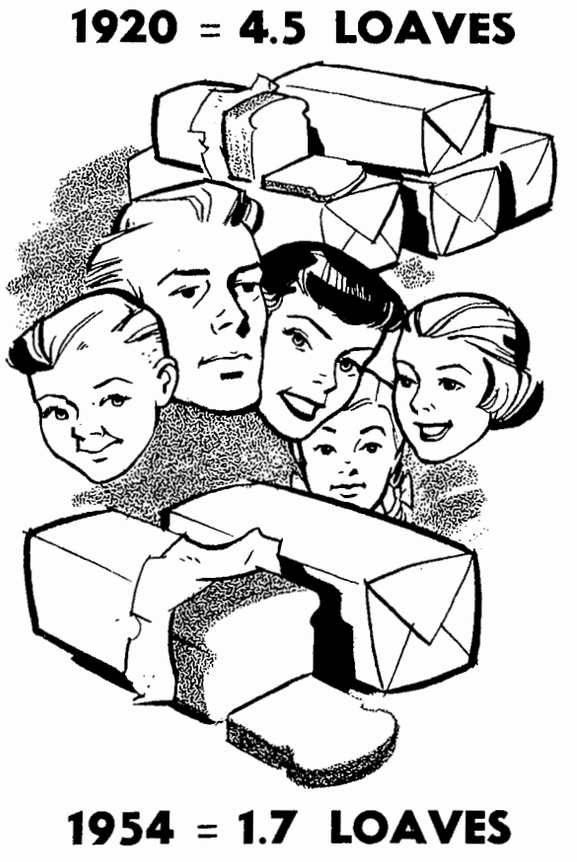
This analysis of Dan's costs and returns is neither complete nor conclusive; but it is sufficient to bring out some striking facts about his situation and that of other farmers today. He is the extreme case in the sense that he is one of the big operators who, because of the inevitable trend toward machine farming, are responsible, as we have seen, for a large share of modern agricultural production. But despite the size of the operation, his net return is not large in relation to his investment and operating costs.

Lean years and fat years.



It is no easy thing to get into farming today; in fact it is so difficult, from the standpoint of the sum of money involved, that it is a wonder we have as many farmers as we do. Dan is relatively prosperous, and in some years, with the right combination of weather and price, he can make a great deal of money. But in this business of wheat growing in the Great Plains, the lean years are likely to be more numerous than the fat ones. Dan's costs are so high and his production is so comparatively precarious (though not so much so as in the still drier areas) that he must have a reasonable price and a relatively assured market or he will go under.

If we ate as much bread.



Dan is producing an indispensable food, but one that has been steadily losing ground over a long period of time in its relative importance in our American diet. In 1954, we consumed for food practically the same amount of wheat in this country (474 million bushels) that we consumed nearly a half-centry ago in 1910 (478 million bushels). Meanwhile the number of us who shared this 4¾ million bushels, grew from 92 million to 164 million. So each of us ate 137 pounds less of wheat, consuming 173 pounds in 1954 compared with 310 pounds in 1910. Since our total food consumption is about the same, we made up for that 137 pounds by eating mainly more vegetables and fruits and milk. If we ate as much bread now as we did in the old days, we would have required some 850 million bushels in 1954.

A half million loaves of bread.

The ability of wheat farmers to produce, however, has been steadily going up with the advance of agricultural technology. Dan West produced 19.7 bushels to the acre in 1954 on his 497 acres. That was a total of 587,500 pounds of wheat, which would yield 423,000 pounds of flour and 164,500 pounds of byproducts for animal feed. Since a pound of flour makes 1½ pounds of bread, Dan's farm contributed the flour for 634,000 one-pound loaves to the United States food supply, plus 82 tons of byproducts for feedstuffs. A half million loaves of bread is a great deal to come off one farm in one year. Dan West can be proud of the achievement. But the sober fact is that the United States has now reached the point where we have a two years' supply of wheat ahead. Over a sufficiently long period of time, the increase in the United States population might more than use up the surplus; but meanwhile the economic problems of wheat farmers justify all the attention and intelligence that can be applied to them.

Unseen hands and brains.

Dan West's "hired hands."

The main point about all this—a point not easy to grasp fully—is that not Dan West or any farmer is an independent unit in society in the sense that farmers used to be independent. Not only does he not produce his own food and clothing and much of the material for his shelter as his forebears did; he could in fact not produce at all without the cooperation and assistance of a large number of other people outside agriculture. Dan West could not by his own effort alone produce the basic material for half a million loaves of bread a year. He can perform this prodigious feat only because a great many unseen hands and brains are helping him. These invisible presences are embodied in his machinery, equipment, gasoline, oil, cement, electric lines, etc. They are the brains that invented and continually improve the machines; the hands that make them; the drillers and transporters and refiners of petroleum products that provide the energy for Dan's work; the roadbuilders who enable him to move so much wheat in so short a time; the scientists who experiment endlessly with soils and plants and chemicals; the millers and bakers who turn his raw wheat into edible food; and finally the storekeepers and others who get it effectively into the hands of consumers. The forbears of practically all of them were farmers a few generations ago.

These invisible, unacknowledged presences are in effect Dan West's hired hands. He pays their wages in the cost of his equipment and fuel and other materials. In our society, the distinction between industry and agriculture grows more and more fuzzy as the cooperation this society demands among its various segments becomes increasingly intricate and complete. How many people actually produce Dan West's half-million loaves of bread it would be hard to say, but it takes the work of many more than Dan and Don, and Dan has to pay for all of it from the sale of his wheat.

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So Dan's problems are not entirely his own and he could not solve them by himself. The problems of the people in production are likewise problems of people in banking and industry and commerce, not to mention consumers. They will never be finally solved, for life itself does not stand still, and in moving forward it creates new problems. Then the new ones have to be solved to make another forward move possible.

Some wheat in all States.

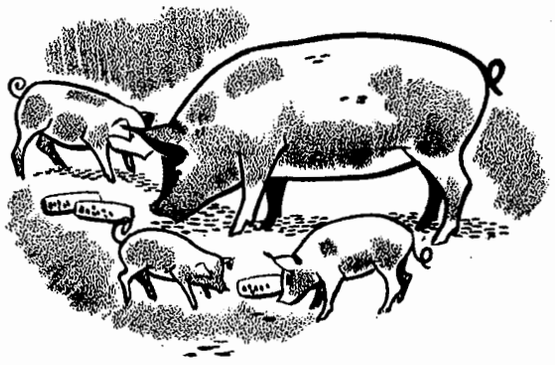
Before leaving Dan West, we wish to point out that he is only one very small factor in wheat production in this country. A tenth of all the capital invested in land, buildings, livestock, and machinery in our agriculture has been invested by farmers whose main enterprise is wheat production. So Dan's investment is only a drop in this bucket. Though our main wheat belt is in the West, extending from somewhere in Texas all the way to the Canadian border, some wheat is grown in all States. Western production is mainly hard red winter wheat where the climate is suitable for fall planting and hard red spring wheat where the winters are ordinarily too severe for the young plants to survive. Durum wheat, grown for macaroni and similar products, is also produced in the northern section of the wheat belt. Farther west, in Oregon and Washington and parts of California, farmers grow white wheat, which is used mainly for cake and pastry, not bread.

In the eastern part of the United States soft wheat is still grown as a sideline on many farms, but most of the supply comes from commercial producers whose main business is producing wheat.

Just as other kinds of wheat are produced in different parts of the country, so there are many farms producing wheat quite different from that of Dan West. Some, particularly on the West Coast, are much larger than his. Some involve much bigger investments and operating costs. Some produce much more per acre; 30 bushels is not uncommon in western irrigated areas. And of course there are more small farms than there are big ones.

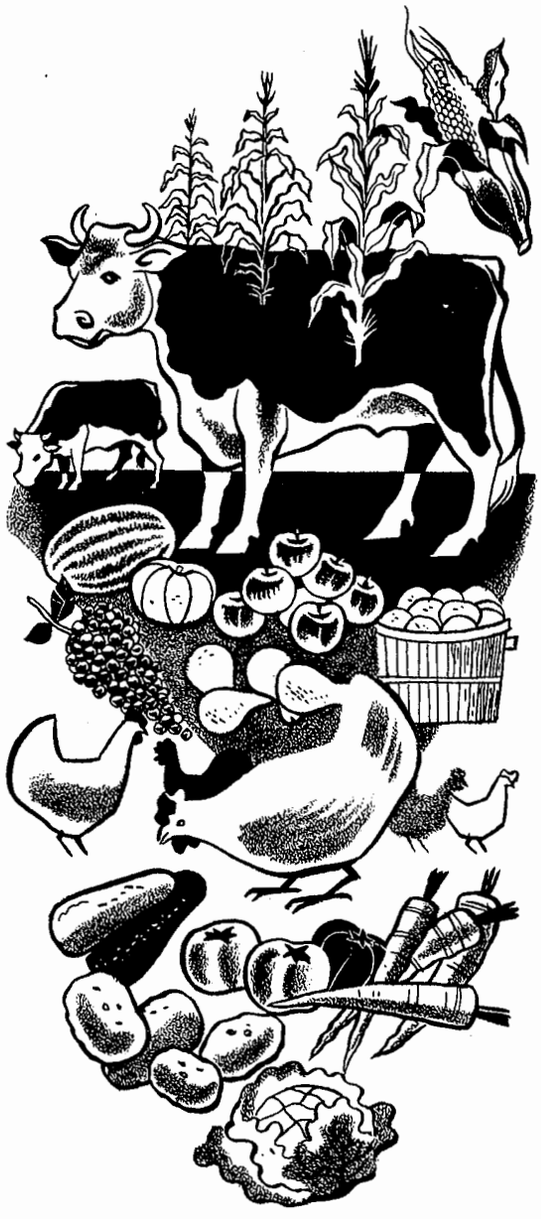
CHAPTER 2—MEAT

Corn and pork.



We now shift to the Corn Belt, where Fred North operates what is essentially a huge biological apparatus for producing great quantities of corn and converting it into great quantities of pork and beef. The apparatus is a complicated one, including rich Indiana soil, plentiful rain, a generous supply of sunlight and summer heat, fertilizers and other chemicals, and a lot of intricate machinery. The plant products coming in at one end (not only corn but some oats and other grains, and grass, and legumes) are transformed by the animals into flesh—not only pork but some beef and lamb and chicken—and milk and eggs and wool. As a country poet once put it, a farm such as this is really just one gigantic alimentary canal.

Good living American style.



Fred North's kind of production caters to and in effect epitomizes the American standard of living. Dan West's wheat provides fuel for the human body in the most direct and perhaps cheapest form. Fred North's corn, on the other hand, goes through a roundabout, time-consuming process to become ham or bacon or beefsteak; and it takes some seven pounds of corn and other ingredients to build one pound of live hog, which in turn yields only about six-tenths of a pound of the pork you buy at the butcher's counter. But in its converted form this flinty corn is a very different product, one with a palatability and succulence much sought after by human appetites; for who would choose a dinner of bread if he could get beefsteak or pork chops? These animal products are costly to produce, but they go along with other things that Americans consider essential for good living and that so many Americans can afford—good houses and clothes, automobiles, televisions, radios.

The Census divides commercial farms into six economic classes, according to the size of the operation. Dan West's place would be in Class I, among those farmers selling products with a value of $25,000 or more a year. There were well over 100,000 of these largest-scale producers in the United States in 1954. Fred North's place would be put in Class II—the big commercial farms selling between $10,000 and $25,000 worth of products a year. In 1954 there were nearly 450,000 farms in this growing group.

A kindly land.

This western Indiana is smiling, buxom country, more kindly disposed toward farmers, not so subject to violent weather hazards as the Great Plains wheat area. Probably most experts, in fact, consider the Corn Belt the best and richest agicultural region in the world. Midwest farmers are peculiarly alert to new scientific developments in agriculture, and the combination of soil, climate, and people has been a singularly happy one from the standpoint of production.

Flying over Indiana, you see no vast sweep of grain and grass but a neat pattern of fenced rectangles and squares—fields of tall dark corn interspersed with smaller patches of wheat or oats, or hay or pasture, woodland and orchard; and somewhere in each cluster of fields a white farmhouse and a group of farm service buildings: ample barn, silo perhaps, machine shed, workshop, hoghouses, chickenhouses, corncrib.

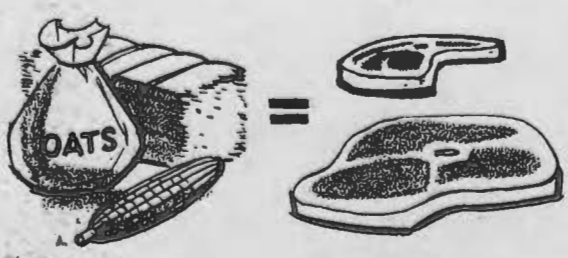
Fred North does not live in the most intensively productive part of the Corn Belt, which is a little farther west, in Illinois and Iowa. Nonetheless, nature is very generous here, and the Norths are good farmers who can make the best of what she offers.

A 250-acre, corn-hog farm.

They farm 250 acres, only part of which they own, renting the remainder from others. This is a practice that is increasing over most of the United States as a result of the pressure to expand the individual farm because modern machinery makes it possible for the farmer to do more work and handle more land than ever before. Sometimes renting additional land is more advantageous than buying it; and the amount of expensive equipment needed in farming today may make it impractical in many cases for a family to buy all the land they farm.

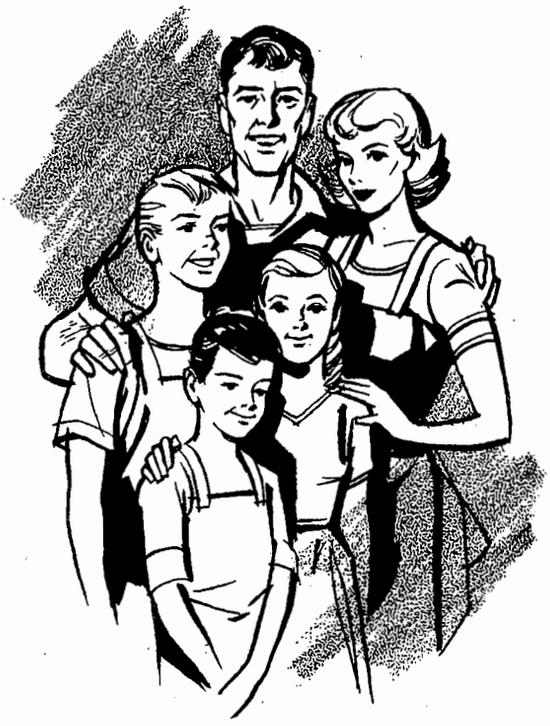
Of the 250 acres in the North farm, about 210 are classed as cropland—185 acres planted to crops for harvesting (80 in corn, 25 in oats, 20 in soft winter wheat, 40 in soybeans, 20 in hay), 20 acres used for pasture, 5 acres or so idle or unharvested for one reason or another. Another 22 acres are in woodland, of which over 15 acres are used for grazing. Some 10 acres that are not suitable for either crops or woods can also be used to pasture livestock. A big kitchen garden, a few fruit trees, roads and lanes, and the farm buildings account for much of the remaining 8 acres.

Crops become meat.



All the corn, hay, and oats Fred North produces are processed on the place into animal products—a situation roughly comparable, let us say, to that of an automobile manufacturer producing his own steel. The wheat and soybeans, which are sold as plant products, help to diversify the farm economy. Soybean production in particular can serve to a limited extent as an economic shock absorber, expanding when prices of other products are down. In recent years this region has proved to be extraordinarily favorable for soybeans, a crop for which research has gradually opened a wide range of food, feed, and industrial uses and which also, properly handled, can be an important factor in soil conservation.

A real family enterprise.



Though Fred North's livestock operations center around hogs—he sold 185 head in 1954—he carries some 27 head of cattle (including calves), of which usually four or five are milk cows and the remainder beef animals, shipped in from the western range to be fattened for market. There are also a few sheep and a flock of chickens on the place. In other words, this is not so exclusively a factory for turning corn into pork as some other Midwest farms are. Though too specialized to be a "general" farm in the Census classification, it maintains a certain diversity that, aside from possible economic advantage, keeps the whole family actively interested and involved in running the place. Mom has the chickens as her province; they contributed $587 to the family income in 1954, mainly from the sale of eggs. Young Bill deserves much of the credit for handling the beef cattle, which brought in $2,700. Susan's specialty is dairy animals; milk sales in 1950 totaled $627. Young Michael is learning to look after the sheep, which brought in another $175. (The young people are members of a national farm youth organization and take their work very seriously.) Fred, of course, is responsible for hog production, which is close to an $8,000 enterprise, and for the management of the crops, which accounted in 1954 for about $2,900 of the farm income—wheat production was 620 bushels, with a yield of 30 bushels to the acre; soybean production, over 1,000 bushels, or 26 bushels to the acre; oats, 1,048 bushels, 41 bushels to the acre; and corn, 4,120 bushels, or 52 bushels to the acre. On a few acres, corn was also grown for silage.

Fred's investment and expenses.

The gross income from all these products totals close to $15,000.

Fred's investment in land and buildings by 1954 was $60,000, with an average land value per acre of some $250. He had $9,000 invested in machinery, and his livestock investment might be put at $10,000. The total investment is considerably less than the $167,400 tied up in Dan West's thousand-acre wheat farm, but it is a sizable sum of money, nevertheless, and again underlines the fact that farming today requires a good deal of capital.

Capital investment per farm, Corn Belt: 1954

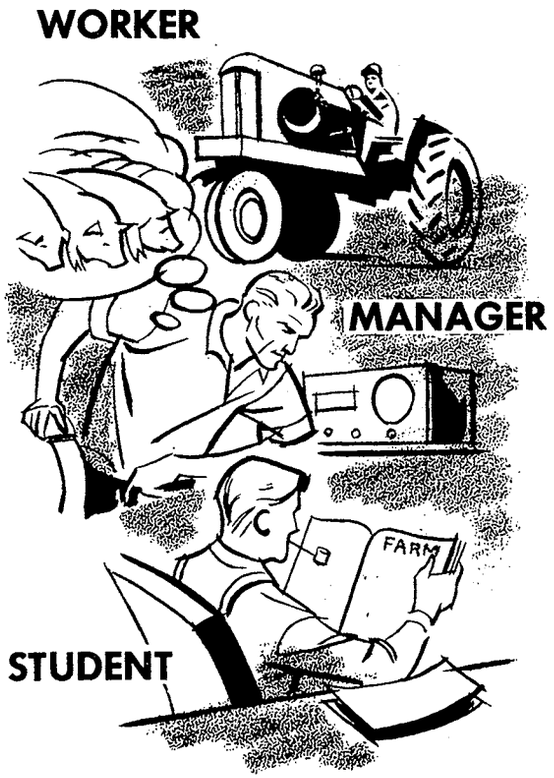
Land and buildings	$33,541
Machinery	5,986
Livestock	4,567
Total	44,094

Operating expenses are proportionately high. The biggest single item in 1954 was over $2,000 for feed for livestock and poultry to supplement the 4,000 bushels of corn and the hay and other products the farm itself produced. Next biggest was $1,000 for purchasing fertilizer and lime to maintain the high fertility of the soil. Next came an item of $700 for gasoline and oil and about an equal amount for hired labor. Machine hire cost about $200. These items total nearly $4,000, but they do not include such important expenses as repairs and depreciation, interest and taxes, seed and livestock purchased, veterinary fees and medicines. The net income of the North family was probably not over $8,000.

