SMITHSONIAN STUDIES IN HISTORY AND TECHNOLOGY • NUMBER 17

Agricultural Implements and Machines in the Collection of the National Museum of History and Technology

by

JOHN T. SCHLEBECKER

SMITHSONIAN INSTITUTION PRESS
City of Washington
1972

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Stock Number 4700-0209

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Introduction

The art and science of agriculture embrace most intentional human efforts to control biological activity so as to produce plants and animals of the sort wanted, when wanted. Rubber plantations, cattle ranches, vegetable gardens, dairy farms, tree farms, and a host of similar enterprises all represent human efforts to compel nature to serve man. Those who undertake agriculture have had, from time immemorial, a variety of names, not all of them complimentary. The people involved in attempted biological control have been called farmers, planters, ranchers, and peasants. Farmers carry on a complicated business in which they use a variety of tools, implements, and machines. They also employ land, chemicals, water, plants, and animals. Their business, however, focuses on living things. No matter how crude their attempts, or how uncertain their successes, those who try to grow living things rank as agriculturalists.[1]

For the most part, a museum cannot show the essential biological aspects of agriculture. Agricultural production involves the farmer in the course of nature in its seasons, and in the peculiar laws of living things. In these respects, agriculture stands rather apart from transportation, manufacturing, and artistic industries where the tools, machines, and raw materials remain fairly inert as men work on them. Machines move but do not live, and therein lies the major difference between agriculture and the other arts. Farmers deal with plants and animals but the museum can show only the things a farmer uses as he accommodates to and regulates nature. Some of the objects, in themselves, give a fair idea of how the farmer used them. Most people, after all, know about edged blades and digging tools. Nearly anyone can grasp what a man might do with a scythe or a plow. Even the working of a modern reaper needs only a little explanation. But museums cannot well show cross-breeding of plants and animals. Museums seldom can show the results of that cross-breeding. Bags of fertilizer can be put on display, as can vials of penicillin, and jars of herbicide. Although some may find these interesting, such items show little in and of themselves.

Unfortunately, the things that cannot be shown

[1] Of course, the definition excludes brewers, distillers, biological supply houses, and others, such as zoo curators, who manage living things. Agriculture takes place on a piece of land widely and commonly known as a farm.

in any easily intelligible way surpass in importance the items that can be shown. The sheep shears, which anyone can understand, represent less to the farmer than do the sheep. Sheep shears, no matter how sophisticated and no matter how necessary, do not explain sheep husbandry. The shears tell little about the wool industry, and nothing much about sheep breeds. And so on through the list of agricultural enterprises.

Museums must collect and exhibit the tools, implements, and machines which farmers use in their business. These items, however, seldom make up the core of real agricultural activity. The catalog here presented shows something of the range of items that farmers use and that can be preserved and shown. The variety nearly equals the volume. Most museums try to avoid duplication. Even so, few museums manage to collect a continuous series of things showing any one line of development. The discontinuity of farm objects on hand virtually rules out the telling of a coherent and complete history of agriculture. Nevertheless, the museum can show something about the major technological developments in agriculture. The evolution of the plow, the reaper, or the tractor can be suggested even if not fully illustrated. Hitting the highlights has to suffice.

The full history of technological change also involves several social and economic conditions.

First, changes in implements, tools, and methods result from the accumulation of knowledge. Device builds upon device: first came the wheel, and then, much later, the tractor.

Secondly, the potential user of the device must feel a need for it. The new method or device not only must save him work but must clearly increase his well-being. If any device or change merely increases the wealth of someone else (a tax collector or a landlord for example), the farmer seldom will adopt the new technology.

Thirdly, since, at first, the new technology almost invariably costs more than the old, the user must have or be able to get the capital to buy and use the newer devices and methods.

Of these conditions for technological change, only the cumulative nature of the knowledge can be shown by the objects. Even here, however, missing objects make it possible to present only the most obvious changes, and then not all of them. Still, seeing the things once used—no matter how crude or how few—can sometimes help us understand the way changes took place. Also, this knowledge sometimes can help us guess how other changes will take place:

> The sequence of inventions also depends upon the changing needs of a society. Needs and circumstances vary more than do degrees of talent. Thus when need and knowledge merge, inventors quickly appear. Indeed, several men in several places are likely to work on the same problems at the same time, and they often solve it in almost identical fashion. Nearly simultaneous inventions or discoveries occur with astonishing frequency in the history of technology.[2]

[2] "The Combine Made in Stockton," *Pacific Historian,* no. 10 (Autumn, 1966), p. 14.

