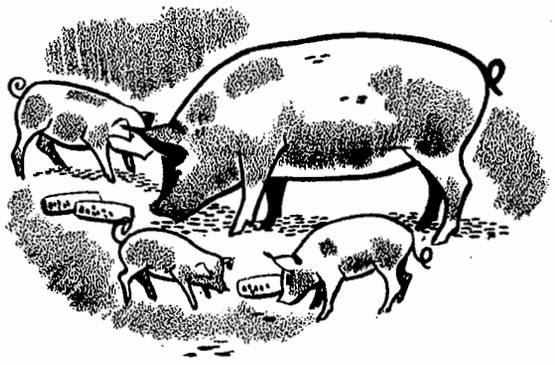
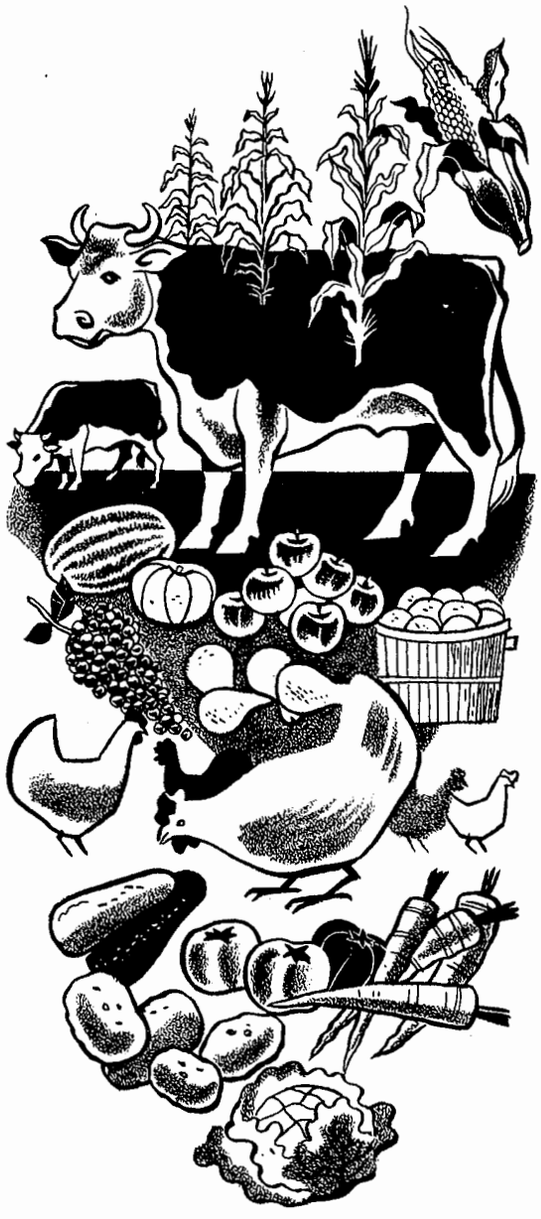
CHAPTER 2—MEAT

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.

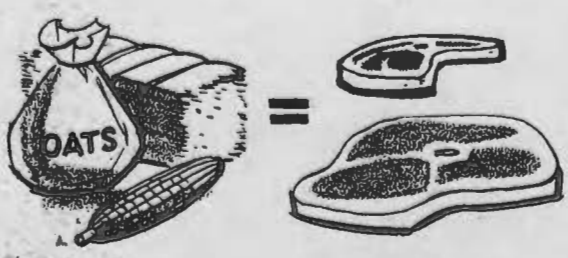
Fred North does not live in the most intensively productive part of the Corn Belt, which is a little farther west, in Illinois and Iowa. Nonetheless, nature is very generous here, and the Norths are good farmers who can make the best of what she offers.

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.