Home-grown food an important item.

On the other hand, they produce a good deal of their own food—pork, beef, veal, lamb, poultry, eggs, milk, vegetables, berries, apples, and other fruits—not without cost, of course, but a considerable saving over retail prices. For storing a good part of this food they rent space in a nearby freezer-locker plant and also have a home freezer of their own. In 1954 almost three-fourths of the farmers at their economic level in this area had home freezers, which have considerably reduced the labor formerly put into food preservation. The development of quick-freezing may be making home food production seem more attractive and advantageous in spite of the general trend in commercial agriculture away from self-sufficiency.

An intricate difficult profession.



Not by the widest stretch of the imagination could Fred North be made to fit the old designation of "country hick" or "hayseed" once so generally applied by city people to farmers. He is a practitioner and student of an intricate, difficult profession as well as an able businessman; and although not a Doctor of Science or Philosophy, both he and his wife Jane are graduates of a State college of agriculture, and they expect their children will go to college. The management and operation of the farm demands a range of knowledge and of skills considerably wider than those required by the average businessman at the same economic level. For most of the things done on this farm are based on a mass of research and experiment carried on in recent years by agricultural experiment stations and other agencies not only nearby but throughout the United States and in other parts of the world also; for science can progress only by a constant, active exchange of knowledge. And here in the Midwest a corps of experts as capable and devoted as could be found anywhere are concentrating on the problems of Fred North and the thousands of other farmers in the region.

Corn is the raw material.

Corn, gift of American Indians to world agriculture, is his most important raw material (likewise the biggest single crop in the United States and the world's No. 1 feed grain). The corn now universally grown in the Midwest is also the No. 1 achievement of modern plant breeding, and one not many years old.

Corn is a wind-pollinated plant; the male pollen landing on the female silk may be blown from anywhere and come from one or a great many different corn plants. Because of this random mating and mixed ancestry there is likely to be as much difference between two plants produced from seed even of a single variety as there is between two children of the same parents of the same race of human beings.

What is hybrid corn?

In producing hybrid corn, the plant breeder suppressed random mating entirely. He inbreeds a line of corn for several generations, using pollen from the same plant to fertilize the silks of that plant, until the inheritance is purified to an unvarying set of genes identical in all the plants. Then he suddenly crosses two of these inbred lines (or, in a more complicated procedure, more than two). The plants in the next generation will all be exactly alike, combining the genetic make-up of the inbred parents. They will grow at the same rate to the same height, mature at the same time with no ears ripening too early or too late, have the same disease resistance or drought resistance or other qualities, and so on. And if the inbred lines are properly chosen, the hybrid will be uniformly vigorous and productive. But the second generation, grown from the seed of the hybrid, does not have this uniformity; it segregates into various types according to Mendelian laws of heredity. The original cross has to be made all over again to produce the seed for each year's planting.

Hybrid corn has been responsible for a sudden upsurge in yields per acre. In 1954 some 87 percent of the total United States corn acreage was planted to hybrids, which were adding perhaps 750 million bushels a year to national production. Increased use of fertilizer and other improved practices have brought a further increment in yield. In the prewar period, 1935–39, Indiana farmers used 220,000 tons of fertilizer a year. In the war periods, 1940–44, the amount had risen to practically 345,000 tons. By 1950 it was 935,000 tons; and in 1954, over one million tons were used.

Gifts of the plant breeder.

Some years ago, before these changes, Fred North's corn production on the same acreage and with the same weather conditions would probably have been around 3,000 bushels instead of 4,000, and his livestock production would have been correspondingly lower.

All the other crops he grows—oats, soybeans, alfalfa, grass, and most of the vegetables in his garden—are likewise products of modern plant breeding, and in general they are better than the old products in much the same sense that present-day airplanes are better than their forerunners. (But this is not to say that all the problems have been solved. Some diseases, for instance, still tend to keep ahead of the breeders.)

Good farmer, good student.

To keep up with the steady stream of new developments; to know what varieties of crop plants will give the best returns on his own farm; to know what fertilizers to use, and how much and when, and whether they should be broadcast or drilled in, and if the latter, how deep and how near the seeds or plants, and whether the new liquid fertilizers are better than the older, dry types; to be familiar with new materials for insect and disease control, and the chemical control of weeds, which saves so much time and labor—all this demands that Fred North (not to mention the other members of the family) be an assiduous student of books, bulletins, and journals, keep in touch with the county agent, and on occasion consult other experts in the State agricultural college.

The animals are even more demanding from this standpoint than the crops.

New styles in pigs.

Fred North's pigs are a breed long favored by producers in his area, yet they are not the same type of animal his father had. The trend in hogs of practically all breeds now is toward leaner and meatier animals with considerably less fat. As the market demand for lard gradually fell off for various reasons, breeders responded by creating an intermediate-type hog, which brings a premium price in comparison with the lard type. Newer developments go considerably further. Stimulated by the spectacular advances made with the hybrid corn, livestock and poultry breeders have been trying similar methods, insofar as they can be used with the animal organism. In the case of hogs, inbred lines have been used for controlled crosses which give evidence of hybrid vigor in the progeny; and a number of new strains have been developed by using such older breeds as Danish Landrace, Poland China, Yorkshire, Duroc-Jersey, Hampshire, Berkshire, and Tamworth as foundation stock for crosses. The aim is to produce hogs that will be prolific, reach market weight rapidly, require less feed per pound of gain, and yield carcasses of which at least 50 percent, slaughter weight, will be of the five primary cuts—hams, loins, bacon, picnic shoulders, shoulder butts—with a minimum thickness of back fat.

In keeping with this trend, Fred North also markets his hogs at much lighter weights than was the practice in the early days. Careful studies have shown that for economy in the use of feed, hogs should be sold when they reach 210 to 225 pounds. Disproportionately large amounts of feed are required for gains beyond that weight, and feed is 70 to 85 percent of the cost of production.

Complexities of feeding

The whole business of feeding has also come in for intensive study and has been profoundly changed by the advances made in the science of nutrition during the past few decades. Although corn is the most important feedstuff, it by no means tells the whole story today. A balanced ration must contain the right amounts of a long list of minerals and vitamins and essential amino acids, the building-blocks of protein. So the feeding formula becomes extremely complicated—at least the formula for the supplement that must be added to the daily grain or good pasturage. For example, one supplement widely used by hog producers contains carefully proportioned quantities of fish meal, tankage (slaughterhouse scrap), soybean meal, linseed meal, alfalfa meal, iodized salt, steamed bone meal, pulverized limestone, iron sulfate, copper sulfate, and manganese sulfate. The recently discovered vitamin B12 is also being rather widely used in feed supplements. Even though Fred North buys these supplements ready-mixed, he must, if he is to do an intelligent job, know what is in them and why. A new practice with which he is experimenting is the use of very small quantities of antibiotics—drugs such as penicillin, ordinarily used to combat disease or infection—in the everyday feeding of young pigs.

Some revolutionary ideas.

A more revolutionary idea that he is watching with interest is the use of artificial milk for feeding baby pigs, weaning them from the sow after the first two or three days of nursing. A number of advantages are claimed for this practice: The baby pigs escape certain infections, more pigs can be raised from a litter, the sow cannot lie on them and crush them, the sow is saved the physiological drain of nursing, which is as great as that of gestation, and so on.

There have even been attempts to develop "pig hatcheries," devoted exclusively to breeding sows, raising baby pigs for the first few days, then selling them to the farmer to be grown for market, on the theory that he can thus avoid the whole troublesome breeding and nursing phase of hog production.

Guard the young pigs.

Whatever may come of such ideas as this, it is certain that the most critical part of a pig's life is its childhood. Close to 40 percent of all pigs farrowed never reach market, and most of these die before they are weaned. This is the reason for the now widespread use of the pig brooder or hover—a simple shelter, often homemade, in one corner of the farrowing pen, where the little pigs can go to keep warm. Experiments at Indiana's Purdue University showed that the use of this supplemental heat kept 83 pigs alive out of every 100 farrowed, compared with 66 without the brooder. According to Census figures, 117,000 farmers had electric pig brooders in 1954. Little pigs are very susceptible to chilling, and in the old days, the farmhouse kitchen would sometimes be turned into a pig nursery during a cold spell in the farrowing season.

Another progressive practice Fred North employs is the use of gilts (young sows) for breeding instead of mature animals. Research has demonstrated that the progeny of these young mothers make faster, more economical gains up to market weight than those of mature sows; and shortly after the brood has been weaned, the gilt can be marketed at a price comparable with that of slaughter hogs.

Progress in disease control.

Everything that will keep pigs alive, healthy, thriving, and growing as fast as possible is important in the swine business. Prevention and control of disease is one of Fred North's main concerns; and here veterinary science has been making notable advances in recent years. Outstanding is the development during the past 30 years of vaccines that effectively prevent hog cholera, a virus disease that used to sweep over large areas causing losses as high as $65,000,000 a year. A new serum-virus gives lifelong immunity in all except a very few cases. Another new vaccine gives effective protection against swine erysipelas, the second most devastating disease. A long list of other diseases to which swine are subject have been, or are on their way to being brought under control. Control of parasites has also become increasingly effective and exact.

All this means that in Fred North's system of management, cleanliness and sanitation are of prime importance. Gone are the days of muddy hogpens and wallows, slops fed in unclean troughs, and crowded hoghouses, messy with litter and manure. The Norths' hogs are divided into small groups; they have concrete feeding floors easily kept clean, and sun yards, and plenty of clean fresh water; they are watched and tested for certain diseases, vaccinated, quarantined if they get sick, and so on. The writer of this booklet still remembers falling off a fence into a hog trough when he was a very small boy. It would be a much cleaner experience today.

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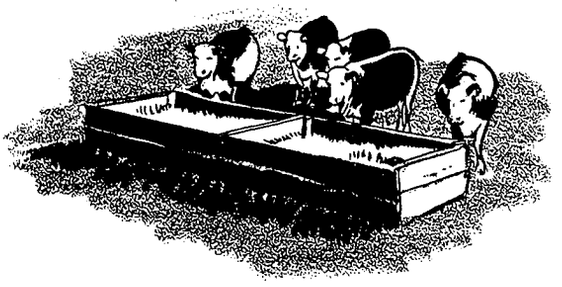
The cattle breeding operation.



The beef cattle operation too has gone through important changes in recent years. The present-day beef animal is as square-cut and chunky as though it were made from an oblong block of wood with a minimum of carving, and almost as low-slung as a dachshund or a 1956 model automobile. The Midwest, rich in corn, alfalfa, and high-grade pasture, is a sort of gourmet's paradise for cattle shipped in from the vast Western short-grass rangelands; they stuff themselves and fatten fast, emulating the Corn Belt pigs. The economics of the business depends primarily on the relation between the market price of beef and the cost of feedstuffs, whether farm-produced or bought. To take a hypothetical example, if a Midwest feeder buys steers at a weight of around 700 pounds and fattens them to around 1,000 pounds in a period of 150 days, it would require approximately 3,800 pounds of concentrates to build the added 300 pounds of body weight. Unless the feed costs less than the difference between the purchase price and the sales price, with an additional margin for interest, labor, etc., the feeder will lose money. So he tries to cut costs in every way he can, shop around for the best price, and sell at the most advantageous time.

Beefsteak from nitrogen.

One of the relatively new practices that may help to cut feeding costs, though this too is a question of price relationships, is the use of urea to replace part of the protein in feeds. Urea is practically pure nitrogen, the main ingredient of protein, in crystalline form, and it is manufactured synthetically by atmospheric fixation. No other animals except ruminants are equipped by nature to turn this inorganic chemical into body proteins; all others must get their protein ready-made. The ruminant does it by the round-about trick of nurturing a good supply of special bacteria in the first of its four stomachs, the rumen. It is the bacteria that actually utilize the inorganic nitrogen, building from it the protein of their microscopic bodies. Eventually, death overtakes them. The dead bacteria are then digested by the host animal, and duly converted into beefsteak, leather, and the other useful things we human beings get from steers.

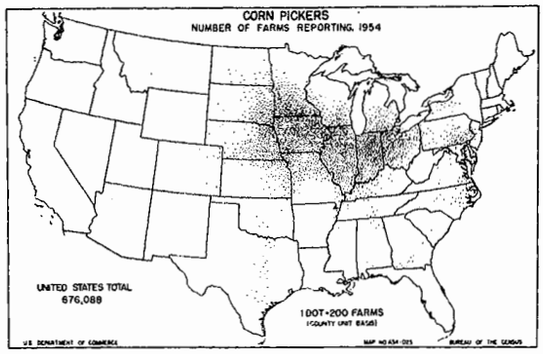
A pound of urea contains almost as much nitrogen as 6½ pounds of soybean meal of 41 percent protein content. It can safely replace up to a third of the total protein in the ration. The use of urea makes it possible to feed some low quality roughage—poor hay, straw, etc., as sources of carbohydrate to replace more costly high-quality material.

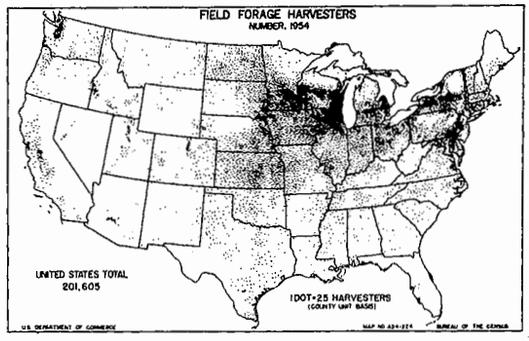
A highly mechanized farm.

Fred North is as machine-minded as Dan West, and his farm has to have an even greater variety of mechanical equipment than Dan's. In fact, whenever any machine can substitute economically for human labor, Fred's aim is to make use of it, by buying or renting or even on occasion making it.

On the North farm, and throughout the Corn Belt, the most important machines are those for the production and harvesting of the principal crop, corn; and of those the most important is probably the corn picker.

Fifty percent more cornpickers.

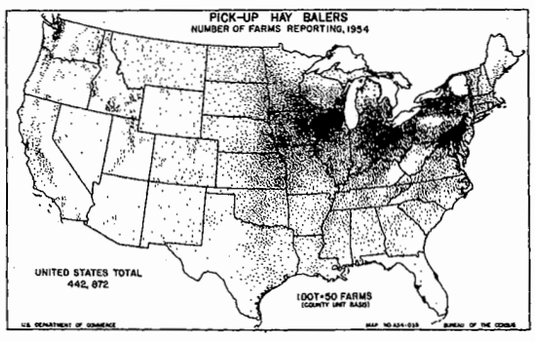




Corn is a big, heavy, cumbersome plant, awkward to handle by hand, and harvesting it used to be a slow laborious process. Now the number of farms on which this work is done by machines is rapidly increasing; there were 680,000 farmers having corn pickers in 1954, for example—50 percent more than in 1950. Between ⅔ and ¾ of the corn acreage in the Corn Belt is now harvested with pickers. The machine cuts the labor required by almost three-fourths; it shortens the harvesting season so that all the corn can be in before winter hits. Powered by a tractor, the corn picker moves along the rows, grinding the corn plants between two rollers, which snap off the ears. The ears then fall to another pair of rollers that strip off the husks; they then ride up a slanting conveyor and are dumped into a wagon trailed behind.

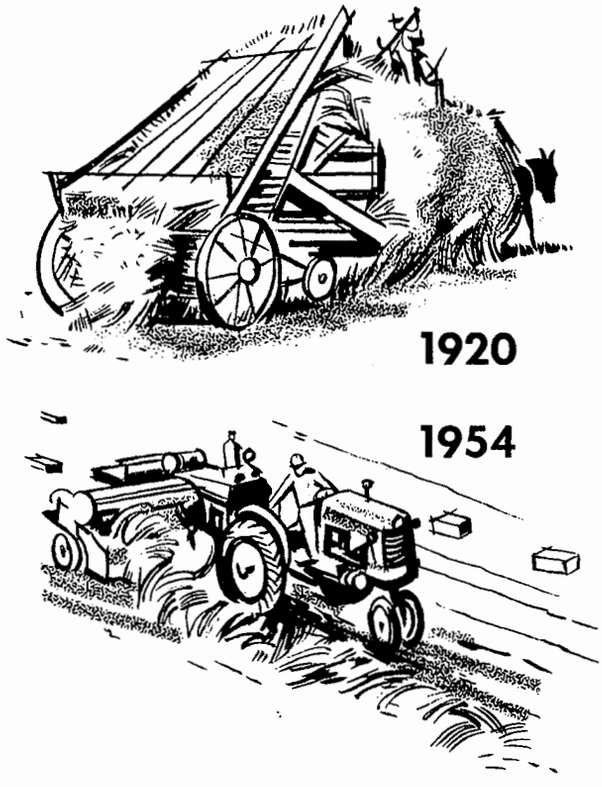
There are also picker-shellers that pick, husk, and shell the corn, delivering the shelled grain to the trailed wagon; stationary shellers; driers that lower the moisture content of the corn so it can be stored safely; husker-shredders, which handle corn already cut and cured in the shock; stalk-cutters, which cut up stalks left in the field after harvesting; power feed grinders, for grinding corn and other grains (over 700,000 farmers had these machines in 1954); mixers, for making up feed mixtures; wagons equipped to deliver feed automatically in measured amounts to feed troughs; field harvesters for cutting and chopping green corn for silage (reported by about 200,000 farmers in 1954); hydraulic lifts and chain hoists for raising and moving heavy weights; and so on. All this work used to be done much more slowly and laboriously by the muscle of man and beast.

Economics of machines.