The Use of Farm Machinery in America

The part of America that was destined to become the United States started its history at the very time when the parent European civilization began to make major breakthroughs in science and technology. Thus, Americans became the automatic beneficiaries of the achievements of others. Because of peculiar opportunities and needs, Americans could and did push on to unique achievements. Nowhere, however, did this building on the past appear as early, or as impressively, as in the agricultural sector of the economy. American inventors of farm implements made important strides earlier than those in any other field. In turn, American farmers made more and better use of discoveries and inventions.

From the 1650s onward Europeans expanded their activities in all fields and in all directions. By that time Europeans had already discovered the New World, and had seized or bullied most of the Old. European trade and industry increased, and as these grew so also did population and urbanization. People multiplied, and an increasingly greater pro-

portion of them began to live in towns and cities. Simultaneously, the Europeans increased in wealth; indeed, most of their activities created more wealth. The ever-increasing number of people called for more food, and for changes in European farming. The Europeans' growing wealth also allowed them to buy luxury items from around the world: silk and spice and everything nice. The goods came not only from the Far East and Africa but also from the New World. When Europeans began to settle America, they almost at once had the advantages of a large and growing metropolitan market in western Europe. This market provided opportunities for wealth, but only if the American farmers developed appropriate commodities and produced them at reasonable prices.

The English, Dutch, Swedes, French, and Spanish settled in North America at trading and exploring stations. So located, they could direct the flow of products to Europe. The English chiefly sought rare products such as gold and spices, and they sent back furs. The Dutch concentrated on furs. All European pioneers, however, had to feed themselves. This took a bit of doing, which at first involved a merging of European technology with Indian crops and methods. Later, the settlers adapted European crops and animals. In spite of starving times in almost every colony from Virginia to New England, the new Americans at least mastered the art of feeding themselves.

European technology used animals for draft and employed plows, harrows, and similar implements. This technology fit European crops better than it fit American crops. Thus, European implements and draft animals did not appear until comparatively late. As long as they depended chiefly on Indian crops, Europeans simply substituted iron hoes for stone hoes, and iron axes for stone axes. But methods such as girdling, slash and burn, and the rest, came almost directly from Indian technology. The Pilgrims of Plymouth Plantation went 12 years without a plow; Virginians went almost as long. The hoe of corn culture served well enough to keep men alive. Hunting and fishing, of course, supplemented the food supply, as it did for the Indians.

From north to south the story was largely the same in the 17th century. Everywhere the new Americans pursued a subsistence agriculture which supported some other major economic activity. Pennsylvania developed possibly the most flourishing subsistence farming. The commercial production of tobacco, an American crop with American methods and uses, began early in Virginia and Maryland. This specialty developed commercially almost exclusively in the upper South. Farmers and planters of the lower South had hesitantly begun rice culture, but as the 17th century ended men in the Carolinas still found hides and furs the most rewarding commodities. Meanwhile, rapid changes took place in the European metropolitan centers, and in the West Indian islands. The growth of population in both places created consumers for more and cheaper food. Markets for American foods definitely began to increase as the 18th century got under way.

Europeans, of course, primarily wanted European foods rather than exotic Indian crops. The foods also had to be comparatively nonperishable and easily transported. Grains, particularly wheat, and processed meat (hams, salt pork, and such) especially met European preferences. Commercial production of these commodities compelled American farmers to embrace the best European technology insofar as that technology fit the American scene. The plants, animals, methods, and tools all derived from Europe. Contrary to a common European view at the time, the immigrants did not bring the worst available methods to the New World. Nor did the Americans allow any deterioration of stock or plants without good economic reasons.

Most European criticism about American farming centered on things of no consequence to American farmers, who were selling in a world market. True, Americans tended toward slovenly cultivation, but niceness of method mattered little if the land yielded an abundant exportable surplus. Americans paid less attention than Europeans to fertilizer, but Americans at first had less need for it. Livestock, in spite of nearly continual importations from Europe, tended to decline from a European standpoint. Still, the animals yielded meat of a quality suitable for export. The hardy American animals could survive in spite of casual care. Americans had few barns and sheds, but the world market for meat did not demand barns, stalls, and fancy feeding. American dairy cows yielded ridiculously low volumes of milk, butter, and cheese, but dairy products, after all, served only the resident Americans. The corn- and mast-fed hogs of America pro-

vided ham that was equal to any in Europe. If the European consumer bought American food, the American farmer thought it pointless to consider the comfort and emotional well-being of his animals.

New Englanders tended to concentrate on animals, the middle Atlantic on grains, the upper South on tobacco, and the lower South on rice and indigo. The Revolutionary War disrupted the marketing from the farmer's view, but the major commercial commodities remained largely unchanged in the years immediately after the war. Indigo declined and then disappeared as a major export commodity, but cotton almost at once replaced it.