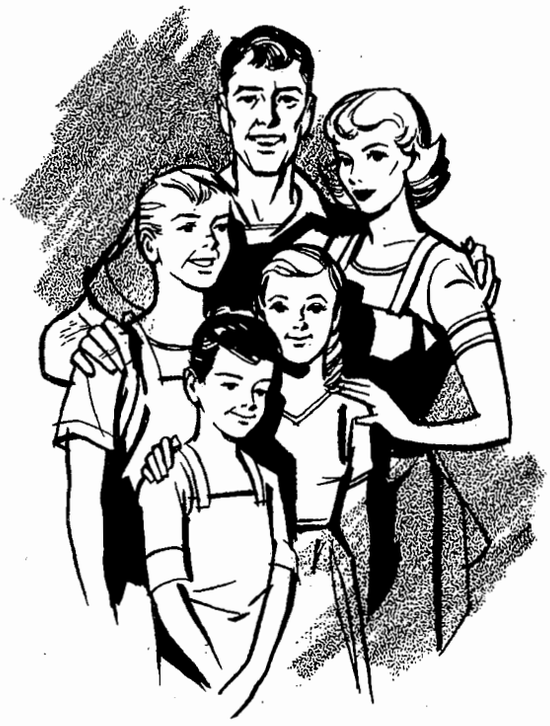
Of the 250 acres in the North farm, about 210 are classed as cropland—185 acres planted to crops for harvesting (80 in corn, 25 in oats, 20 in soft winter wheat, 40 in soybeans, 20 in hay), 20 acres used for pasture, 5 acres or so idle or unharvested for one reason or another. Another 22 acres are in 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

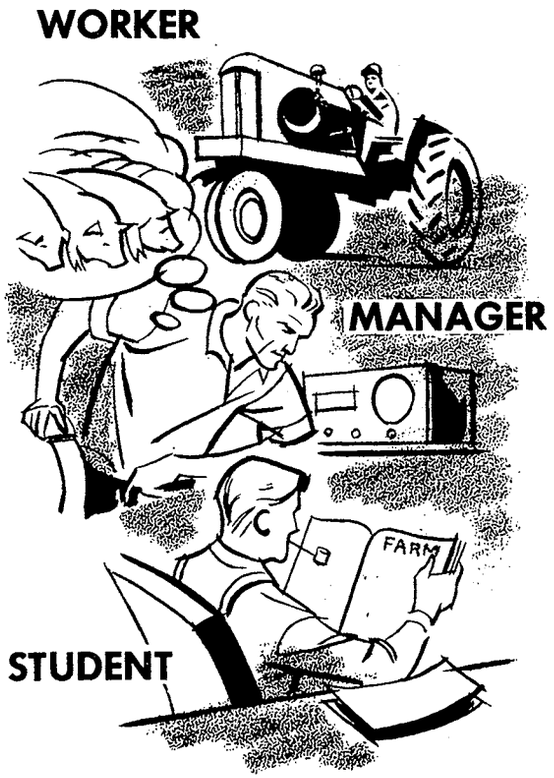
Land and buildings	$33,541
Machinery	5,986
Livestock	4,567
Total	44,094

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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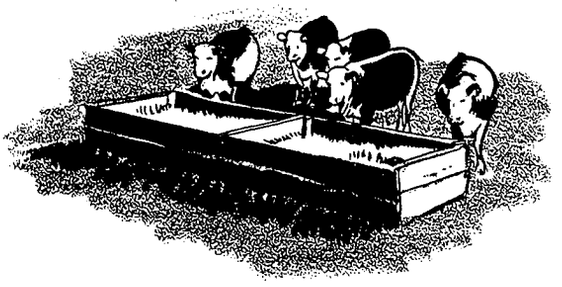
The cattle breeding operation.



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.