One of the problems of mechanized farming is to make full enough use of some of these machines to achieve maximum economy. A corn picker costs around $1,500. The one-row machine can harvest up to 200 acres in a season; the two-row, 400 to 450 acres. Fred North has 75 acres in corn. How get the full benefit of such costly equipment before it becomes obsolete? A partial answer is custom work and joint ownership. Fred North owns his corn picker and harvests corn for other farmers; in turn, he hires a combine with an operator to harvest his wheat, oats, and soybeans; and he and two other farmers jointly own a pick-up hay baler. This too is an expensive device; a self-propelled machine costs around $2,500, one operated from the power take-off of a tractor, around $1,500. But it makes an easy, quick job of what used to be the hard, sweaty, uncomfortable, time-consuming work of getting in the hay crop. Even with such developments as power forks, mechanical loaders, slings, and conveyors, handling loose hay was troublesome. The pick-up baler takes the hay up from the windrow, compresses it into a tight rectangular bale with a plunger device, ties it mechanically with twine or wire, and drops the bales to the ground, where they can be picked up by mechanical loaders and put on a truck or trailer. (Another type flattens the hay in the windrow and rolls it up like a carpet into round bales.)

Three-fourths of all hay now baled.



The automatic pick-up baler operated by one man (all the earlier methods required a crew) was developed about 1940. So great is the saving of labor that its use has spread rapidly. Between 1950 and 1954, the number of pick-up balers on farms increased from 192,000 to 443,000, according to Census figures; and in 1954 almost three-fourths of the 100 million tons of hay in the United States was baled, the part of the crop still handled in long loose form being mainly in dry areas or on western ranches where hay can be left stacked in the field. A still newer device, even more economical of time and labor, is the pick-up chopper which chops the hay from the windrow. The amount of hay chopped and baled increased from 2 percent of the crop in 1944 to 7 percent in 1954.

The work saved in handling the hay crop by these new methods compared with hand labor must add up to a very impressive total. Even the thought of lifting one hundred million tons of hay by the forkful, first to the wagon and then to the hayloft, entirely with arm, back, and leg muscles, is fatiguing. It all used to be done that way.

Billions of hours saved.

Haymaking is, of course, only a part of the transformation. In 1920 it took some 24 billion man-hours to produce this country's agricultural products, according to U. S. Department of Agriculture figures. In 1955 it took only 14.6 billion—a reduction of about 40 percent. Meanwhile, output (or that part of it intended for use by human beings) increased by 60 percent, and the number of workers on farms fell from 13.4 to 8.2 million—a drop of almost a third. In 1920, each farmworker produced enough food and fiber for eight and one-half people, including himself, and in 1954 enough for 20 people. An hour's work in 1954 was equal to two and one-half hours in 1920. The number of farms in this period decreased from 6.4 to 4.8 million, but the average size expanded from 148 to 242 acres.

This prodigious change in 35 years parallels the same kind of progress in industry, which, as we said earlier, is now inseparably meshed with agriculture in a new kind of unity, based on the discoveries of physics, chemistry, and biology that apply to both.

Old legends tell about the knight or warrior who was an ordinary weak mortal until he got the magic weapon that gave him gigantic, untiring strength. This is what science has done for Fred North, but more dependably than magic.

CHAPTER 3—MILK

Jack Lait's dairy farm.

There were 20 million milk cows in the United States in 1954. Only half of them, 10.7 million, were on commercial dairy farms; but this half produced four-fifths of the whole milk sold for consumption as fluid milk, condensed milk, and cheese. On the other hand, the dairy farms produced less than a fifth of the cream sold, largely to be made into butter. The rest came from farmers who did not make dairying their main business.

The principal milk-poducing region in the United States is the Northern dairy belt. It extends from New England through Wisconsin and Minnesota and is divided into five major dairy areas. The oldest of these is the Northeast dairy area, which takes in Maine, New Hampshire, Vermont, most of New York, and parts of Pennsylvania and Massachusetts.

In the heart of this area are the lovely rolling green hills and meadows of south-central New York, where Jack Lait runs a 215-acre farm with some 38 head of cattle—24 of them milking cows and the remainder young stock.

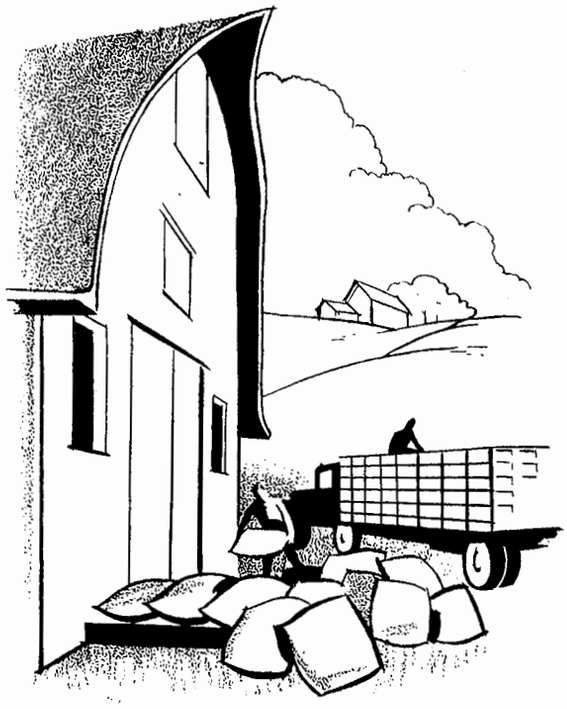
Milk production an exacting business.

Jack Lait is not a large-scale producer. His gross income in 1954 was a little over $7,000, which puts him in what the Census calls Economic Class III; the big Class I dairy farm would probably gross five times as much, around $35,000. Eighty to ninety percent of his returns comes from whole milk, though the sale of cattle and calves brings in around $500 a year; few people realize that a considerable portion of the beef marketed in the United States comes from cows culled from dairy herds, and bull calves are of course ordinarily sold for veal. The Laits usually have a pig or two and some 60 to 70 chickens, which provide a little cash from the sale of eggs; but on the whole, the business is strictly dairying, for the fresh milk market. An exacting business it is too, requiring meticulous attention to detail, with a couple of dozen cows to be milked at least 730 times a year, and half again as many to be fed, watered, and cleaned up after just about as frequently. Of all farmers, the successful dairyman has to have a temperament peculiarly suited to his work. "The eye of the master fattens his cattle." It must be a calm as well as a knowledgeable eye; for if the ruminating cow seems to be as placid as a statue, the fact is that she is singularly sensitive to good or bad treatment and that even a change in the daily routine can have a prompt effect in reducing her milk production.

True conservation farming.

The soil here is what is known as gray-brown podzolic, leached by the 40-inch yearly rainfall and developed under the immense forest that originally covered this area. It is not particularly fertile but responds well to manure and to the fertilizer which the dairy farmers use as liberally as they can afford to. The system of farming is calculated to keep the soil in good condition, for this is primarily a hay-and-pasture area, with a minimum amount of land in row crops. Of the Laits' 215 acres, 70 are harvested cropland, and most of this is hay; there are hardly 20 acres in oats and corn, the latter grown for silage. The total pasturage adds up to a hundred acres, about a fourth of it pastured woodland. Another 25 to 30 acres is in woodland not pastured. So more than nine-tenths of this farm has a year-round vegetative cover such as might gladden the heart of a conservationist. The whole countryside, in fact, looks as pastoral as though it had stepped out of a poem by John Milton.

Jack Lait's invisible partners.



This does not mean, however, that the dairy cows of the area manufacture their milk entirely from grass and clover. They also get carefully calculated rations of grain and concentrates. But Jack Lait does not produce this part of the feed. Like the other dairymen of the region, he has it shipped in from the Middle West. If he had to raise all his feed himself, he could keep only half as many cows on the same amount of land. By having other farmers raise some of it, he can about double his production. Expensive as this process is, the demand for fresh milk in the cities and towns of this most densely populated part of the United States is so great that it pays. In effect, then, a sizable share of Jack Lait's milk production comes from Midwest soil, and Midwest farmers are unseen partners in his business.

In fact, of all farm businesses dairy production is one of the most intricate, integrated, and highly organized within and among producers and handlers. This is fundamentally because of the nature of milk.

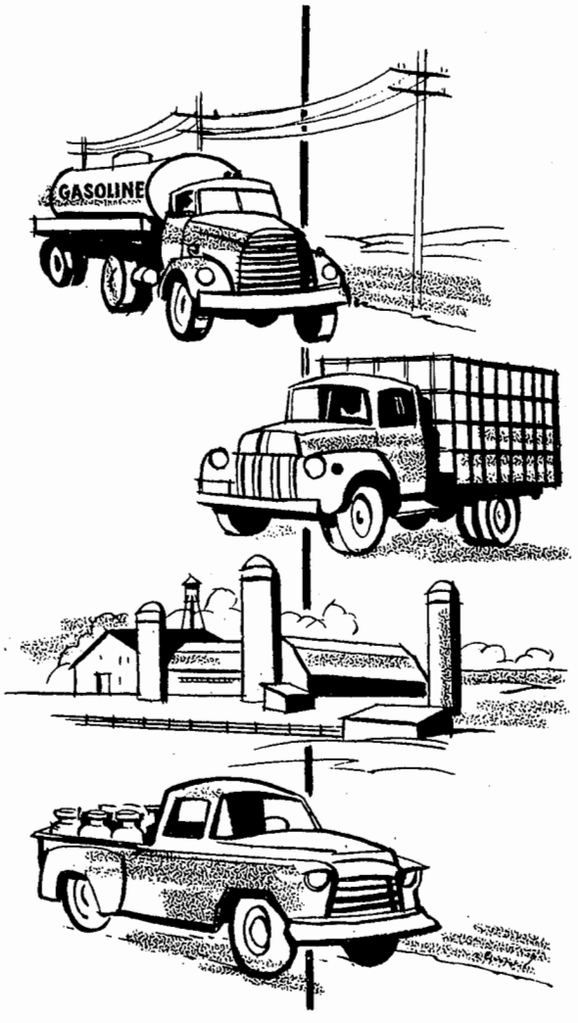
The universal food of youngsters.

Infants the world over start life with milk as their only food. In the United States they graduate from the breast to cow's milk; and from then on, the milk of cows is the most universal and important food of every American youngster, though children in many other countries are not so fortunate. Increasingly it has become an important part of the diet of all young people, even up to the age of 20 or so, and nowadays of people from 20 on. In fact this most nearly complete food has so grown in popularity, largely as a result of modern nutritional research and education, that the per capita consumption of milk and milk products—other than butter—increased about a fifth from 1925 to 1954. Though milk is not in the same category as air and water from the standpoint of human need, in this country it is probably the most nearly indispensable food; and if some catastrophe suddenly cut off the milk supply of any sizable part of the population, the result would be calamitous. At the same time, this well-nigh indispensable food is peculiarly perishable, becoming loaded with germs when it is wrongly handled and requiring at every stage from production to consumption the utmost cleanliness, sanitation, refrigeration or other sanitary safeguards, and dispatch.

Safeguarding the milk supply.

So the United States economy, with its rapidly growing nonfarm population and rapidly shrinking number of farmers (in Jack Lait's part of the country, central New York, less than 15 percent of the population are farmers), has developed a remarkably complex milk industry. The producers themselves are well organized in most of the big dairy areas—so well that they can register effective protests when they think something is seriously wrong with prices or marketing conditions. Since 1937, a Federal law, the Agricultural Marketing Agreement Act, has operated in most of the major areas (except where it is not needed or where there are adequate State controls) to fix the prices handlers must pay for milk and prescribe the method of prorating the returns to producers. This is a very complicated procedure since the price varies according to the use to which the milk is to be put, which in turn varies with the area and the season, and also according to the fat content and quality of the milk, the price and supply of feed locally available, handling costs, and other factors. The law, based on the fact that milk is so peculiarly essential a food, provides for public hearings and is designed to insure an adequate supply, adequate returns to producers, and orderly marketing in the public interest. In addition, of course, sanitary regulations govern production and handling from the cow's udder through collection and pasteurizing and bottling to the ultimate retail outlet, and they are especially strict in the case of milk to be used fresh.

No farmer can go it alone.



The general truth that no farmer today can be self-sufficing or independent in the sense that almost all farmers used to be applies with particular force to dairymen in the position of Jack Lait. At one end, he is dependent on others for an important part of his feed. At the other end, his product has to be taken off his hands regularly, promptly, and efficiently, and go through an elaborate, rather costly distribution system. He is subject to a cost squeeze at one end and a price squeeze at the other that might crush him without some such protection as the marketing agreements provide. Even so, he has to do an increasingly efficient production job to stay in business, and this requires cooperation of another sort.

As in all branches of agriculture, two factors have a particularly vital bearing on the efficiency and profitableness of a dairy operation—how much production per cow?—how much milk per man-hour of labor?

Dairy-cow breeding program.

Of the various elements that determine the former, breeding is the most important. The average production of United States dairy cows has been steadily rising. From an average of 4,167 pounds a year in 1924 it has gone up to 5,512 in 1954, an increase of almost one-third in 30 years. To a considerable extent this is due directly or indirectly to the nationwide Dairy Herd Improvement Association (DHIA) movement which began in the United States in 1906 (having originated in Denmark) and had spread to about 21,000 herds by 1956. In the interval, two simpler plans adapted to smaller herds, the Weigh-a-Day-a-Month and the Owner-Sampler programs, grew out of the DHIA movement; and the cow-testing, recordkeeping habit became so widespread that it was possible to inaugurate the national Proved Sire Program in 1935.

Throughout the country there were some 2,266 associations in the DHIA program in 1956. Each association has a supervisor who spends one day a month at each member's farm and makes an official record of each cow's production, feed consumption, etc., for that day. This costs the producer about $0.40 a cow a month or, say, about $105 a year for the average of 22 milking cows in a herd the size of Jack Lait's. In the two other plans the owner himself does the weighing and recordkeeping. The Owner-Sampler plan costs about $0.25 a cow a month, or some $66 a year for a herd the size of Lait's, and the Weigh-a-Day-a-Month plan (which omits butterfat testing) about $0.05 a cow a month—$13 a year for a herd the size of Lait's.

In addition to these programs involving the county agents, the State Extension Service, and the Federal Government, there is the work of the breed associations, which keep official Herd Improvement Registry (HIR) records of all the animals in purebred herds, and in the case of some breeds, Advanced Registry (AR) records of selected animals. Finally, the Proved Sire Program makes systematic use of the production records of all the daughters of each sire to determine his ability to raise production levels when bred to cows in a given herd. A dairyman who uses only proved sires, selected to fit the production of his particular herd, should be able to increase yields consistently with each new generation.

Improvement more rapid than ever.

Now a new element has come into the picture which promises a far more rapid advance in average production than could possibly have been achieved before. This is artificial insemination. The first United States artificial breeding association for dairy animals was organized in New Jersey in 1938. Within two years a million cows were involved in these organizations. Artificial breeding can extend the merit of a good sire from the normal 40 to 50 cows a year by natural mating to 5,000 or even 10,000; and with further technical improvements the number may be increased before many years to 25,000. Moreover, distance is no barrier since the seminal fluid can be shipped long distances, even overseas, under refrigeration. For a small herd the cost of artificial breeding is far less than that of keeping a bull; the dangers of handling these animals are eliminated; and the dairyman is saved the slow and often disappointing process of proving his own bulls by breeding them and raising all the daughters to producing age. Artificial insemination also prevents the spread of certain diseases. Proved sires are now used for about two-thirds of all cows bred artificially, and the other third are bred to bulls of exceptional merit in the process of being proved.

Production up, feed costs down.

At least half the cost of producing a hundred pounds of milk is the cost of the feed. A cow weighing 1,200 pounds and producing 4,000 pounds of milk a year requires just as much feed every day to maintain herself as does a 1,200 pound cow producing 14,000 pounds of milk. All the latter needs is enough extra feed to produce the extra quantity of milk; she needs nothing extra for maintaining life processes. The result is that the cost of feed per 100 pounds of milk drops rapidly with higher production. DHIA records for 1953–54 show that for a cow producing 4,000 pounds the feed cost is $3.15 per hundred pounds. For a cow producing 14,000 pounds the feed cost is $1.61 per hundred pounds—about 50 percent less.

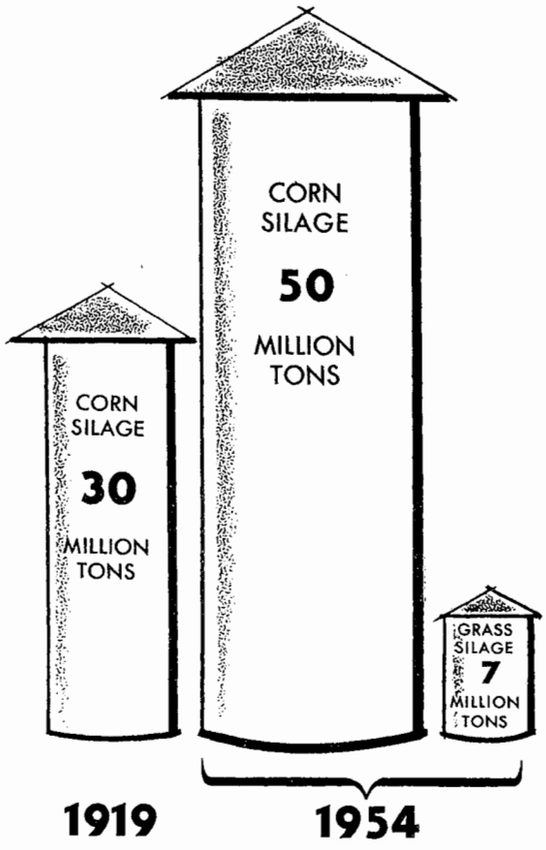
The average DHIA cow in 1954 produced 9,363 pounds of milk. Jack Lait's herd is far below that figure, averaging about 6,600 pounds. His milk sales per cow were about $260 in 1954, whereas herds in the same area averaging 8,000 pounds brought returns of more than $300 per cow. The Laits probably do the best they can with the limited resources of a $7,000 gross income—which nets a good deal less than half that. At any rate Jack is among the 10 percent of producers who are well aware of the relation between production levels and costs, keep careful records, cull their cows, use the better producers for breeding, and follow a program calculated to upgrade the herd. At best this is a slow process, but it would be far slower without the widespread cooperation between producers and scientists involved in the recordkeeping, breeding, and artificial insemination organizations.

Feed the major expense.

We noted that Jack Lait's milk sales per cow amounted to some $260 in 1954. To get this return he had to spend $100 per cow on grain and concentrates, or a total of $2,400 for the 24 milkers. Nor is this all, because the $275 he spent for fertilizer and lime to spread on pasture and cropland was an indirect feed cost, and so was some of the $365 for gas and oil, and the $120 for machine hire, and the $370 for hired labor to supplement the work of himself and his family; so that in fact most of the direct production expense of $3,500 to $3,600 given in Census figures went for feed. Expenditures for seed and for machinery repair, not reported in the Census of 1954, would add a little more.