In the 19th century men everywhere made great technological advances. In America, the advances took place in a sort of reciprocal action with three major historical series and events dominating the story: the westward movement, urbanization, and industrialization.

The greatest westward expansion in American history took place during the 19th century. American farmers and stockmen conquered, and almost entirely settled, a continent. They did this in a single century, 1801-1900. Nothing quite like it had ever happened before. Starting from a thin line of people on the eastern seaboard (with a few incursions across the mountains as of 1800), farmers and herders pushed into a nearly empty land, dispossessed the Indians, and exploited the country. And in course of time the American pioneers wanted and received political organization. California entered the Union in 1850, the Plains states mostly in the 1880s, and more states, such as Arizona, New Mexico, and Oklahoma, came into the Union in the 20th century.

At the same time, a nation that was weak and underdeveloped in 1801, had, by 1900, become the world's leading industrial nation. From virtually no industry in 1801, America rose to leading industrial power in 1900, with more railroads and more manufactured goods per capita than any other nation. Involved in the industrialization, and importantly so, was the farm implement and machinery industry. Factories everywhere supplied farmers with the sophisticated tools and machines of the new agriculture.

In these years urbanization also went forward rapidly. Cities of the east grew fantastically, and even in the interior cities rose from wilderness outposts to gigantic metropolises. Within one man's lifetime Chicago increased from 350 people in 1830 to 1,099,000 in 1890. Simultaneously, tremendous developments in transportation kept the nation and its economy tied together. All of these developments had a profound influence on farming and farmers. The rich cities provided ever greater markets for the farmers' produce. The transportation system, rapidly moving farm commodities, made farming profitable in remote regions far distant from the coast. Farmers also felt the advantages of the return flow of goods and services: the mail order catalog, the industrially made reapers and threshers, and countless other items. City people made a countless range of devices for farmers—from steel plows to steam engines.

Meanwhile, as these events altered the life of the farmer, a burst of activity took place in invention and discovery. These activities had a delayed but considerable impact on farm methods and technology. The list of inventions and discoveries could hardly fit in this narrative, but this catalog of items reflects fairly well what men accomplished in the 19th century. The changes included such diverse elements as the invention of the cotton gin by Eli Whitney in 1793, the introduction of Mexican Upland cotton in 1805, the discovery of the cause of Texas fever in cattle in 1889, and the invention of the internal combustion tractor in 1892. These and many other achievements substantially changed the farm enterprise in two major directions: first, advances in technology allowed farmers to do more in less time; second, discoveries in science allowed farmers to increase the yield from the land. Farmers got more from each acre, plant, and animal.

Farmers could use the savings in time brought by better implements and new machines to increase the amount of land farmed and the number of animals cared for. Presumably, the farmer could also use the saved time for greater leisure. In fact, however, they usually used the extra time for more work. In the 20th century they often used the saved time for outside employment. Farmers did this in the 19th century, but not so commonly as later. Greater man-hour efficiency gave the farmer more time to devote to managing his enterprise, to keeping records, and to studying his business.

Technological efficiency also allowed farmers to use more land and more animals. The average size

of farms steadily increased across the century. Furthermore, the new machines and the pure-bred livestock cost money which could be most profitable only if the farmer specialized in one, or at most two, types of enterprise. So the greater efficiency created by technology impelled farmers to greater specialization, and with specialization came even greater efficiency. Anyone who specializes will likely be more efficient because of the mastering of skills. He will also have a minimum of other cares to distract him. Of course, for the consumers, foreign or domestic, greater farming efficiencies resulted in abundant food at comparatively low cost.

Plant and animal importation, improvement of breeds, and discoveries in genetics, soil chemistry, the use of fertilizers, and in controlling plant and animal diseases all helped the living things which form the basis of farming yield. Grain farmers not only had to have a wheat which yielded well but a wheat which resisted the attacks of nature. For example, Turkey Red wheat, introduced in 1873 by Mennonites from Russia, not only survived drought and yielded well but provided the genetic elements for newer breeds of wheat. The farmer not only wanted good-producing meat cattle, such as the Herefords, but had to control diseases and predators which killed the animals. Sick animals do not grow properly or, in the case of dairy animals, give much milk. Steady advances in disease control for both plants and animals brought fewer losses and greater productivity to farmers.