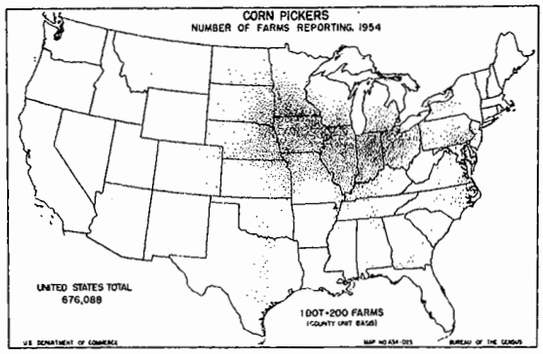
A pound of urea contains almost as much nitrogen as 6½ pounds of soybean meal of 41 percent protein content. It can safely replace up to a third of the total protein in the ration. The use of urea makes it possible to feed some low quality roughage—poor hay, straw, etc., as sources of carbohydrate to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

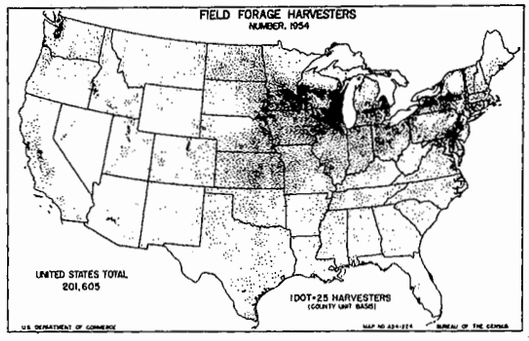
A highly mechanized farm.

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.

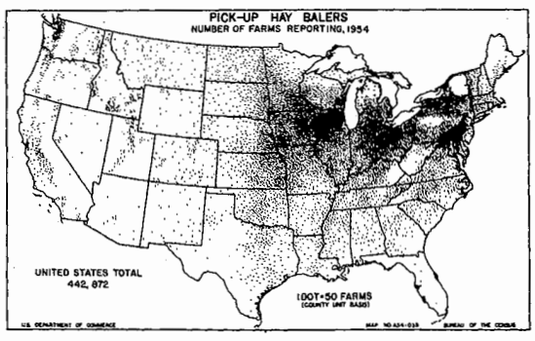




Corn is a big, heavy, cumbersome plant, awkward to handle by hand, and harvesting it used to be a slow laborious process. Now the number of farms on which this work is done by machines is rapidly increasing; there were 680,000 farmers having corn pickers in 1954, for example—50 percent more than in 1950. 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.

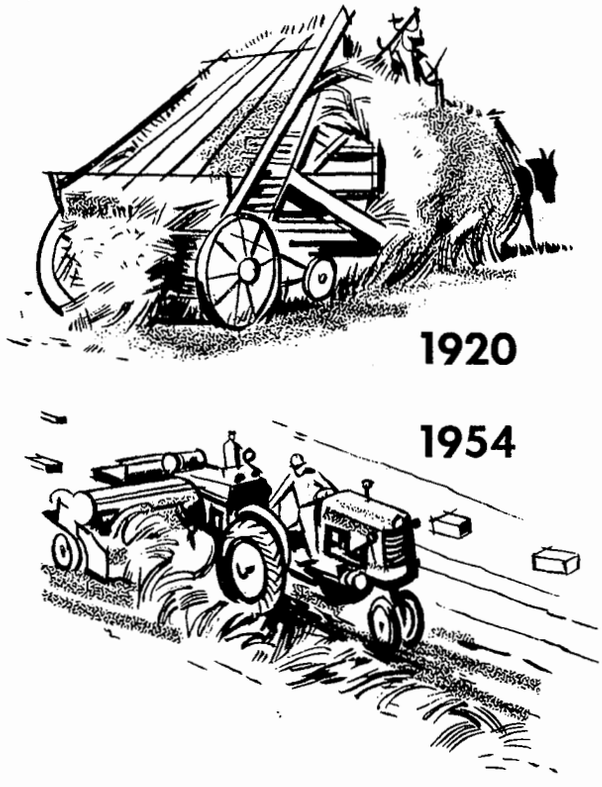
There are also picker-shellers that pick, husk, and shell the corn, delivering the shelled grain to the trailed wagon; stationary shellers; driers that lower the moisture content of the corn so it can be stored safely; husker-shredders, which handle corn already cut and cured in the shock; stalk-cutters, 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.