So Jack Lait tries to figure out rations that will keep feed costs down as much as possible. Roughage—pasture, hay, ensilage—is the cheapest source of energy and also provides a good deal of protein, especially if the roughage is high quality clover or alfalfa. He gives the animals all they will eat; a cow will clean up 50 pounds of corn silage a day in the barn, and 20 to 25 of hay a day even when on pasture. But milk is 3.6 percent protein, and a sizable amount of this most expensive feed ingredient must be fed daily to keep up the milk flow. The aim is to get it from the cheapest available source. Corn is 7 percent protein, oats 10 percent, barley 9 percent; Jack may use one or all in various proportions, plus soybean or linseed meal or wheat bran or some other concentrate running much higher in protein than the grains. In the end he comes out with a mixture averaging, say, 16 percent protein if his hay is not of the highest quality, or 14 percent if it is.

Emphasis on grass.



The cost of high-protein rations, especially in a grain deficit area such as Jack Lait's, puts increasing emphasis on getting all the nutritive value possible out of the roughage part of the feed. Partly this is a matter of pasture management. Pasture forage changes in composition and nutritive value with the seasons of the year and the stage of maturity of the plants, and fertilized grass may be twice as high in protein as unfertilized. In the case of bluegrass, for example, the use of manure may mean a yearly increase of as much as 325 pounds of protein to the acre. This is as good as feeding 800 pounds of soybean meal of 41 percent protein content. Using fertilizer and manure also stimulates new growth and makes the grass more appetizing to the animals.

Better ways of handling and preserving forage are equally important. More and more hay, for instance, is being chopped in the field, blown onto wagons, blown into the barn, and artificially dried, to save not only labor but the maximum amount of nutrients. Also, more and more farmers are turning grass and legumes into silage, which preserves the nutritive values of the green plants better than any other method. The fine-cut fresh material is packed tight in the silo, usually with molasses or some other carbohydrate added to feed the bacteria that produce the lactic acid needed to preserve the silage; or more recently sulphur dioxide gas is injected into the ensilage as the cheapest kind of preservative. This grass silage is often fed at the rate of more than 100 pounds a day per cow. Good milk yields can be produced on roughage alone with this kind of feeding. They are not as high as with grain and concentrates, but the economics of production may force a stronger trend toward straight roughage feeding in some areas.

Mastitis the biggest disease problem.

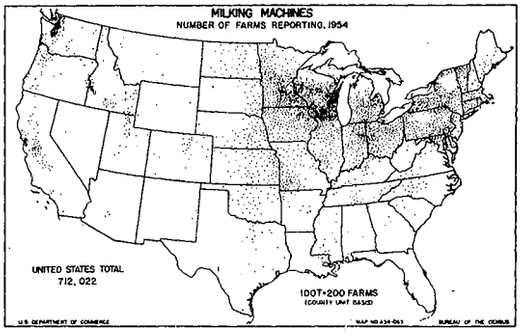
Prevention and control of disease is also more or less constantly on Jack Lait's mind. Fortunately, tuberculosis is now completely under control, as all herds are tested regularly. Bang's disease is still responsible for losses amounting to $100,000,000 a year, but testing, vaccination of calves, and other measures have achieved a considerable degree of control.

The most common and serious disease is mastitis. Sooner or later practically every cow in the United States gets this udder infection, which always brings a temporary and sometime a permanent reduction in milk yield, boosts the bacteria count of the milk, and may in extreme cases ruin whole herds. Losses are estimated by the United States Department of Agriculture at $225,000,000 a year. No dairyman can hope to succeed who is not constantly on the alert for mastitis and conscientious in preventing and controlling it. Several kinds of micro-organisms cause the disease, particularly streptococci and staphylococci. At one time there were high hopes that penicillin might completely control mastitis, but there are too many causes for any one remedy to be effective in all cases. Good dairymen have learned that they can minimize the damage by very careful herd management, unremitting emphasis on sanitation, periodic testing of all animals, accurate diagnosis of those affected, and treatment with the proper drug, depending on the cause in each specific case.

A horse-and-tractor farm.

From the standpoint of labor-saving devices, Jack Lait is reasonably well equipped. Like more than half the dairy producers in this area, he still uses both horse and gasoline power for field work. The biggest labor saver in harvesting is the field forage harvester, a machine that not only cuts and chops standing corn, grass, and legumes for ensilage, but can also be adapted to picking up and chopping hay and straw from the windrow. These machines, first introduced about 1920, are becoming so popular, especially in dairy areas, that the number on farms jumped from 80,000 in 1950 to 200,000 in 1954. Though they represent a considerable investment, one-third of those in the East were owned by farmers with less than 180-acre farms. In many cases the cost is reduced by joint ownership or by doing contract work for other farmers.

Milking by machine.

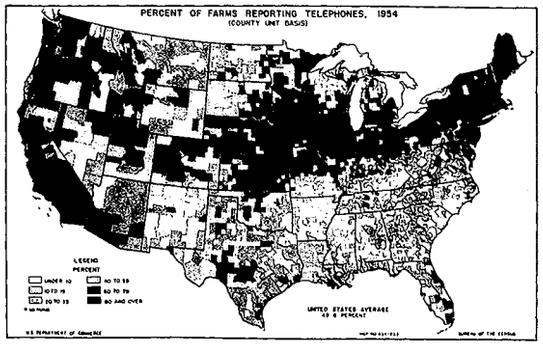


The most universally used mechanical device among dairy farmers is of course the milking machine; 90 percent of the producers in the Northeast area had them in 1954. This machine takes the tediousness out of the milking chore. Each machine more than doubles the number of cows one man can handle in an hour, and he can run several machines simultaneously. Vacuum cups attached to the four teats are actuated by rhythmic pulsators that suck out the milk, which is emptied into a container; or in the most up-to-date and economical method, it is passed along through a pipeline to a stainless steel tank in the milkroom, where it is cooled by refrigeration and stored until the refrigerated tank truck of the dairy company collects it each day, all without any direct handling and therefore with greatly reduced chances of contamination.

The well-run farm.

The Laits' big, clean, well-lighted barn is arranged for handling and distributing feed in carts and for ease in the twice-a-day removal of manure from the gutters, to be spread on the fields daily with a mechanical manure spreader (not pitched with a fork from the tail of a wagon as in the old days) or if necessary stored temporarily under cover to keep the fertility elements undamaged by weather. Jack Lait would like to have one of the gutter cleaners that removes manure mechanically with a revolving-screw pushing device but has not been able to afford it yet.

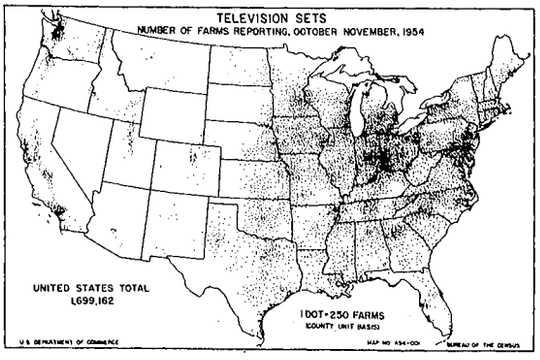
Home life reflects agricultural advance.



The revolutionary developments that have occurred in agriculture in recent decades are nowhere more strikingly evident than in the home and community life of farm families. Like Dan West and Fred North, John Lait has a good paved road running past the farm, which is not many miles from a good-sized town. He and Mary and the three youngsters do not feel that they live away out in the country, isolated from city life like the older generation. In the car or truck they can get to town quickly to see movies, visit a wide array of shops and stores, eat at a restaurant, and in fact enjoy most of the advantages of a city without the disadvanage of having to live in one. Although they seldom have occasion to travel by air, they are not far from an airport. They have a radio in the house and another portable one that as often as not is in use in the barn. This, with a daily paper delivered at the door, keeps them in touch with the news, daily market developments, and so on. In fact, like city folk, they are constantly bombarded by air with news reports, commentaries, music, drama, advertising, and a regular farm program.

It need hardly be said that like almost all farm families in their economic group in the area, the Laits also have electricity, telephone, electric refrigerator, and washing machine. They want to get a freezer as soon as they can afford it; over half of the families in their economic group in the area had freezers in 1954.

Television comes to the farm.



Recently the Laits acquired a television set. The purchase of television sets by farm families within the past few years is the most striking current evidence of the rapid disappearance of traditional differences between city and country. The farm Census collected statistics on television ownership for the first time in 1954. In 1950 there were very few sets on farms. By 1954 a third of all the farmers in the United States had them. The concentration is of course greatest where there are nearby broadcasting stations. In this 4- to 5-year period, more than 8 out of 10 farmers in New Jersey bought television sets; almost 8 out of 10 in Rhode Island; about 7 out of 10 in New York, Massachusetts, Connecticut, Ohio; about 6 out of 10 in Indiana, Delaware, Maryland, California; more than 5 out of 10 in Michigan, Iowa, Pennsylvania, New Hampshire. In Montana, Wyoming, and Nevada less than one farm in 10 had television—but many more undoubtedly would have had if programs had been available.

In other words Jack and Mary Lait want the same good things for themselves and their children that city families have, and they get these things as soon as they can afford to. This particular device for entertainment and education is especially well calculated to make them feel in intimate contact with persons and events far beyond their own neighborhood. Also, it is well calculated to stimulate the sale throughout rural areas of the same products that are sold in the cities—clothing, household devices, breakfast foods, and everything else—so that farm and city people will become even more indistinguishable.

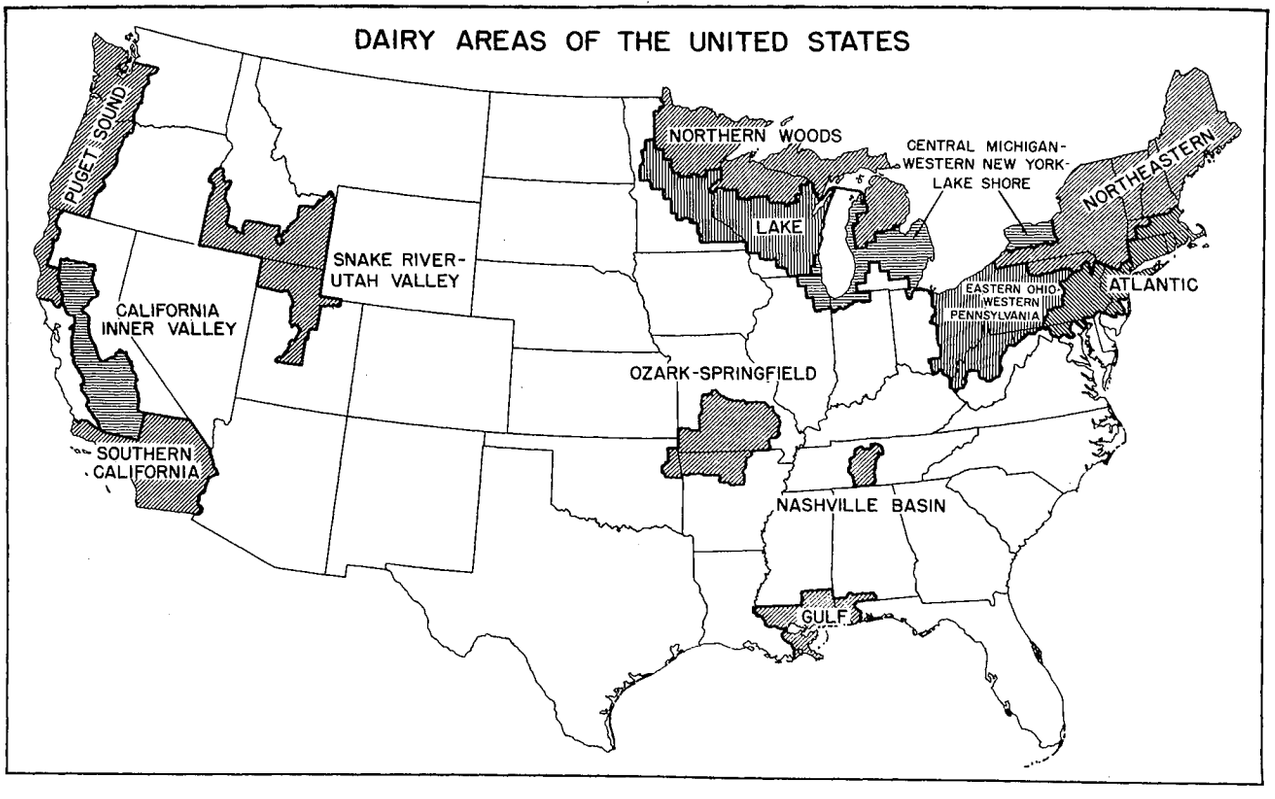
Differences in dairy areas.

While Jack Lait's farm is typical of the Northeast dairy region, conditions vary considerably among the different major areas, of which there are 4 others—Eastern Ohio-Western Pennsylvania, Central Michigan-New York Lake Shore, Northern Lake, and Northern Woods. The Northern Lake area, for example, produces only twice as much milk as the Northeast area but 10 times as much butter and 16 times as much cheese. In fact, the North Central States produce 80 percent of the United States butter supply, about 79 percent of the American cheese, 65 percent of the farm-type cheeses, and 50 percent of the evaporated and condensed milk. But as we have noted earlier, much of the cream supply, which goes into butter, comes from farms where dairying is secondary to other kinds of production.

Besides these main dairy areas there are seven smaller ones where dairying is important—Nashville Basin, Gulf Coastal, Ozark-Springfield, Snake River-Utah Valley, Southern California, Sacramento-San Joaquin, Puget Sound-Coastal.

Of all the dairy areas, Southern California is the most unique, not to say fabulous. Here a handfull of farmers, comparatively speaking, have made Los Angeles the leading county in the United States in milk production and number of milk cows. Of 23,847 commercial farms in the Southern California area in 1954, only 1,101 were dairy farms, four-fifths located around Los Angeles. The herds run from 200 to 300 cows each. Average sales in 1954 were $107,000 per farm, over nine-tenths from dairy products. Average production per cow was 11,112 pounds and average sales per cow $548. Total investment per farm averaged $136,502. Most of the farms do not raise their own feed; they buy high-quality baled alfalfa hay, often trucked from considerable distances, or fresh-cut green alfalfa delivered daily by truck. Cows are replaced every two to three years by animals not raised on the farm but bought from other farmers, often in distant parts of the country. The average expenditure for feed in 1954 was $48,000, and for labor, $15,000. One man handles as many as 60 cows. This system of utilizing the cow's endocrine system to produce milk in big, highly specialized, biological factories seems to be a product of climatic and economic factors in that particular area.

The Los Angeles area is an extreme case, not likely to be duplicated elsewhere. By contrast with the average investment of more than $135,000 per farm there, Jack Lait's total investment is $24,000—$14,000 in land and buildings, $10,000 in machinery and livestock. But in his area as elsewhere, the general trend is toward larger farms, bigger herds, more production per cow, more machinery, heavier investment, an increase in the proportion of farms in the higher income brackets—more of almost everything, in fact, except low-income producers and young people to go into dairying.



CHAPTER 4—EGGS

Jim Avery.

Born and raised on a farm, Jim Avery had gone to work in one of northern Oregon's big lumber mills when he was a young man; but farming was in his blood and he always had a hankering to get back to it. His chance came when he was almost 50 years old. An accident at the mill left him with a bad leg and a small pension, not enough to live on. The children were grown by then and had their own families to take care of. It took Jim and Martha no time at all to decide what they were going to do—buy a farm with their small savings and some borrowed money and raise chickens. (It is an interesting fact, incidentally, that nearly half the poultrymen in that region are past the age of 55, and about a fourth of them are over 65.)

They liked chickens.

That was ten years ago. They never regretted it. They made very little money, but they liked the life, they liked the country, they liked chickens, and they produced enough fruit, berries, vegetables, and milk on the place, plus the eggs and poultry, to eat, as Jim put it, like royalty. For this was a beneficent land they lived in, this valley area between the Cascades and the Coast Range—mild winters, cool summers, plenty of rain, magnificent trees and mountains, a climate and soil admirable for the production of fruits and nuts and dairy products and poultry, good neighbors, and booming towns and cities to provide nearby markets.

Jim's income.

Jim's income from the farm in 1954 was about $3,600, so he was in what the Census Bureau calls Economic Class IV. The place had 35 acres, which is very small as farms go but not as small as many highly specialized poultry farms. With that much land he could devote 14 or 15 acres to pasture and 9 or 10 acres to growing a little hay, oats, wheat, barley, fruits, nuts, and vegetables. There was enough to sell about $170 worth of crop products in 1954, besides what he fed and used in the house. In addition Jim and Martha kept a couple of milk cows and usually had a calf or two and a pig. The cows were in production practically only during the long grazing season, but they produced enough milk to bring a return of some $140 from a local factory making Oregon's excellent cheddar cheese. The sale of other livestock products aside from eggs and poultry brought in about the same amount.

Around $3,100 of the $3,600 farm income came from poultry products—$2,300 from eggs, $440 from broilers, $310 from other chickens sold for meat, and $60 from minor items. Essentially, then, Jim and Martha were in the egg business, which contributed two-thirds of their farm income while other poultry products brought in another 20 percent or so.

Small-scale producer in a squeeze.

Not much of the $3,600 was left after meeting expenses. The ratio of costs to returns is exceptionally high in the poultry business, and it squeezes especially hard on the small-scale producer. Jim Avery, with a flock of 500 chickens (excluding those under 4 months old) of the egg-meat breed highly favored in Oregon, was on the small side as poultry farms go, and the year's work he and Martha put in did not net them more than a few hundred dollars at best. Farther down the scale, the Economic Class VI producer is more than likely to lose money. Altogether, in specialized poultry production the pressure is particularly heavy to operate on a bigger and bigger scale to make any reasonable profit. In 1954 there were almost 32,300 fewer small poultry farms (Economic Classes IV, V, and VI) in the United States than there were in 1950, but there were 11,000 more large ones (Classes I, II, and III); and the number of the biggest farms (Class I) increased by half. (This does not mean more acreage; the trend is toward less land but larger flocks.) The net decrease in the total number of poultry farms, therefore, was around 21,000 in the five-year period. One out of five in Jim Avery's economic group either went out of the poultry business or enlarged to a bigger size.

How much profit?

In fact it is questionable whether Jim Avery actually made a profit from farming in 1954. According to Census figures, poultrymen in his economic group in that particular area spent an average of $2,660 for feed, $114 for gas and oil, $12 for lime and fertilizer, $64 for hired labor, and $43 for machine hire. These cash expenses total $2,893, leaving a return of $707. Jim did not spend anything for hired labor or machine hire that year, which increases the return by about $100. But he did have other expenses. These the Census does not pinpoint specifically for Oregon poultrymen in his economic group but does estimate for poultry farms in the United States as a whole. They include purchase of chicks and other stock, machinery repair and maintenance, marketing cost, miscellaneous expenses (vaccines, veterinary services, etc.), real estate tax, interest, construction and land improvement, and purchase of machinery and equipment. The average of these expenses for the smaller-scale operations (Economic Classes IV, V, and VI) is about $1,800. Assuming that Jim Avery did not have all of them in 1954, he did have to buy baby chicks (a sizeable item—500 at 40 cents would cost $200), get machinery repaired, pay the veterinarian, and meet the cost of taxes and interest, all of which might well add up to enough to eliminate any profit. Certainly if you consider the poultry operation alone, with gross sales of $3,100, it could hardly be considered remunerative.