The 19th century also brought scientific discoveries in both plant and animal nutrition. Fertilizer and soil chemistry made great advances through scientific experiments, at first by farmers and later by government servants. The first experiment station in the modern era began in Connecticut in 1875, and in 1887 the Congress established such stations in every state in conjunction with the agricultural Land Grant colleges. Scientists at many of the stations also made discoveries in animal nutrition. For example, as a result of animal feeding experiments E. V. McCollum discovered vitamins A and B at the experiment station in Wisconsin in 1915.

None of these scientific advances left much residue in the form of artifacts for museums, but the reality of the changes should not be obscured by the lack of objects on exhibit. Even so, some of the related equipment survived. For example, the centrifuge used in the butterfat test, discovered in 1890 by Stephen M. Babcock, survived in several forms. Manure spreaders and tree sprayers, reflective of advances in biochemistry, also survived. But these only suggest the more important biological control activities for which these machines and tools served merely as agents in some way.

The 20th century introduced Americans to total war. World Wars I and II demanded the total mobilization of all resources by all contenders. In both conflicts America became the food reservoir of the Allies. From a technological view, the wars engendered a level of prosperity which both allowed and encouraged farmers to adopt new methods and devices. The principal technological change in farms was the widespread adoption of the internal combustion tractor, first used in 1892. Inventors and manufacturers gradually but constantly improved tractors along with the various devices attached to them. Most notable were the corn picker, in 1909, and the cotton picker, in 1942. (Dates are for commercial production in each instance.) Farmers found both machines impracticable until a power source independent of the ground wheel had been developed. More than anything else the tractor and its related equipment finally set men free from the worst drudgery of farming. It also set many farmers free from the need to farm at all.

The tractor and its equipment accomplished several other remarkable things, some obvious and some not so obvious. First, it allowed the farmer to get rid of horses and mules, and these animals steadily declined—to such an extent that in the 1960s the census did not even bother to count them. As a result of this decline, land that farmers had used to raise feed for animals could grow food for people or fodder for dairy animals. The amount of land thus released for other needs finally amounted to perhaps 60 million acres, and maybe even more. The change took place with increasing rapidity into the 20th century.

Also, the tractor sharply reduced labor needs for the major crops of the United States. Even dairying, least susceptible to this sort of improvement, felt the impact of the tractor in such things as harvesting fodder and storing silage by running loaders off the tractor power-take-off. Since the very founding of agriculture men had discovered only one way to prosper in farming. The farmer had to exploit somebody or something. Animals, serfs, slaves, ten-

ants, sharecroppers, or whatever, including the farmer's family and farm, had at various times been exploited on the farmer's way to success. After the age of machinery, however, the farmer tended to exploit the machine instead of other people or things. People had to leave farming, but in the long run they benefited from their removal. The machine had set them free. Chief of the machines was the gasoline tractor.

The influence of science and technology inside a free society may have been even more profound than seems at first glance. The farming of the 20th century, with its chemicals, genetics, machines, and all, required not only vast infusions of capital but brains and a considerable knowledge. Farmers had to be literate at the very least. Elitist systems, where one group of people get educated and the others get worked, could not accomplish much in the modern agricultural world. Furthermore, notions of two kinds of education—one for the better sort who think, and another for the inferiors who do the work—could and did seriously impede the development of a modern agriculture. The backwardness of most of the world, the poverty of the underdeveloped countries, stemmed in large part from the impediments created by an ignorant population.

A country like the United States with its highly technical and scientific farming could not afford, simply could not endure, limited educational opportunities for its people. Neither could it long endure any class structure which placed farmers in an inferior position; for when men feel inferior because of their work they tend to shift to some other task, leaving the despised work to those who cannot avoid it. A highly developed agriculture in the hands of the truly inferior, the stupid and uneducated, would simply collapse. America, the land of plenty, had to maintain a high level of education open to all and a society where men reached status, at least partly, by effort and talent. In 20th century America the comparative social and economic equality continued, in large part, because the level of technology and science used in America demanded it. This equality may be one of the most important consequences of the technological and scientific advances in agriculture during the years 1607-1972.

Catalog of Agricultural Implements and Machines in the Collection

In the following catalog the items are listed numerically in the order in which the museum received them, with the earliest first and the latest last. This arrangement permits expansion and reissue of the catalog simply by adding new entries; and the user of the catalog can easily find everything acquired in any given year. In effect, the catalog thus presents an historical account of the development of the museum collection. Following the item's title appears the National Museum accession number (USNM number); year of accession, if known; description; and donor.

The index to the catalog has several major categories of cross-referenced entries. In addition to the general object class, such as "Tractor," it includes use-entries, such as "Plant husbandry," the names of donors, vendors, and those who arranged for the gifts.

1. Korean Sketch of Farming in the Late 18th Century. USNM 19048; 1887. Korean farmers plowing and breaking clods of earth. Painted by Han Chin U. Gift of G. Goward, Washington, D. C.
2. Korean Sketch of Threshing in the Late 18th Century. USNM 10948; 1887. Korean farmers threshing rice. By Han Chin U. Gift of G. Goward, Washington, D. C.
3. Korean Fishing Scene of the Late 18th Century. USNM 19048; 1887. Koreans using a fish trap. By Han Chin U. Gift of G. Goward, Washington, D. C.
4. Scene of Korean Farmers Chopping Tobacco in 18th Century. USNM 19048; 1887. Korean farmers chopping tobacco after it has been cured. By Han Chin U. Gift of G. Goward, Washington, D. C.

5. Scene of Korean Farmers Working on Farm Buildings in Late 18th Century. USNM 19048; 1887. Korean farmers doing carpentry work, including roof repair. By Han Chin U. Gift of G. Goward, Washington, D. C.
6. Scene of a Korean Blacksmith at Work in Late 18th Century. USNM 19048; 1887. A Korean blacksmith working at his forge and anvil. By Han Chin U. Gift of G. Goward, Washington, D. C.
7. A Korean Farrier Shoeing a Horse in the Late 18th Century. USNM 19048; 1887. By Han Chin U. Gift of G. Goward, Washington, D. C.
8. Centrifugal Cream Separator, 1868. USNM 23744; 1890. The first centrifugal cream separator used commercially in the United States. The Deerfoot Farm at Southborough, Massachusetts, used this machine, patented by D. M. Weston of Boston. Gift of Deerfoot Farm Company, Southborough, Massachusetts.
9. Model of Blount's Daisy Plow, 1890. USNM 23873; 1891. This model of a one-horse plow shows Blount's Daisy steel plow as pictured in the catalog of Henry F. Blount. Gift of Henry F. Blount, Evansville, Indiana.
10. Old Colony Strong Plow, 1732. USNM 34769; 1899. In 1732 Peter Hardy of Raymond, New Hampshire, made this plow for Henry Lamprey of Kensington, New Hampshire. Gift of J. P. Lamprey, Kensington, New Hampshire.
11. Winnowing Basket, 1799. USNM 37441; 1901. A winnowing basket, or pan, made of willow woven over wide sprints; eliptical in shape, with a frame of thick rods. Noah Rogers bought this pan in New York in 1799 or 1800. Gift of Frank A. Brown, Savage, Maryland.
12. Model of Flail Threshing Machine, 19th Century. USNM 46812; 1906. The frame of this wooden model is 7½ inches high and 5 by 6 inches, restangular. The levers, 14 inches long, project from the frame and strike the floor much as a flail would. Pins set in the shaft of a hand crank act as cams, raising the flails which then fall to the ground by gravity. Gift of United States Department of the Interior.
13. Model of Gallic Grain Header, about A.D. 70. USNM 46812; 1906. A wooden box on wheels, 12 by 5 inches, has metal teeth set at the front end. Shafts extend to the rear, where an ox is yoked. The forward movement of the cart causes the grain to lodge against the teeth, which pulled the heads off. The grain then fell back into the box. Gift of United States Department of the Interior.
14. Model of Ten Eyck Grain Harvester, 1825. USNM 46812; 1906. Model is made of wood and iron, 15 inches by 8 inches. Long knives on a drum were rotated by belt shaft on traveling wheels. Long projecting points gathered the straw. Iron shafts at the rear allowed animals to be harnessed to push the machine. James Ten Eyck patented the harvester on November 2, 1825. Gift of United States Department of the Interior.
15. Model of Manning Grain Harvester, 1831. USNM 46812; 1906. Model of horse-drawn reaper measures 16 inches by 8 inches, with a wheel diameter of 6 inches. Projecting iron points at the front end gather the grain, and vibrating knives, powered from the hob of the wheel, cut the grain. Patented by William Manning on May 3, 1831. Gift of United States Department of the Interior.
16. Model of Boyce Grain Harvester, 1799. USNM 46812; 1906. This model, made of wood and iron, is 15 inches long, 6 inches wide, and 5½ inches high. Six rotating knives radically positioned on a vertical shaft rotate by level gearing on the wheel axle. The whole is mounted on a two-wheeled cart with shafts for draft animals. English patent number 2324 granted to James Boyce in 1799. Gift of United States Department of the Interior.
17. Model of Newbold Plow, 1797. USNM 46812; 1906. This model of a metal plow, with wooden beam and handles 14 inches long, represents the plow patented by Charles Newbold on June 26, 1797, the first American patent for a cast-iron plow. Moldboard, share, and landside were cast