A sense of accomplishment.

That is why Jim's small pension comes in handy, and also why, being a good mechanic and in demand, he occasionally puts in a few days working at the mill during rush periods. Considering all the food he and Martha get from the farm and the house, which is old but comfortable to live in, and the work to keep a vigorous man like himself busy and interested, he considers that farming pays; but he would admit that a good deal of the return is not in the form of hard cash but in the psychological sense of accomplishment and healthful living. He is one of the cases, increasing in number, where the city meshes directly with the country in the sense that it provides part of the farmer's livelihood, though in his case not very much.

In 1954 well over a third of the poultrymen in Jim's economic group in that area earned more money from outside work than the value of the farm products they sold, and a fourth of them worked at least 200 days off the farm.

How much capital invested?

Capital investment per poultry farm, United States: 1954

Land and buildings	$13,646
Equipment	2,496
Livestock	1,536
Total	17,678

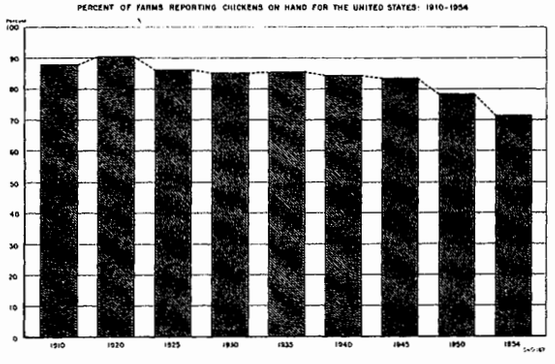
Although it is not possible from the 1954 Census figures to determine just how much capital an Oregon poultryman in Jim Avery's position has invested in his place, the figures are available for the United States as a whole. The average for a poultry farm in Economic Class IV in 1954 was a little over $14,000—almost $11,000 in land and buildings, about $1,200 in poultry and other livestock, and about $2,000 in machinery and equipment. In the case of Economic Class I poultry farms the average investment in 1954 was three times as much, close to $45,000.

A business of paradoxes.

Jim Avery is in a business that rather bristles with paradoxes. It has about the highest sales return yet the smallest margin of profit of any type of farming. It accounts for 28 percent of all the returns from livestock production—more than half as much as dairying does; yet it adds the least value over and above costs.

Since a large share of the cost of production goes for feed, poultry producers contribute materially to the income of other farmers and of feed dealers. In particular, poultry use a lot of grain. They consume about a billion bushels a year to produce the same number of calories in the form of eggs and meat that people could get (if they had to) from one-eighth that number of bushels consumed directly.

Almost everybody used to keep chickens.



Almost everybody used to keep chickens—9 out of 10 farmers and a great many villagers and townspeople as well. On the farms they were commonly a sideline, often a source of "pin money" for the womenfolk; in the villages, a backyard companion of the vegetable garden, fed mainly on scraps. Today only one farm in 3 sells eggs (though 7 out of 10 still keep chickens, most of them for the home table), and 5 percent or less of commercial farms specialize in poultry production.

The big and little flocks.

Percent of chickens in big flocks (1600 or more chickens)

	Percent
1954	18.7
1950	9.4
1940	3.8
1935	2.9

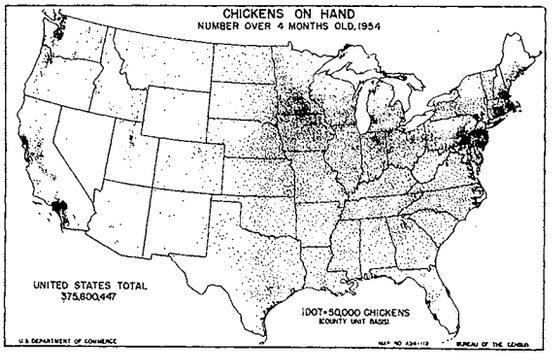
Chickens are scattered all over the country, but the hens in 5 States—California, Iowa, Minnesota, Pennsylvania, and New Jersey—laid two-fifths of the eggs sold in 1954. In three geographic regions (of the 9 designated by Census) the small precentage of farms with big flocks of 1,600 or more had a large share of the chickens. Two-thirds of the chickens in New England were on 11 percent of the farms; over half of those in the Middle Atlantic and the Pacific regions were on less than 7 percent of the farms. On the other hand, in the East North Central and West North Central regions, which account for a little less than half of the eggs sold, over 80 percent of the chickens are in small flocks of less than 400 and one-third in flocks of 200 or less; very few farms have as many as 1,600 birds.

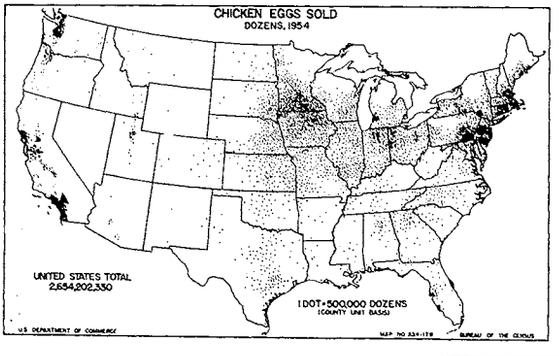
Obviously, in this huge area, egg production is seldom the main farm business. But the region produces most of the country's grain, and farmers there can feed chickens a good deal more cheaply than the specialized poultry producers in the East and West who have to import feed. Egg prices are generally higher in the East and West than they are in the Midwest.

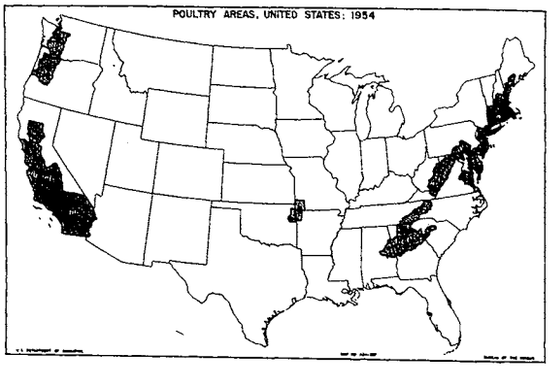
How can the Atlantic Coast and the Pacific Coast producers compete with this situation? Partly because, devoting practically all their time to poultry, they are extremely efficient. The 15 States where laying hens averaged more than 200 eggs per bird in 1955 included all three on the Pacific Coast, where the averages were very high, around 210 eggs or more; 7 of the 9 States in the North Atlantic and Middle Atlantic regions, on the East Coast; but only 5 of the 36 States in all the other regions. The lowest egg production per bird is in some of the Southern States. But—another paradox—the South does an extraordinary job with broilers; the 16 South Atlantic and South Central States accounted for two-thirds of the 3.3 billion pounds produced in the United States in 1955, and Georgia alone contributed more than a sixth of the total United States production.

Where the chickens are located.

The first of the three maps shows where the chickens are located. Notice the intense concentrations in a relatively few coastal areas and the diffuse scattering in the Midwest. The second shows where the eggs are sold; again there are intense coastal concentrations and diffusion in the center. Finally, the third map shows the main strictly commercial poultry areas.







Gigantic setting hen.

A hatchery is a gigantic artificial setting hen much bigger than any Paul Bunyan ever had. At intervals it turns out hundreds of thousands of fuzzy baby chicks, which are shipped a day after hatching either in cartons by mail or in special trucks or vans. Artificial hatching on a large scale is not new; the Egyptians and Chinese were experts at it probably thousands of years ago, with no way to judge temperature except by touch. The modern hatchery with automatic temperature and moisture control, mechanical turning of the eggs, and so on, is new, and so is mail shipment of chicks, which began in the United States in 1918.

Progress in control of disease.

The hatchery business is now one of the highly specialized branches of the poultry industry, and it was a major factor in making present-day commercial production possible. The egg or broiler producer no longer breeds his own stock. The hatchery does the breeding or buys eggs from breeders. This end of the industry, then, is a particularly vital one, for the hen's rate of production, viability of the eggs, rate of growth, rate of feathering, size of egg, and other characteristics important to the egg- or meat-producing chicken are inherited. Progress in poultry genetics and breeding, and the specialization in breeding fostered by the development of hatcheries, are foundation stones of the industry today. Control of pullorum disease, which once killed off young chickens like a man blowing out candles on a birthday cake, is also an achievement of the hatchery business. Not that the threat is by any means removed; but the system of blood testing for carriers and accrediting hatcheries as "pullorum clean" or "pullorum passed" under the National Poultry Improvement Plan—initiated in 1935—is a major development.

From cheepers to chickens.

Though Jim Avery does not have to be a poultry genetics expert, he is well aware of the importance of good stock and selects his source of chicks accordingly. The van delivers the little cheepers to him around the first of the year. He uses small movable colony houses, each equipped with a stove to supply heat and a hover to keep the heat confined. The young chickens are kept in these houses until they are 4 months old. This early period is an anxious one. The chicks are let out into a small yard as soon as possible, and later the houses are moved to the range, where good grass and other green plants provide excellent forage and help to reduce the feed bill—high enough in any case. Feed and water must be supplied regularly, temperature and ventilation and humidity watched, overcrowding prevented, and hawks, crows, owls, rats, dogs, and other marauders circumvented.

About the time the pullets mature they are moved to the laying house. Jim converted one end of the big barn, originally built when the farm was much larger, to house chickens—not an easy job but less expensive than putting up a new building. The setup is as conveniently arranged as possible to save time and labor in collecting eggs, feeding, watering, cleaning out litter and manure, spraying and painting for cleanliness and sanitation, and inspecting the birds on the roosts to cull out or separate the sick, the poorly developed, the poor layers, the premature molters; and the building has good ventilation and admits a fair amount of sunlight.

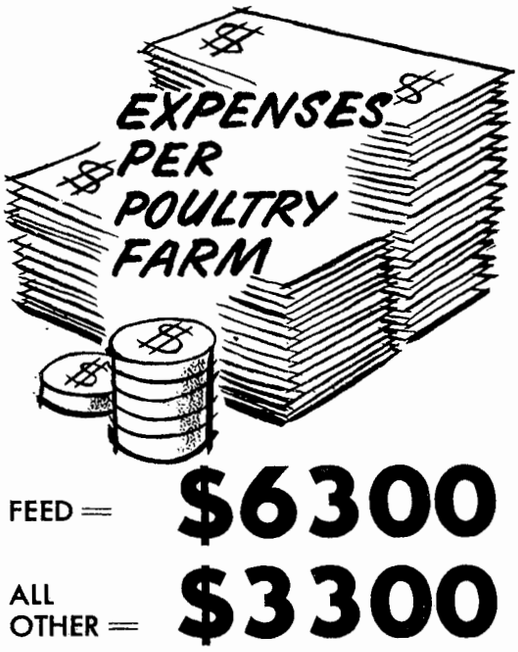
Meanwhile, before moving the pullets, the Averys have sold off their young cockerels as broilers at the age of about 3 months. They buy "straight-run" rather than sexed chicks—sexing being the process of separating males and females at the hatchery. Many specialized egg producers prefer to get only female chicks; but they cost more, and in the case of a large breed such as the Averys use, the cockerels can bring a sizable return which offsets some of the costs of egg production. In 1954 in Oregon broilers brought an average of a little over 25 cents a pound, or about 75 cents a bird, so that the Averys' $440 broiler income represented around 600 birds. Later on, at the end of the laying season, they begin selling off the hens for meat (at a lower price per pound than broilers) and get ready to house a new batch of pullets.

Same problems, less equipment.

Jim's problems, and the factors that determine success or failure in his poultry business, are the same as those of the big producers except that he operates on a small scale and cannot afford to do many things the big producer does.

The main scientific and technological advances of recent years that have made specialized poultry enterprises possible include breeding for high production; greatly improved feeding; better disease control; the prevention of nutritional diseases; the development of efficient labor-saving practices; and, especially in the case of poultry meat, progress in wholesale and retail handling to reduce spoilage and improve quality and convenience (quick freezing has been especially important).

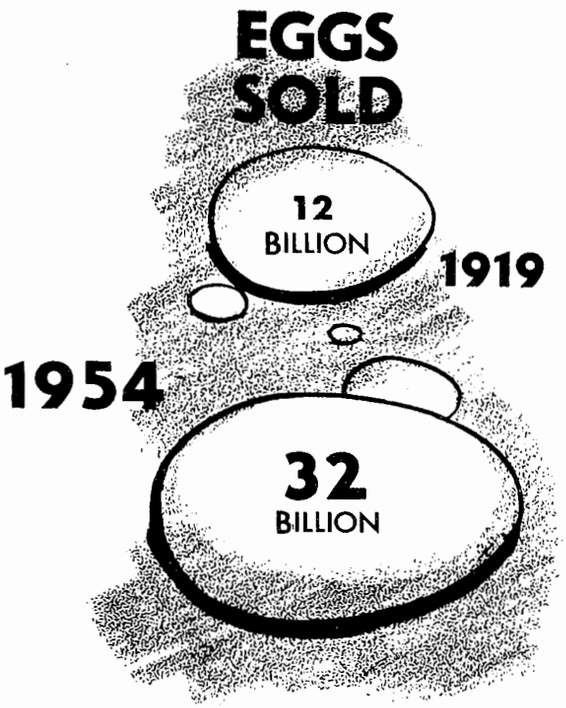
Feed, the big expense.



Feed, as we have noted, is the biggest single expense; the heavy breeds consume about 5 pounds for each dozen eggs produced, plus more than four and one-half pounds per pound of body weight up to laying time. Poultry rations have been worked out to a fine point, and the Averys try to do a good job of feeding. It does not involve as much figuring as it might, however, because Jim buys from the feed dealer, a large part of his feed already mixed, either in the mash form or as pellets. This makes up the entire ration to the age of 8 weeks, after which he adds scratch grain, though not all producers feed scratch grain nowadays.

Feed dealers naturally have a large stake in the success of the poultry enterprise—so much so that they give a good deal of help to producers in the form both of printed material and of an extension type of advisory service. In the case of specialized broiler production, feed dealers frequently finance the whole operation. A broiler producer who raises, say, 10,000 chicks a year buys them in four lots 3 months apart and markets the broilers at the same intervals. With no income in between, he faces a problem of short-term credit, since his outlay for chicks and feed alone may be well over $2,000 for each of the four batches, and he operates on a small margin of profit, in a fluctuating market, with no Government supports. In his case there is an especially high premium on efficient feed use.

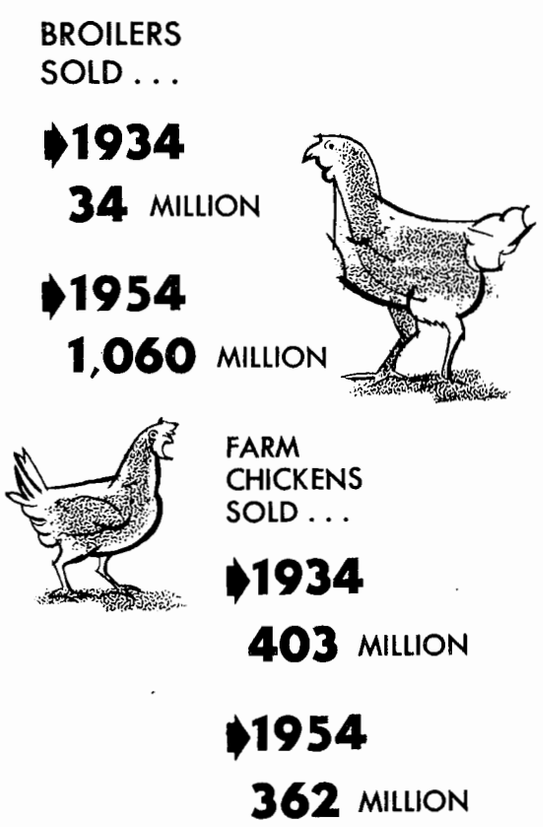
Eggs and meat are the products.



On the other hand, the birds must be kept eating as much as they need; eggs and meat are conversion products of feed. So when the days begin to shorten in the fall Jim starts the clock-regulated lighting system in the laying house, with the lights turned on morning or evening so the hens will stay active and eating for a full 13-hour day.

He has to be on the watch for several diseases; some could do a vast amount of damage. Pullorum control is now largely in the hands of the hatcheries. A number of diseases can be controlled more or less effectively by vaccination or immunization—fowl pox, infectious bronchitis, laryngotracheitis (to some extent), Newcastle disease. For a few, medication is useful—coccidiosis and coryza, for example. For some there is no preventive except good management and meticulous sanitation—chronic respiratory disease, fowl cholera, lymphomatosis, which kills as many chickens as all other diseases together. If fowl plague or paratyphoid shows up, the affected birds have to be eradicated.

A highly segmented industry.



Plainly the Averys are only one segment in a highly segmented industry which includes the hatcheries, the hatchery egg producers, the market egg producers, the broiler producers, a few producers who specialize in roasting birds or capons, the turkey producers, the duck producers, and even producers of guineafowl and game birds. A large-scale enterprise may resemble a manufacturing plant more than it does a farm, at least in the old sense. Instead of small colony houses, young chicks may occupy a solid permanent brooder house heated by a hot-water system; and the chicks may be bought in batches at intervals to make continuous year-round use of the brooder house, in which there is a fairly heavy investment. Laying houses may be two or three stories high rather than spread out horizontally. There may be automatic self-feeders, automatic watering systems, overhead trolleys to haul manure, electric machines to stir the thick layer of litter on the floor, hydraulic lifts, electric egg washers, and so on. Some of the big farms have metal battery brooders—cages stacked one above the other for young chicks; and even laying hens may be kept separately confined in small metal cages like guinea pigs in a laboratory. But innovations such as cages for layers have disadvantages as well as advantages, and, in any case, they are practical only in large operations.

Modern specialized broiler production is perhaps the most factory-like of all agricultural production. This business has grown spectacularly in recent years. In 1945 the average American ate 21.3 pounds of chicken, of which only 5 pounds was in the form of broilers. In 1956 he ate only a little more chicken, 23.4 pounds, but 16 pounds was in the form of broilers. In the same period turkey consumption expanded greatly—from 3.5 to 5.4 pounds a person. The marked stepping up of broiler and turkey consumption was probably due to a combination of high employment, good wages, increased consumer attractiveness of the product, and economies in production due partly to technical advances.

Eggs were still eggs.

Meanwhile eggs were still eggs, and the competition of other foods seems to have crept up on them a little. Consumption per person averaged 397 in 1945 but dropped to the equivalent of one egg a person a day in 1956. Poundwise, of course, 365 average-size eggs weigh considerably more than the 28.8 pounds of poultry meat consumed per person, but dollarwise somewhat less than half of the $2 billion farm returns from poultry products came from eggs as compared with meat. A little more than one-fourth of the poultry income came from broilers.

The number of broilers produced in 1954 reached a total of 1.3 billion—97 percent of them coming from 28,000 farms that turned out more than 8,000 apiece and only 3 percent from 22,000 smaller enterprises such as Jim Avery's. The big plants need very little land; practically everything is done indoors. One building may house 20,000 birds. Conversion of feed to meat is highly efficient; in 1955 it took only 8.8 pounds to produce a three-pound broiler compared to 12.3 pounds in 1933. The farmer delivers live birds to the dressing plant, where killing, plucking, singeing, cleaning, dressing, packing, chilling are carried out as a continuous line production process; there are even specialists for different stages of evisceration.

They got what they wanted.

This kind of operation is far beyond Jim Avery's reach, and in fact he is not sure he would want to be in the business on such a large scale even if he could. He prefers to take life a little easier without quite so much drive. On a better equipped place, even with no outside help, he and Martha between them could probably handle well over 2,500 chickens instead of a few hundred, and make more profit; but they tell themselves they have enough worries as it is without taking on more. All in all, they think they have about what they want—an old but liveable house fitted out with much younger conveniences, a good town nearby, a faithful old automobile to get there, a still-usable tractor and small truck, and a better chance to make a little extra money than many men of Jim's age have.

CHAPTER 5—COTTON

Ned Doxey, cotton cropper.

The high cost of poultry production makes Jim Avery a borderline case from the standpoint of profitable farming; without off-farm work and past savings, he would not be nearly as well off as he is. Many farmers do not have these advantages, and many of them are still lower down on the economic scale.

Ned Doxey is one. Ned grows cotton in that wonderfully productive area in northwest Mississippi where the Father of Waters has deposited layer on layer of soil as rich as that laid down by the Nile in Egypt. He and his wife Sarah are both descendants of slave families on plantations lower down on the river before the Civil War. They have never been outside of Mississippi and don't want to be. But their two older boys, Lester and Howard, live in New York, and their daughter Miranda has just married a young Philadelphia preacher, and a third son, Adam, has made it clear that as soon as he gets old enough he is going to leave and get a job somewhere else too.

The striking progress made in American agriculture has passed by Ned and Sarah Doxey, as it has some 1¼ million other families making up well over a third of the 3.3 million commercial farmers in the United States; unless you want to say that the better opportunities opened to Lester and Howard and Miranda are an indirect outcome of changes in agriculture, which is true, since in the old days the young Doxeys would probably have stayed where they were.

Two-thirds of the cotton farms are small.

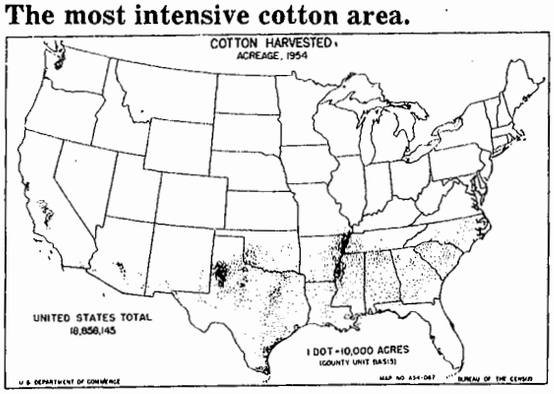
These 1¼ million families are the ones earning less than $2,500 a year from the sale of farm products. The Census divides them into two groups. A farmer is listed in Economic Class V if he earns $1,200 to $2,499 from the farm. He is in Economic Class VI if his farm earnings are between $250 and $1,199, provided he does not work 100 days or more off the farm during the year or receive more income from outside sources than from farm sales, in which case he would not be considered a commercial farmer by the Census but a part-time, noncommercial farmer.

Farms growing cotton

	Percent
1 bale or less	16
2 bales or less	29
3 bales or less	39
4 bales or less	48
5 bales or less	55
6 bales or less	60
7 bales or less	69

The farm families with incomes under $2,500 are scattered pretty well all over the United States, but there are more of them in the South than anywhere else. Nearly two-thirds of the 525,000 commercial cotton farms in the United States in 1954 were in that category, and there were more cotton farms than any other type at the Class V and Class VI levels. Most of them are in the old Cotton Belt States east of the Mississippi River.

The most intensive cotton area.



The part of Mississippi where Ned Doxey lives is in the Delta area, one of the main cotton regions in the United States. This long narrow strip is now more intensively planted to cotton than almost any other part of the country; more than 8 out of 10 farms grow cotton and about 87 cents of every dollar of farm income is from cotton sales. The cotton farms include some of the best and the biggest, but also half of the smallest, with the lowest incomes. In fact 53 percent of the cotton farms there were in Classes V and VI in 1954, but they produced only 19 percent of the Delta area cotton. By contrast, less than 3 out of every 100 cotton farms were in Economic Class I (over $25,000 a year farm income), but they accounted for more than 26 of every 100 bales produced.

Most of the cotton growers in Ned's economic group in the Delta area are Negroes and more than a third are croppers. A cropper is different from a crop-share tenant who pays a share of the crop in lieu of cash rent but normally provides his own equipment, livestock, feed, and so on. The cropper furnishes none of these things. He gives half the proceeds of crop sales to the landlord, who in turn furnishes not only house and land but power, equipment, feed, and usually half the fertilizer. The cropper contributes only his labor. In effect, he is a hired worker who shares the risk of crop and price failures but is reasonably sure of having a roof over his head, though it may be a leaky one.

Typical cropper family.

Of 28 acres in the farm Ned Doxey works, 17 are in harvested cropland—about 11 in cotton, most of the rest in corn. He normally produces considerably less than a bale to the acre, and it is practically his sole source of income; few cotton farmers in this region have any outside work and very few croppers earn more than a pittance from selling any product other than cotton. Ned's total farm income in 1954 was a little over $1,700. Half of this went to the landlord. Out of his own share he had to pay around $160 for his half of the fertilizer bill and some extra help at cotton picking time. His year's income, then, was about $700 plus a four-room house rent-free, wood he could cut for the kitchen stove, an outdoor toilet, a shed for a couple dozen chickens, another for some of the landlord's farm equipment, a pigpen in which he sometimes had a pig, and space for a garden where he could grow some vegetables.

Because he is a cropper and not a cash-rent tenant farmer or an owner, Ned's situation does not fairly represent that of Economic Class V farmers in general. Many would have been somewhat better off financially, even after deducting expenses, which in Ned's case were met almost entirely by the landlord.

A meager home and a meager diet.

The Doxeys' small frame house was old, and not in very good condition, but it was home, and Sarah kept it neat and clean. Up to a short time ago they still used kerosene lamps; now they have electric lights but no other conveniences except an antique car bought secondhand years ago and a radio which the two older boys sent them the Christmas after the electricity went in. Sarah nurses a secret hope that some Christmas the children might chip in for a washing machine.

Sarah is a good enough cook, but the diet of the Doxeys does not give much chance for variety. Cornbread and syrup and salt pork are staples; eggs, unless they are sold to get a little cash; some fresh meat for a while when a pig is killed; now and then a hen in the pot, or occasionally a fried chicken; blackeyed peas; sometimes collards cooked with a bit of salt pork. Perhaps the limited, rather meager diet is one reason why Ned and Sarah seem older than their actual age, the midforties. This is younger than the median age of farmers in the United States, but people in the Doxeys' position tend to die young, having few of the comforts of life, sketchy medical care, and too little education to know much about the fundamentals of health. Neither Ned nor Sarah got through grade school. The three older children did, and young Adam, influenced by the preacher brother-in-law, even thinks he is going to go to high school.

Changes are on the way.

Some of the Doxeys' neighbors do better from the food standpoint. There is a growing awareness of the inadequacy of the traditional diet, and some landlords believe it pays to help their cropper families get a cow, pig, and chickens, have an adequate garden, and raise some hay and feed. It is good for the landlord, good for the tenants, good for the land. This attitude is part of the widespread change that has been going on in the South, but Ned's landlord has not yet got around to it.

The changes that have occurred in cotton production result from the efforts of growers to cope with problems of great magnitude and difficulty, of which three are outstanding: the problem of labor, the problem of the boll weevil, the problem of competition. All of them together have brought a series of interrelated adjustments that are by no means ended.

Before 1793 cotton was an impractical curiosity because separating the fiber from the seed by hand involved so much labor. Then Eli Whitney invented the cotton gin to do the work mechanically. The United States became the world production center, England, the manufacturing and trading center, for a vast industry.

Cotton demands much labor.

The production of cotton was voracious in its labor demands. Preparing the soil, planting the crop, weeding, chopping (thinning) all required a huge amount of work; and worst of all was picking the cotton by hand, careful fingers pulling the lock or bunch of fiber from each boll as cleanly as possible with a minimum of adhering trash. This problem was solved first by indentured labor, then by importing slaves from Africa and developing the plantation system.

The boll weevil arrives.

The abolition of slavery in the sixties nullified that solution and made it necessary to start over again. The South went through an agony of readjustment, and it was many years before cotton production was again functioning smoothly, with the cropper system to provide an ample supply of cheap labor.

In 1892, just 99 years after Eli Whitney knocked down one hurdle, an inconspicuous little insect not more than a quarter of an inch long ambled up from Mexico to set up another. The boll weevil has a wicked, piercing snout. It feeds almost entirely on the cotton plant. It likes to travel in search of its favorite food. The female lays her eggs in the squares (blossoms) or the young boll, which then falls off the plant in six or seven days. She lives only a month at most, during which she lays up to 300 eggs. There may be as many as seven generations in one season.

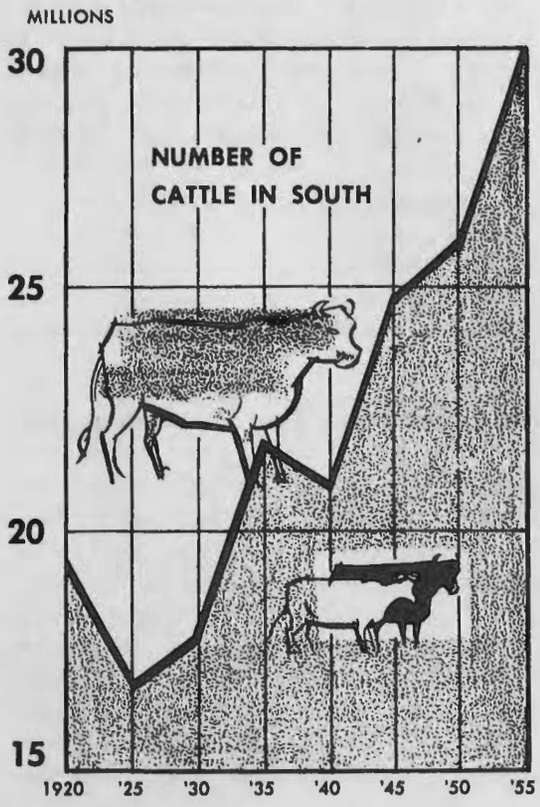
And brings tragedy.

Within 30 years after the first weevil immigrant crossed the border near Brownsville, Texas, the insect had overrun almost the whole Cotton Belt. The results were catastrophic. Production dropped 25, 50, even 90 percent a few years after the little weevils wandered into an area. Growers went bankrupt, farms were abandoned, banks failed, trade and industry stagnated, credit dried up, workers went north. This was the plight to which a small persistent insect reduced a land solely dependent on a single crop, America's greatest cash crop and one of her main exports.

Changes caused by an insect.

As the South eventually adjusted to the changes brought about by the Civil War, so it has been adjusting to this situation. Partly because the boll weevil does not survive cold winters or thrive in dry areas, it did not become established in western cotton-growing regions (they have pests of their own, however); so production has tended to move northward in the original Cotton Belt and westward across Texas and Oklahoma into New Mexico, Arizona, and California. Georgia, the Carolinas, Alabama, Louisiana, and Arkansas are now far less dependent on cotton than they used to be. In fact only in Mississippi and Alabama is cotton still the major source of farm income; in the former case largely because of the natural advantages of the hill and alluvial areas in the northwestern part of the State. Even in Mississippi, however, the larger-scale growers are diversifying their production considerably, adding more livestock, hay, soybeans, and other crops, though such changes have hardly begun to filter down to the little fellows like Ned Doxey.

A blessing in disguise.



Elsewhere in the Southeast other types of farming—livestock, peanuts, broiler production, for example—are taking hold more and more extensively to replace cotton. In Georgia, 81 percent of the farms were producing cotton in 1930; in 1954, only 48 percent. In South Carolina in the same period the percentage dropped from 83 to 61 percent, in Louisiana from 80 to 46 percent, in North Carolina from 54 to 29 percent. Not only has farming improved as a result of these changes; the region has also been developing industrially so that in many areas there are increased opportunities for nonfarm employment. The South may be compared to a man who has had a bad heart attack. If he survives, he may be healthier and stronger than ever and also take better care of himself. The shock of boll weevils or heart attacks may be looked on as warnings of something basically wrong that needs to be corrected.

A challenge that brought progress.

Also, through various cultural practices and the use of insecticides, scientists and growers have learned much more about combating not only this insect but a host of others that seem to find the cotton plant especially delicious. Some of the newer insect poisons are particularly effective. Growers like Ned Doxey watch the cotton patch carefully for boll weevil infestation, and if it is bad enough, plod up and down the rows with small hand or wheelbarrow or one-mule dusters. The bigger-scale growers use multiple-row tractor-drawn equipment, or if the acreage is large enough, contract to have the dusting done by airplanes, a swift and rather hair-raising operation with small planes skimming a few feet off the ground strafing the insects with clouds of poison at the rate of 350 acres an hour. Even so, boll weevils have not been eradicated, and in the weevil territory cotton yields are more uneven from year to year than before the advent of the weevil; and the guerrilla warfare is expensive, adding a good deal to the cost of production.

Advance of mechanization.

Use of large-scale equipment for insect and disease control is part of the accelerating trend toward mechanization of cotton growing. In the earlier days when labor was plentiful and cheap there was no need to mechanize production; in fact it might have created a tremendous problem of surplus workers. Also, there was no use in mechanizing soil preparation, planting, cultivation, weeding, thinning as long as an army of pickers had to be on hand to harvest the crop as the Doxeys do by finger-power, trailing a long bag into which they stuff the white fluffy locks, and managing to pick, say, 150 pounds of seed cotton a worker a day, which means about a third of that much lint after ginning. Then the field has to be gone over perhaps three times to get the later-ripening cotton. Ned does well if he can do an acre in less than 70 hours.

Cotton picking the biggest hurdle.

Man-hours for harvesting 1 acre of cotton

Delta, Miss.:	
Hand picking	100
Machine picking	5
High Plains, Texas:	
Hand snapping	24
Machine stripping	1.3

Farther west in Texas and Oklahoma they developed a faster method, snapping the whole boll off the plant instead of carefully picking the locks from the bur. By snapping, a worker can average perhaps a hundred pounds more seed cotton a day than by picking; but since it includes much more trash, the grade is lower. Then in 1914 someone in northwest Texas got the idea of attaching a piece of picket fence to a sled and dragging it through the field. The plants got caught between the pickets and the cotton was stripped off as the sled moved along. Gradually this crude device was elaborated and perfected until today tractor-mounted mechanical strippers are widely used in western areas where level land is well adapted to machinery.

Development of the mechanical picker.

Though efforts to develop a mechanical picker (as distinguished from a stripper) go back to 1895, they were not operationally and commercially successful until a few years ago. The Census does not collect figures on either strippers or pickers, but their use has been rapidly increasing where cotton is grown on large acreages and the topography is suitable. This is particularly true in the West, but the Delta region too is using mechanical pickers. The revolving steel spindles of this machine, which are kept wet, are pushed into the cotton plants on both sides; they catch and wind the fibers of the lock much as you might wind a lock of hair around your own finger, and persuasively tug it out of the boll. Then the fiber is mechanically doffed from the spindles and lifted or blown into a container. A one-row picker can cover as much as eight acres a day and harvest as much as 5,000 pounds (10 bales), the exact amount depending on

Completely mechanized production possible.

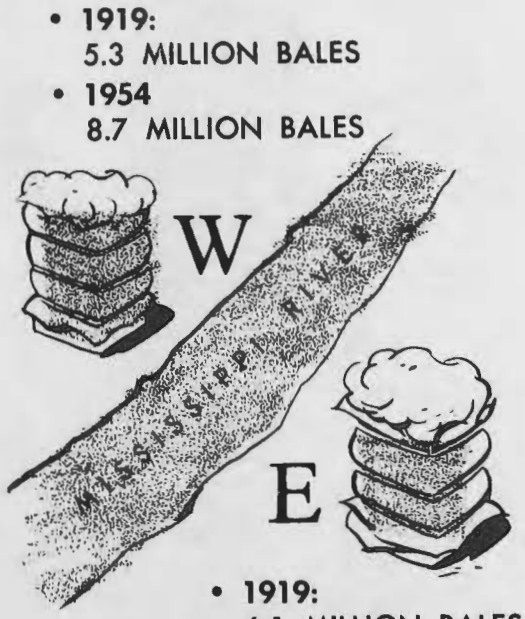
yield and other conditions; and a two-row machine picks 50 to 75 percent more. Sometimes the cotton grades are lower than hand-picked, but even so the machine saves time and money.

There are certain requirements. The plant should be specially adapted to machine picking (breeding takes care of that) and it should be completely stripped of leaves before the picking begins or the cotton would be mixed with green trash very hard to eliminate. The latter requirement has been met by development of chemical defoliants, which are dusted or sprayed on, sometimes by airplane, and make the leaves drop as effectively as the coming of winter.

These developments furnish another example of the combination of biology, chemistry, mechanics—agriculture and industry—nature and man—which is so potent a mixture for solving and creating problems. The mixture is finally bringing cotton—which, with tobacco, is about the last holdout—into the fold of mechanized production. Cotton can now be produced and harvested like corn entirely by machine, without the use of hands except at throttles and levers.