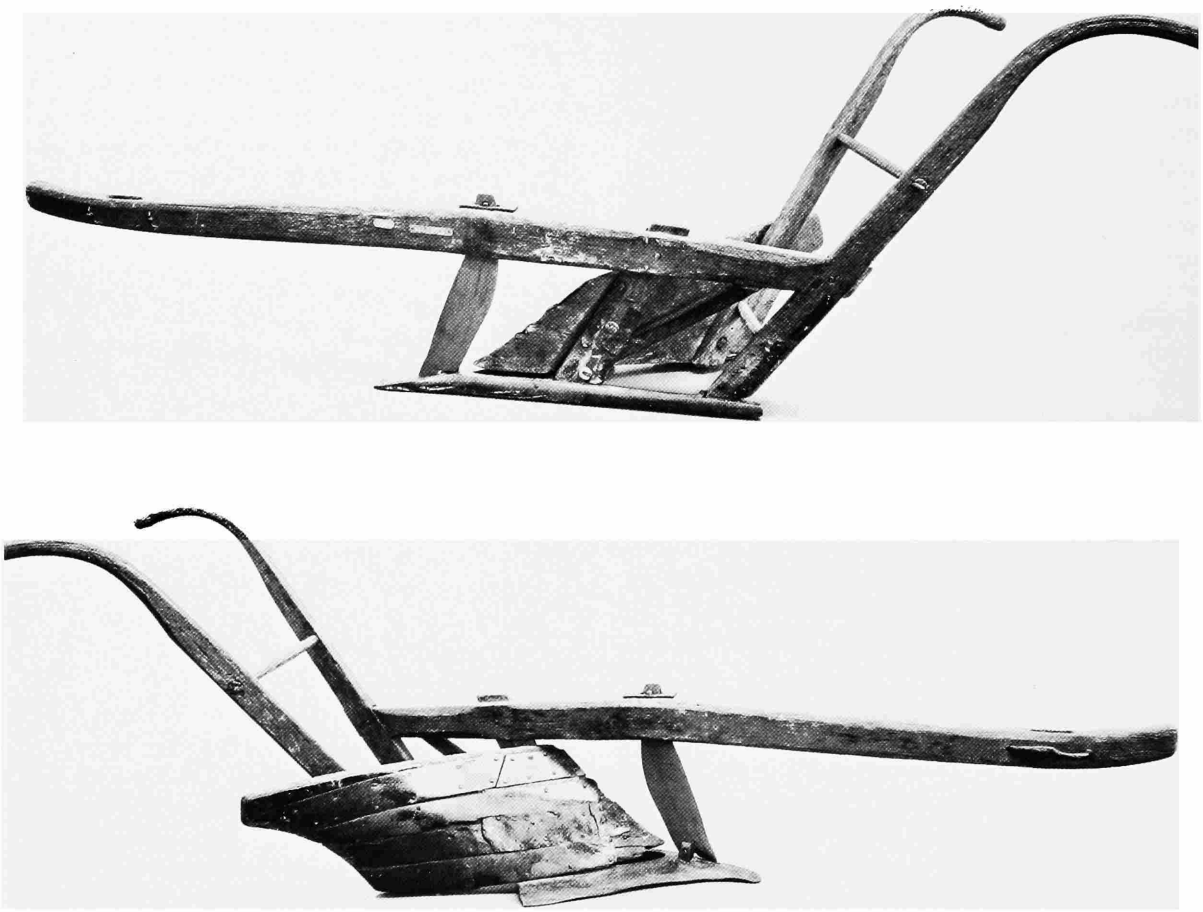

FIGURE 1.—Views of Old Colony Strong Plow, about 1732. (Catalog No. 10.)

in one piece. If the plow broke, it became totally useless. Not until the parts were made in separate pieces did the iron plow come into wide use. The cast iron broke more readily than did the later wrought-iron plows. Gift of United States Department of the Interior.

18. WINNOWING BASKET, about 1750. USNM 54513; 1912. Used by the three Richardson brothers, the first settlers of Wobrun, Massachusetts. The threshed grain could be winnowed in two ways. It could be poured slowly from the edge of the basket in a breeze, where the heavier grain fell to the ground while the chaff blew away. More commonly, the farmer tossed the grain into the air and caught it in the basket, while the chaff blew away. This rectangular basket measures 50 inches by 30 inches. Gift of Mrs. Clarissa W. Samson, West Medford, Massachusetts.

19. CENTRIFUGAL CREAM SEPARATOR, 1914. USNM 56432; 1914. Carl Gustav De Laval of Sweden invented this successful continuous-flow cream separator in 1879. Loaned by De Laval Separator Company, New York, New York.

20. MODEL TRACTOR, 1919. USNM 64098; 1919. No particular manufacturer seems represented by this spring-driven toy, which merely represents tractors of around 1919.

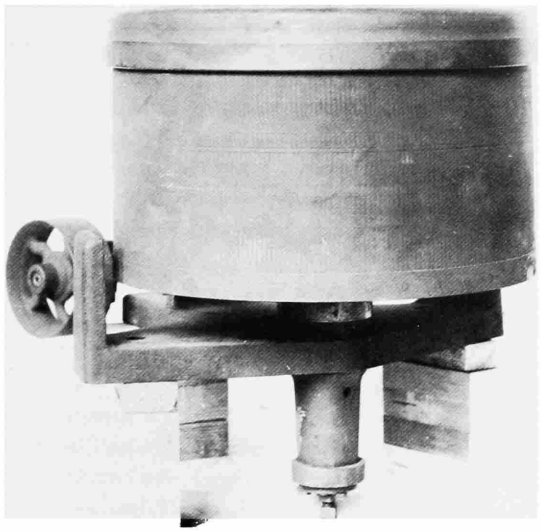

FIGURE 2.—De Laval centrifugal cream separator of 1879. (An earlier version of Catalog No. 19.)

The heavy-duty field tractor has four widely spaced iron wheels. Gift of Toy Manufacturers of the United States, New York, New York.

21. MODEL TRACTOR WITH PLOW, HARROW, AND ROLLER, 1919. USNM 64098; 1919. Spring-driven, toy tractor. The plow, harrow, and roller, as well as the tractor itself, represent a typical machine of the period. The product of no particular firm seems to have been copied. Gift of Toy Manufacturers of the United States, New York, New York.

22. MEAT GRINDING MACHINE, about 1810. USNM 110326; 1930. Hand made of wood and iron, with six parts held together by two iron bolts. The cutting edges are set in the sides of a box parallel to each other and about one-quarter inch apart. A shaft, set in the center of the box, is turned by a crank. The horizontal shaft has iron slugs, graduated from coarse to fine, set into the shaft in a helical pattern. The meat enters through the square hole at the top and the iron teeth press it against the knife edges; thus, the meat is cut smaller and smaller until it comes out a small hole in the bottom of the machine. The device is very ancient in design and could still be found in common use in the United States as late as 1860. Gift of R. C. Fairhead, Rushville, Nebraska.

23. CAREY PLOW, about 1815. Received from Division of Ethnology in 1931. A Carey plow with a slot in the beam for a colter. The landside handle passes through the beam. Usually, the beam tenon passes through a mortise in the handle. Possibly made by the farmer. Replication of a common and popular American plow of the 18th century. Donor not known.

24. HOE, about 1830. USNM 115122; 1931. Wrought-iron, handmade hoe made in Ohio and attributed to very early 19th century. The hoe's blade is 5 inches wide and its handle is 6 feet long. Gift of Mrs. Grace M. Swiggett, Washington, D. C.

25. REAPER SICKLE BAR, about 1847. USNM 115878; 1931. Sickle bar from a McCormick reaper. The blade style suggests a comparatively sophisticated stage of development, most surely after 1833. David Cromer of Seneca County, Ohio, used this sickle bar on a McCormick reaper. The blade is 5 feet long and 5 inches deep. Gift of Frank Hepp, Berwick, Ohio.

26. BORDEN VACUUM PAN, 1853. USNM 119188; 1932. The original vacuum pan used by Gail Borden in 1853 for condensing milk by concentrating it in a vacuum. He patented the process on August 19, 1856. Borden borrowed this pan from nearby Shaker farmers who had used it for canning. Borden did his early work at New Lebanon, New York. Borden at first failed to get a patent because the process was not deemed useful. There is nothing exceptional about this pan except that Borden used it. Gift of Borden Milk Company, New York, New York.

27. MODEL OF MCCORMICK REAPER, 1834. USNM 121105; 1932. Scale model of the grain reaper patented by Cyrus McCormick on June 21, 1834. Roderick Davis constructed the model from the specifications of the patent. Gift of Charles G. Abbot, Washington, D. C.

28. MODEL OF MCCORMICK REAPER, 1845. USNM

FIGURE 3.—Gail Borden's vacuum pan of 1853, used to make condensed milk. (Catalog No. 26.)

124615; 1933. Scale model of the reaper patented by Cyrus H. McCormick on January 31, 1845. Roderick Davis constructed the model from the specifications of United States patent 3895. Gift of McCormick Historical Association, Chicago, Illinois.