The present significance of this revolution, at least for United States producers, is perhaps connected chiefly with that third major problem, competition, which we have not yet defined. It has two aspects. First, the competition of other cotton-producing countries has in recent years been cutting deeply into United States export trade on the basis of lower prices. Second, synthetic fibers, notably rayon, have progressively been capturing a larger and larger share of the fabrics market from the "natural" fibers. Experts generally agree that if cotton is to regain any of this lost ground, or forestall further losses, it must be on the basis of lower production costs and the development of fabrics with qualities equal or superior, in the consumer's judgment, to certain special qualities of competing synthetics.

The westward shift.

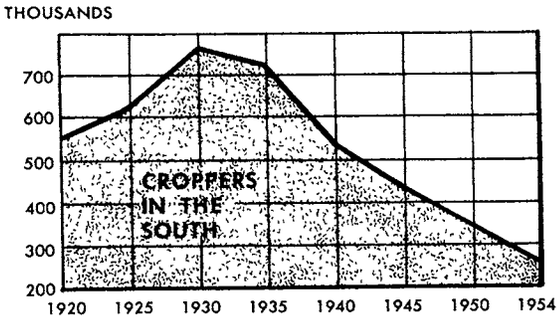


Cotton is moving West. Unless adequate small-scale equipment can be developed, mechanization will probably continue to pull cotton westward away from the eastern areas of hills and small fields (and boll weevils) to the level western land admirably suited to large-scale machinery. Half of the cotton crop in 1954 came from Oklahoma, Texas, New Mexico, Arizona, and California, and in at least three-fifths of the area it was grown under irrigation, which produces exceptional yields. The number of cotton farms had been reduced during the past 25 years or so in a number of the eastern States. The contribution made by cotton to the farm income of these States decreased accordingly. By contrast, in California, cotton contributed only 4 percent of the farm income in 1929 but more than 12 percent in 1954; in Arizona, 38 percent in 1929, 50 percent in 1954; in New Mexico, 17 percent in 1929, 38 percent in 1954. In the High Plains area of Texas the acreage in irrigated cotton doubled between 1950 and 1954. The consequence was a sharp decrease in total acreage but an increase in production—and in the number of Economic Class I cotton farms.

The Delta region where the Doxeys live is very much in this picture and has been adapting to changed conditions and practices. The bigger farms, some of them a thousand acres or more, use tractors for plowing, planting, cultivating, thinning; tractors or airplanes for dusting; mechanical pickers; and in some cases, flame for weed-

ing, Mississippi having been the first State to try this method with cotton. "Multiple Units" (plantations using the cropper system) are in some cases being reorganized into single units using hired labor instead of croppers—a development made possible by machinery. In 1954 the acreage in cotton in Mississippi was 51 percent less than in 1929, the period just before Government price supports and acreage controls began, but production was only 17 percent less.

A past that is disappearing.



Meanwhile only one out of four farmers in the Doxeys' economic group owns even a mule, let alone a tractor. Ned and Sarah belong to a past that for better or worse is disappearing. Even between the two most recent Agriculture Censuses, 1950 and 1954, the number of cotton farmers in Mississippi decreased by 18 percent—mostly the little fellows. Perhaps in a sense the Doxeys too are adapting to changed conditions, through their children, who have new horizons and a new outlook; but as individuals Ned and Sarah are chips circling in an eddy off from the main current. Busy about 200 days of the year, they are idle the rest. The opportunities for outside work where they live are limited. Always they are desperately poor. When they die the tradition of generations will be broken; there will be no more of their direct line on the land.

CHAPTER 6—TOBACCO

Will Ashton, Burley grower.

Still lower on the economic scale is Will Ashton. He has a small farm in the Highland Rim area of Kentucky, not far from the Tennessee boundary. The land here is very hilly. Some of the hills are so steep you wonder why the corn does not slide off. A good deal of soil does.

Will raises tobacco. It has been grown here for a long time, though not so long as in the old original tobacco country. John Rolfe deserves fame for something more than marrying Pocahontas; he started the modern tobacco growing business at Jamestown, Virginia, in 1612, learning from the Indians. Six years later Virginia was shipping 20,000 pounds to England, and before 1630 overproduction brought the first crop-control law, limiting the number of leaves a man could harvest from each plant.

Fewer acres, more production.

The tobacco that Will Ashton grows is Burley, now used mainly for cigarettes. His whole farm is less than 40 acres, but he gets practically all his cash income from the part planted to tobacco, which in 1954 was 2½ acres. That year about 10 percent of the Burley crop was pledged for Commodity Credit Corporation loans, but in 1955 this increased to 20 percent. The following year acreage allotments were reduced, and Will was not allowed to grow tobacco on more than one and three-fourths acres. Four out of five Burley producers were in the same situation. This process splits up tobacco production in still smaller pieces (they were small to start with), but how much it reduces production in the long run is debatable. Since 1920 the United States tobacco acreage has changed very little, but production has greatly increased—in the case of Burley, more than 100 percent. When prices go down, a man tries to plant more land to get the same amount of income; if his land is cut in half, he tries to grow two leaves of tobacco where only one grew before. Apparently he has a good chance of succeeding.

Tobacco farms are small.

Farms growing tobacco in the South

	Percent
Less than 1 acre	33
Less than 2.5 acres	54
Less than 5 acres	81
Less than 10 acres	97

This is evidence of progress in production techniques such as you find elsewhere in agriculture. Yet tobacco growing has, on the whole, been curiously static, not following the trends in other types of farming. There has been little mechanization, at least in the great Middle Atlantic region where most of the tobacco is grown. Though tractors are coming in, most of the work even on the bigger farms is still done by mule or horse. But a big tobacco farm is small in comparison with a big farm of practically any other type. In the main the crop is grown in small patches and at small profit. More than half the growers, and over 70 percent of those producing Burley, are at the lower end of the economic scale, Classes V and VI in the Census terminology. A grower may not actually lose money, but he is likely to get little for his labor, and tobacco demands a great deal of labor. Very few farmers are getting rich supplying the needs of the devotees of Lady Nicotine. In the Kentucky Burley area in 1954 only about one grower in a thousand had as much as 20 acres in tobacco.

Will's net cash return, $675 a year.

Where Will Ashton lives, more than 9 out of 10 growers are white, though farther east, in the flue-cured tobacco areas of the Carolinas, a third are Negro. Also, more than three-fourths of Will's fellow growers own their farms, though in the flue-cured tobacco areas croppers and other tenants outnumber owners. The value of the total investment in the Ashton place as of 1954 might be reckoned at a little over $5,000, of which land and buildings accounted for something less than $4,000, equipment (no power machinery) for $1,000, and livestock for about $300. The livestock consisted of a mule, a milk cow, a heifer, a young home-raised steer, a pig or two and a couple of dozen chickens. Of the 40 acres in the farm about half was cropland—the bulk of it pasture, plus corn and the tobacco patch. Woodland took about another 10 acres and grazing land and wasteland the remaining 10.

Farm sales per tobacco farm in the South: 1954

Crops	$3,043
Livestock and livestock products	275
Other	10
Total	3,328

Aside from tobacco sales of $685 in 1954, the Ashtons were able to sell other crop products worth about $15 and meat and eggs worth about $100. The total cash expenses amounted to at least $125, not including interest and other costs, so the net return was not over $675. Of course Will and his wife Sophie (they are no longer young, being close to 60) and their grown daughter Anna Mae (the other children left the farm when they married) get a fair amount of food off the place, which helps to make ends meet. There is in fact still a good deal of out-and-out subsistence farming in this area, which remains one of the most rural and least urbanized in the United States.

Of comforts, little.

Of comforts they have little more than Jim and Sarah Doxey—a somewhat more solid house because the climate is colder, but a well for water, an outhouse for toilet, a tin basin for washing, a galvanized tub for bathing and laundry, a spring house on the hillside for refrigeration, a stove and woodpile for cooking and heating, a wagon and the mule for getting around. Electric lights and a radio they do have, and a good small tobacco barn for curing the crop, and enough other barn and shed space for the animals and tools.

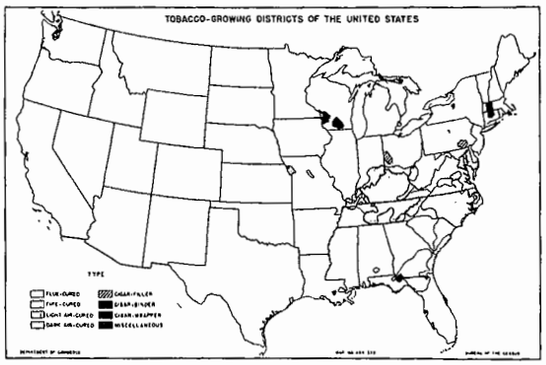
Hand work and mule work.

Neither Will nor Sophie have any outside work to supplement their farm income, but Anna Mae does a day's housework away from home whenever she can get it. The opportunities for outside employment are very limited, especially without an automobile for transportation, and no bus nearby; and besides, the Ashtons are about as closely tied to the land as all farmers used to be before modern machinery so greatly expanded what a man could do in a day. In the first place, his operation is too small to afford machinery or hired labor. In the second place, there is no way, yet, to harvest tobacco except by hand, just as there was no other way to harvest cotton until a short time ago. Will has all he can do, with help from the womenfolk and children, to cut the plants when harvest time comes, wilt them in the field, spear the big stalks on tobacco sticks, lift the heavy drooping plants with their enormous leaves to the racks on the long wagon, unload them at the barn, and lift them again to the horizontal poles that rise in several tiers up to the roof, where they hang, with carefully watched ventilation, to dry; and finally to sort them leaf by leaf into grades, tie the leaves in flat bundles, or hands, and haul the hands to the annual tobacco auction in a warehouse not far away, where they are sold along with the thousands of other bundles in the picturesque, hectic ceremony that a tobacco auction is.

Since there are no machines to reduce the time and labor required for this part of the work and Will can seldom hire help or power machinery for seed planting (which is done in coldframes anyway), plowing, transplanting the delicate plants, spreading and placing the fertilizer (of which he has to use a good deal), cultivating and weeding, topping or cutting out the tip of the plant at just the right stage, suckering or removing the side shoots as they develop in the leaf axils, and combating the diseases and insects that have accumulated in the main tobacco areas from nearly 300 years of growing the same crop in the same place. Even if power machines were available for all of these operations, as they are not, he can manage the work with hand tools and mule tools and do the farm chores besides. So why get anything more elaborate even if he had the money?

Some growers are more prosperous.

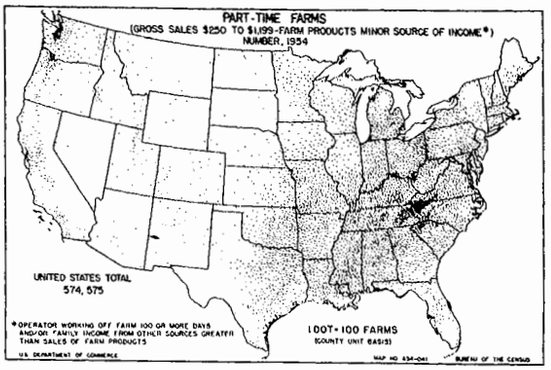
Not all tobacco growers are in Will Ashton's situation, of course, and not all tobacco-growing districts are like this one. For example, a big-scale grower in Economic Class I in this area (only three-tenths of one percent were at that level) might have had gross sales amounting to $30,000 in 1954, of which $20,000 would come from tobacco and about $10,000 from livestock and livestock products, including dairy, beef, and pork. A healthy diversification such as this is increasing. There are other differences. In the central bluegrass area of Kentucky, where Burley is also grown, the soil is better and more productive than where the Ashtons live and the tobacco does not need so much commercial fertilizer, which reduces production costs. In the flue-cured tobacco areas near the Atlantic Coast, less than half of the growers are in Economic Classes V and VI instead of about three-fourths where the Ashtons live. And the cigar-tobacco districts in the North—Connecticut, New York, Pennsylvania, Ohio, Wisconsin—are of course quite different from the tobacco areas in the South, but also much less important in the whole tobacco picture.



Yet under these variations is the stubborn fact that on the average an acre of tobacco takes 18 times as many man-hours of work as an acre of small grain, and seven times as many as an acre of corn, and 2½ times as many as an acre of cotton, and twice as many horse-hours as an acre of corn; so that in 1942, according to W. W. Garner, who quotes these figures in *Production of Tobacco* (Blakiston 1951), it took an hour's work for a man to produce three pounds of tobacco, worth at that time $1.10. This was during the War. Minus expenses, the net return would be considerably less. It seems like small profit for the experience, knowledge, judgment, and hard work required to grow tobacco successfully.

CHAPTER 7—FRUIT (PART-TIME)

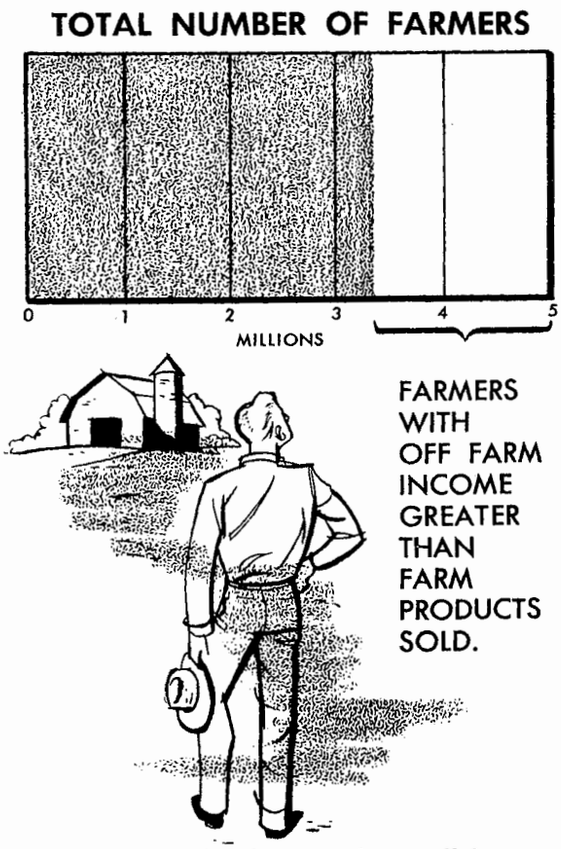
Meet Axel Peterson.



Now we are going to look in on the affairs of Axel Peterson, the youngest of the three Peterson boys who run a filling station in the San Joaquin Valley in California. Axel also runs a fruit farm though at present he makes more money selling gas than fruit. In combining agricultural and nonagricultural work he is more or less typical of some 2 million of our present-day farmers.

About 1880 this country reached a turning point in its economic development at which only half of the working population was in agriculture while half was in industry and business. The same process that brought us to that state seems now to be bringing us close to another turning point at which farm people, who today are only an eighth of the population, may earn only half their income from agriculture while the other half will come from off-farm sources—mainly wages and salaries for work in industry and business.

Off-farm earnings going up.



Many commercial farmers have off-farm income.

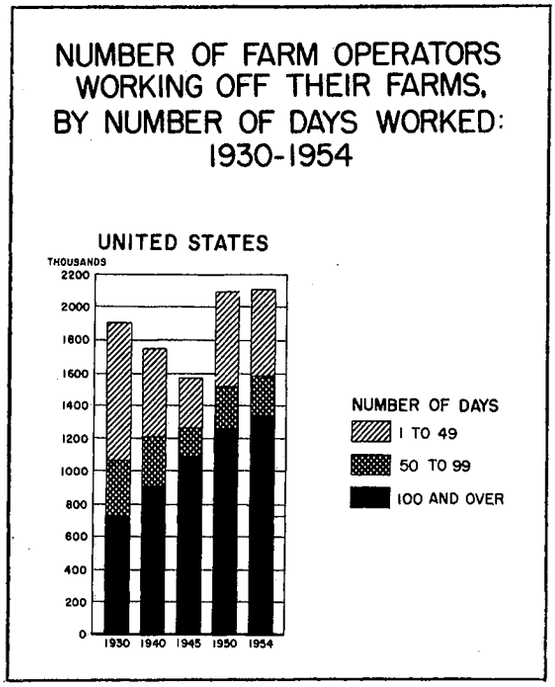
We have not yet reached this point, but we are not far from it. Out of every $10 of farm family income in 1954, $5.90 was the net return from the farm operation (including Government payments and products consumed at home), and $4.10 came from sources outside the farm. This is not true, of course, for every farm family, but it is true for farmers as a group. The total income of farm families in 1955 was about 19.3 billion dollars, of which 11.3 billion was the net return from farming while 8 billion dollars came from off-farm sources. The amount of off-farm income varied in different regions, with different types of farming, and at different economic levels, but the trend is evident almost everywhere at all levels.

Of the 8 billion dollars of off-farm income, the farmers at the two top economic levels, selling $10,000 to more than $25,000 worth of products a year, received over one billion dollars; those at the two lowest levels, with farm sales of $250 to $2,500 a year, over 1.4 billion; and the middle group, with farm sales of $2,500 to $10,000, about 1.8 billion. That leaves about 3.7 billion dollars, which went to families not counted as commercial producers—the part-time farmers, who received almost 1.7 billion dollars of the nonfarm income, and residential farmers, who received a little over two billion. Part-time farmers, under the Census definition, are those selling $250 to $1,200 worth of farm products who either work more than 100 days a year off the farm or whose off-farm income is bigger than their farm income. Residential farmers are those selling less than $250 worth of farm products a year, many of these having a bigger off-farm than farm income.

The distinction between commercial and noncommercial farmers is useful since the former are responsible for 98 percent of the value of farm products sold and the latter for only two percent. But it is also somewhat artificial in view of the fact that the commercial producers, as we have just noted, get 4.3 billion dollars of the off-farm income and a little more than half of them did some off-farm work in 1955, while the noncommercial producers get only 3.7 billion dollars and less than half of them did off-farm work. True, the residential farmers, being limited by definition to farm sales under $250 (when they run over that they are counted as part-time farmers) cannot contribute very much to total agriculture production, even though they are numerous—almost 900,000 of them, about

one farmer out of five. The so-called part-time farmer, however, may be very much a commercial producer in spirit, intent, and fact. But he too is limited by definition—in this case, to farm sales of less than $1,200, which puts him agriculturally at the lowest economic level, Class VI. When he sells more than this, he is no longer counted as a part-time farmer; he has graduated to the status of a commercial farmer, no matter how many days he may work off the farm or how big his nonfarm income is. It is an odd fact that between 1950 and 1954 the proportion of commercial producers working off their farms a considerable part of the year—more than 100 days—increased from 26.8 to 32. 5 percent, and the proportion with more nonfarm than farm income increased from 21.4 to 25.2 percent, while on both counts the proportion of noncommercial producers decreased.

Today city and country mingle.



In other words, four out of every ten farmers in the United States today are actually part-time farmers, not in the Census classification but in the sense that they spend only part of their time farming. In fact if time could be measured by income, which of course it cannot, they spend on the average 22 weeks a year in off-farm work and 30 weeks farming.

Perhaps nothing illustrates more strikingly how in this American civilization the city has been moving to the country and the country to the city in a steady growth of interpenetration and interdependence.

This digression was necessary to give some of the background. Now to return to Axel Peterson.

Axel and Hilda both have jobs.

Axel and Hilda have not set out on an easy road, but they are doing what they want to do. The service station business itself is an exacting one, but with three brothers working together Axel is able to stagger his hours and get stretches of time off when he needs to. His farm is not far from the station, which is on the edge of a large town. Hilda has a job in town as a stenographer; she is a good one and makes around $1,000 a year working part-time. Axel's share of the service station earnings totals about $3,500 a year. The Petersons have no children yet, but they want a big family. Whether Hilda will continue working after the first baby arrives remains to be seen. Probably not; but many women do nowadays, and even when they have children a considerable number of farm as well as city wives work in offices or stores or factories nearby. In 1955 more than a tenth of the total off-farm income of part-time farm families was earned by the wives, and those families reporting this source of income averaged over $1,400.

But they are farmers too.

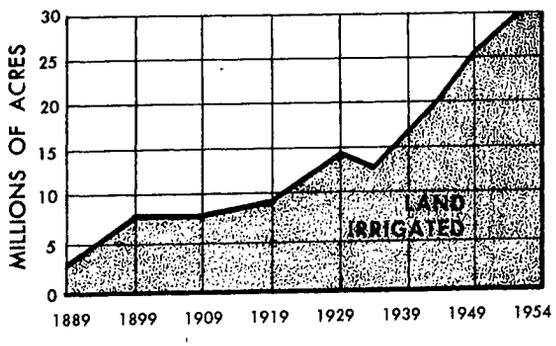
The Petersons both came from a California farm background; Axel's third brother, the oldest, inherited the home place when their father died. The young Petersons have put all the money they could scrape together into their farm. The service station too was a good deal of a strain in the early days, but the biggest share of that expense was borne by the two older brothers while Axel was still in school.

This is a great fruit area, the value of the fruit crop went up twenty million dollars between 1950 and 1954 while the number of fruit growers went down. Especially is it a great peach area, one of the best in the United States; and the Petersons' first ambition is to have a sizable peach orchard. It takes five years for peaches to bear, and their trees had not come into bearing at the time the last United States Agricultural Census was taken. But they had set out close to 500 trees in a three-year period, like a lot of other farmers in the area, where the acreage in both clingstone and freestone peaches expanded materially between 1950 and 1954—the latter, the predominant type, by 30 percent. Axel figured that if they could get around three bushels per tree, which was the average production for California's 7.5 million trees (it was less than two bushels for the United States as a whole), and if the price were somewhere near the 1954 level of $1.50 a bushel, they should gross close to $2,200. They plan to enlarge their farm production as their circumstances make it possible to get more free time or hire more help, and especially to bring more land under irrigation; for practically all fruit here is irrigated, as is much other crop and pasture land.

Strawberries while waiting for peaches.

Meanwhile they were using strawberry production in part of the peach orchard as a source of cash income, probably temporary. This is also an important crop in the area, where the number of farmers growing strawberries, though small compared with the number of peach growers, nearly doubled between 1950 and 1954, the acreage tripled, and production increased tenfold—a trend shared by the rest of California except that the number of growers decreased for the State as whole. Yields in California are extraordinarily high, averaging more than 8,800 quarts to the acre in 1954, compared with about 2,500 for the entire United States, and 6,200 for California in 1950. (In part the remarkably high California average is due to the practically year-round harvesting in the central coast area, the only place in the United States where this is possible.) The Petersons have the equivalent of some two-thirds of an acre in strawberries—the actual area is larger because the planting is among young peach trees—from which they got about 4,000 quarts in 1954. At $0.30 a quart, the State average, their gross return was close ot $1,200.

Growth of irrigation.



One of the major developments in United States agriculture has been the steady increase over a long period in the amount of land under irrigation, with an especially steep rise since 1939. This is true not only in California and the other 19 Western States where rainfall is scant, but also in the East, where the use of overhead irrigation has been expanding to supplement rainfall in dry periods. Irrigation is expensive, however, especially when it is an individual enterprise, with each farmer pumping his own water, as is the case in much of California, where 7 million acres was reported under irrigation in 1954. And the cost of operation and maintenance has been rising rather than decreasing as the pumps have to reach down to deeper and deeper levels to get water.

So Axel does not have any more land under irrigation than he actually needs for his young peach trees—at present, five to six acres. He has plenty of room for expansion, however, since there are twelve acres, all irrigable, in the farm. The rest is land he is not now using because he has all he can handle for the time being; and the work of spraying, pruning, and other maintenance will increase as the trees get bigger and begin to bear fruit, which will have to be picked. Picking fruit is still a hand operation though almost every other aspect of production, including much of the handling of the harvested crop, can be mechanized. Axel and Hilda can set out and tend the peach orchard and strawberry patch themselves, but they will have to hire some help for picking peaches as they do for strawberries. This is one of the biggest items of expense.

Equipment for the fruit farm.

The total value of the Petersons' land and buildings in 1954 might be estimated at about $20,000. Aside from the house itself, the buildings were not elaborate—a packing shed, used for strawberries but big enough for the peach crop in due course; shelter for a light tractor, small truck, power equipment, hand tools, spray materials, fertilizer; a workshop with power tools. Most part-time fruit growers do not own a tractor or a truck, but Axel did, partly because, in his business, he was in a position to get favorable prices on good used equipment, partly because he was headed for a somewhat larger operation than most part-time growers have. Under ordinary circumstances it might have been better to rent machines or get heavy work done on contract, but with a tight time schedule he preferred to have things handy for use at odd hours—or for Hilda to use, since she could run the tractor and truck as well as he could.

The Petersons had no livestock, not even chickens; most fruit growers in the area don't have, and in their case there was a special reason not to get tied down to daily chores; seasonal peaks of labor were more manageable. They did have a good vegetable garden and enough of California's gorgeous flowers to make the place colorful.

The house was a bungalow, well furnished and with the conveniences that would go with a good modern town or suburban house. Getting the more expensive items was not easy while also paying for a farm. Since the kind of living they did was on the strenuous side, it was necessary to have everything as time-saving as possible from the housework standpoint. Naturally they had a car. On the days when she went to town to work, Hilda took a bus that went by the door.

Many kinds of part-time farmers.

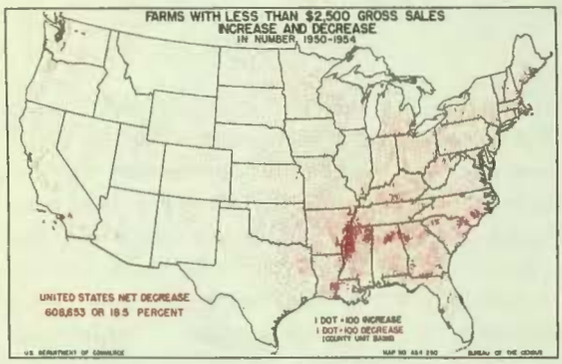
Part-time farms (575,000) by type, United States: 1954

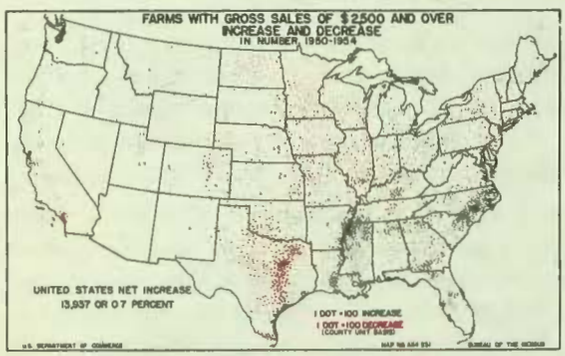
	Percent
Livestock, except dairy and poultry	32.9
Cotton	14.4
Cash-grain	11.0
Tobacco, other field crop	9.4
Dairy	9.3
Poultry	8.8
Vegetable, fruit, nut	5.6
General, miscellaneous	8.6

There are many kinds of part-time farmers. Axel and Hilda Peterson represent only one type. More part-time farmers are wage earners than proprietors or partners in a business like Axel, but they come from practically every occupation. Some run a farm to supplement other income. Some work in town to supplement farm income. Some use part-time farming as a step toward full-time farming. Some stick to it only until they can get out of farming altogether. Some take other work because farming with modern equipment leaves them with spare time and energy. Some run a farm because modern business hours leave them with spare time and energy. Some just like the rich meaning and challenge and sights and sound and smells that are part of a farm.

Similarly, there are as many variations in the kinds of farming part-timers undertake as there are types of farms, with corresponding regional and local differences; but some types are less suited than others to small-scale part-time operations.

The marked decrease in the number of small farms.





Until recently the number of part-time farmers fitting the Census definition had been steadily increasing, together with the number of residential farmers. Between the 1950 and the 1954 Censuses, however, this trend was suddenly reversed. The number of part-time farms in the United States dropped from 639,000 to 575,000, a loss of 10 percent, and the number of residential farms from a little over one million to 878,000, a loss of more than 14 percent. You will remember that under the Census definition both these groups are very small-scale farms. The third group of very small-scale operations is the Economic Class VI commercial farm. The number of farms in this group decreased even more between 1950 and 1954, from 717,000 to 462,000, a loss of more than 35 percent. Thus in a five-year period, 470,000 of the smallest farms dropped out of United States agriculture, either raised to a better economic level by expanding operations or abandoned; or perhaps the operator quit farming because he had a nonfarm job.

In the same period the number of commercial farms at the next higher level, Economic Class V, decreased by nearly 15 percent, the number in Class IV, by 8 percent, and the number in Class III, by 2 percent. This adds up to an aggregate loss of 222,000 middle-size farms.

The only farms that increased in number were the biggest, those in Economic Class I, up 30 percent, and in Economic Class II, up about 18 percent, making a combined increase of 99,000. The net decrease in the number of all farms was 596,000, or about 10 percent.

These are striking phenomena, though it may be said that they merely carry to a further stage two trends that have long characterized United States agriculture—a steady reduction in the number of farms and a steady increase in the magnitude of the operation of those that remain. The total amount of land in farms has not decreased; it is only divided into fewer and bigger units.

But another striking phenomenon not so evident or expected showed up between 1950 and 1954—a decided increase in the number of commercial producers, in all the four higher economic groups, who with their families made more money from off-farm work than from farming, and a corresponding increase in the number working off the farm more than 100 days in the year.

New light on part-time farming.

These developments are analyzed and interpreted in detail in another Census Bureau publication, *Part-time Farming*, which puts situations such as that of Axel Peterson in an interesting light. Axel seems to be in a group that is diminishing in number and importance—the part-time-farmers-according-to-current-definition. But actually he is in a group that is increasingly important in the agricultural picture—the commercial farmers who are enlarging the size of their farm business and at the same time earning more and more from off-farm sources. If all goes well, Axel will be selling enough fruit in another year or two to put him in Economic Class V or Class IV, with farm sales around $2,500 or more. The next Census enumerator may not be able to list him as a part-time farmer. Yet

he will still be farming probably less than half his time and he and Hilda will be making more money off the farm than on it.

What is a part-time farmer? Perhaps the conception or definition needs to be changed. Perhaps part-time and commercial farming are not two entirely different things. Maybe each is shading more and more into the other. Maybe there are getting to be as many hybrids as purebreds.

A large percentage of fruit farms are part-time.

The Census publication mentioned makes an interesting analysis based on the assumption that an Economic Class V farm, with sales of $1,200 to $2,500, is also a part-time farm if the family gets more than half of its income from outside sources. On that basis, almost 54 percent of all the farms in this economic class in the western part of the United States are part-time farms, and only about 46 percent are "commercial". But many of these "commercial" farmers may also earn a good deal from other work—though not enough to make half their income.

In the case of fruit-and-nut farms, the situation is even more surprising. Practically three out of four fruit-and-nut farms in the Western Region are part-time farms in the $1,200 to $2,500 income bracket; and "curioser and curioser," as Alice in Wonderland put it, so are more than two out of three in the United States as a whole.

Is there a new agricultural ladder?

People like Axel and Hilda Peterson, working so hard to make a success of two major occupations, may have a rather special significance in the current American scene. Mobility—freedom to move from one place to another, one job or occupation to another, one economic level to a higher level—has been one of the most outstanding characteristics of American life. In the old days it was represented in agriculture by the Westward frontier, homesteading, and the "agricultural ladder," which a man climbed by first getting a job at the bottom as a hired man, then climbing one step by renting a farm, then another step by buying one. Today the first two of these great types of opportunity have disappeared, and the last may be flickering out because of the high cost of buying, equipping, and operating a farm. But it is still possible in many cases for a determined man to get the necessary capital by holding down another job while he is acquiring and building up a farm.

Maybe it means no more hard work and less actual hardship than the other ways. At any rate, the Petersons are trying it.

CHAPTER 8—HONEY (RESIDENTIAL)

Frank Quinby retires.

When Frank Quinby retired at the age of 60 from his job as expert accountant after a rather strenuous life which included roaming over much of the United States, he did what so many of his generation wanted to do—headed for a little place in the country, his native country, Connecticut, where the hills are so green and the streams and woods so inviting. He had bought the place some years before. He and his wife Josephine spent vacations there with their two youngsters and the grandchildren, then just beginning to come along with satisfying regularity; and Jo often stayed alone at the farm, with a couple of good dogs for company, while Frank went away on trips.

About the time he retired Frank stocked the place with a small menagerie of cows, pigs, chickens, ducks, and honeybees. He had been brought up on a farm as a boy, liked it, and wanted just the kind of physical and mental exercise such a place would give him. Retirement, to him, was an opportunity not for loafing but for a challenging kind of work. The Quinbys also had a well-stocked vegetable garden, some dwarf apple trees, and a variety of other tree and bush fruits. In effect, this was a miniature general farm of the subsistence type that used to be very common, though on a larger scale, before commercialization and specialization dominated agriculture.

It was not a fancy place but a modest and practical one. Frank had enough small power equipment to mechanize most of the work of cultivating, weeding mowing, spraying, etc., plus a good carpenter shop. For the heavier jobs like plowing and getting in hay he hired a man with a tractor.

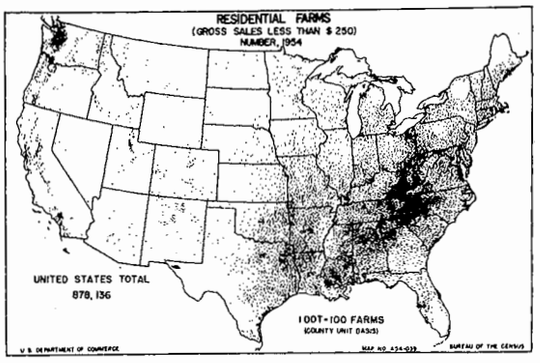
A man who likes bees.

The bees were a special hobby, going back to his boyhood days on the farm. Being something of a nature student even then, he found their ways fascinating and thought that being out on a fine spring day among millions of bees so intent on honey gathering that the air shimmered with bright wings was one of the headiest of experiences. Now he kept a dozen colonies or so, which usually brought in about 100 pounds of honey apiece—not a large yield but good enough for that particular area. Frank had a small hand-operated extractor in the cellar and a storage tank for warming and bottling the honey, which he put up in attractive jars and sold. There was a sign, Honey for Sale, in the front yard. The sales amounted to some $200 to $250 a year, besides what he and Jo ate with pancakes and hot biscuits, and what he gave away to family and friends; a jar of honey makes a nice Christmas present. He made no serious effort to sell anything else from the farm, but he and Jo got a lot of pleasure out of a generous sharing of fruits and vegetables and what not with others. It was one of the dividends of this kind of life.

Good farming takes brains.

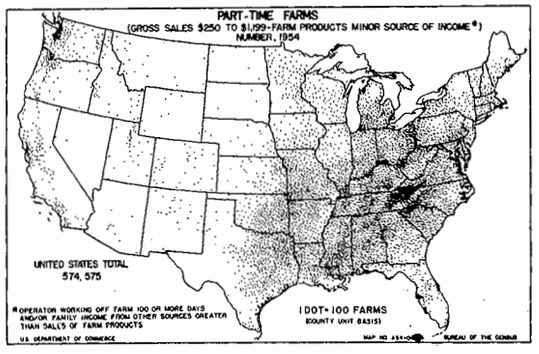
Besides the small amount from honey sales, Frank had his retirement income of almost $4,000 a year and occasionally took on an accounting job in winter. He had no investment income, having put all his savings into this place, which he owned free and clear. He knew this kind of farming did not pay from the standpoint of giving an adequate return for the work he put in; but if he could break somewhere near even on expenses, not counting his own labor, he figured he got a remarkably good food supply, fresh, frozen, and

canned, for very little—with a sense of down-to-earth achievement and satisfaction thrown in. And let no one belittle the achievement. Running even a small farm really well and economically takes ability and brains.



Like the Petersons, the Quinbys are only one example of a kind of farming now widespread in the United States. There are various types, from the well-to-do executive or professional man who runs a sizable place as a particularly satisfying but quite often expensive hobby to the poverty-ridden family in the Appalachian area where subsistence farming is a holdover from the past and represents not opportunity but a desperate lack of it. The accompanying maps show that this area has the densest concentration of both residential and part-time farms anywhere in the country. They also show that most of the residential and part-time farms are in the southeast, as are most of the lowest income (Class VI) commercial farms, which leads to the conclusion that they may be born of necessity more often than of free choice. But no-hard-and-fast generalization can be made.

The rural tradition is still strong.



In this case too the Census definition draws a sharp line where in fact there is an area of shading. As we have noted, if a family with the necessary outside income makes anything over $250 a year from the farm where they live, it is no longer a residential but a part-time farm. The industrialist or professional man who lives on a big farm outside the city and has large cattle sales is a commercial farmer even though he may invariably lose money. Frank Quinby's place might be classed as a residential farm one year, a part-time farm another, and a commercial farm still another, with no change in Frank's outside income or habits or attitudes, only a relatively small change in the farm earnings. This undoubtedly happens in some cases—how many no one knows. It may account for some of the marked reduction in the number of residential farms between 1950 and 1954 that we noted earlier. Perhaps some of these lost farms merely moved into another category.

Whatever else may be said about residential farms, it would seem that they do represent a continuation of the rural tradition in America in the face of a steady decline in the farm population. Most Americans are not too far away from a farm background. If their parents were not farmers, their grandparents likely were. We retain a high opinion of the virtues of farming not only as a way to live but as a way to build character. With fast transportation, shorter working hours, longer weekends, rural electrification, and farm equipment that saves time and lessens drudgery, a great many people can seek to recapture that experience even if they have not "retired" like the Quinbys.

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