29. MODEL OF MCCORMICK REAPER, 1847. USNM 124615; 1933. Cyrus McCormick patented this reaper on October 23, 1847. Roderick Davis built the model from specifications of United States patent 5335. Gift of McCormick Historical Association, Chicago, Illinois.

30. WHEELED PLOW, 1769. USNM 127755; 1934. Wheeled plow made by Matthew Thumb in 1769 at Palatine, New York, for Henry Kloch. It has an almost flat, wooden moldboard; wrought-iron share and colter; a two-wheel truck in front for the beam; and one handle. The large wheel ran in the furrow and the small wheel on the land. The wooden parts of the hitch and the draft chain have been restored. The plow is probably a copy of a German one. Gift of Sir Henry Solomon Wellcome, London, England.

31. MODEL OF GRAIN SEPARATOR, 1875. USNM 129836; 1934. Working model of a grain separator for a threshing machine made by Daniel Garver. The model represents inventions covered by three patents issued to Daniel and Cyrus Garver: the grain separator, patent 114546, issued May 9, 1871; the fan blast regulator, patent 114547, issued May 9, 1871; and the bag holding device, patent 161501, issued March 30, 1875. Loaned by Miss Melchora Garver, Hagerstown, Maryland.

32. WALDRON CRADLE BLADE AND SNEAD, about 1840. USNM 129789; 1934. The blade has holes for attaching the cradle. The wooden frame, or snead, supports the cradle fingers, now missing. Gift of Sydney S. Stabler, Washington, D. C.

33. SETTLING CAN CREAM SEPARATOR, about 1890. USNM 129789; 1934. Cooley brand creamer, used for separating milk from cream prior to churning. The milk and cream were set in a cool place for several hours while the cream rose to the top. The farmer drew skim milk off through a spigot at the bottom, after which the cream could be drawn off. Used on farms before the hand centrifugal separator came into wide use. By 1890, in butter-producing areas, the centrifugal separator had already caused the disuse of the Cooley and similar separators. Gift of Sidney S. Stabler, Washington, D. C.

34. WOODEN HAYFORK, about 1879. USNM 137459; 1936. Hayfork of second-growth white oak, made by John Heiss, Lima Township, Lagrange County, Indiana. It was used for feeding stock and for handling clover and short straw of all kinds. Gift of E. W. Heiss, Washington, D. C.

35. WOODEN MEASURE, 1845 or earlier. USNM 137960; 1936. Small, round wooden measure used in 1845 by William Heiss, Lagrange County, Indiana, to feed small grain or mill feed to livestock. William Heiss was a grandfather of the donor, E. W. Heiss of Washington, D. C.

36. HALF-BUSHEL MEASURE, about 1829. USNM 137960; 1936. Made and used by William Heiss on his farm in Lagrange County, Indiana, about 1829. Probably used in local barter and trade in such items as beans, corn, and seeds for various crops. Loaned by E. W. Heiss, Washington, D. C.
37. WOODEN DRUM COTTON PLANTER, about 1895. USNM 14557; 1937. All wood except for a duckbill furrow opener in front and two duckbill row coverers in the rear, both made of metal. The drum of soft wood measures 20 inches in diameter and 13 inches wide. About the center of the drum is a wooden, metal-rimmed wheel which ran down the furrow, keeping the seeder on course. Near the wheel, and all around the drum, are 13 evenly spaced holes through which the cotton seeds fell into the furrow as the drum revolved. No counting or tripping mechanism was involved, so the device undoubtedly wasted seed. A mule or a horse pulled the planter and the farmer walked behind it. James Nelson of Greenwood, South Carolina, made this planter about 1895. Gift of Ruben F. Vaughn, Honea Path, South Carolina.
38. CAST-IRON PLOW, 1854. USNM 150396; 1938. A cast-iron plow made by Stephen McCormick of Fauquier County, Virginia, in 1854. The plow embodies features covered by patents issued to Stephen McCormick on February 3, 1819, January 28, 1826, and December 1, 1837. Plows of this type, made chiefly between 1826 and 1850, involved interchangeable parts. The first patent precedes that of Jethro Wood by seven months, but the principle of interchangeable parts had been worked out and patented as early as 1813. Gift of Leander McCormick-Goodhart, Silver Spring, Md.
39. MEHRING'S MILKING MACHINE, 1884. USNM 148530; 1938. Original working model of a hand-powered milking machine built by William M. Mehring in 1884. Mehring subsequently improved and patented the machine in 1892. The improved machine did not work well because it created continuous suction for the length of the stroke. The successful application of intermittent suction, necessary so as not to injure the cow, was worked out in Scotland in 1902. Gift of Mrs. Bessie D. Mehring, Keymar, Maryland.

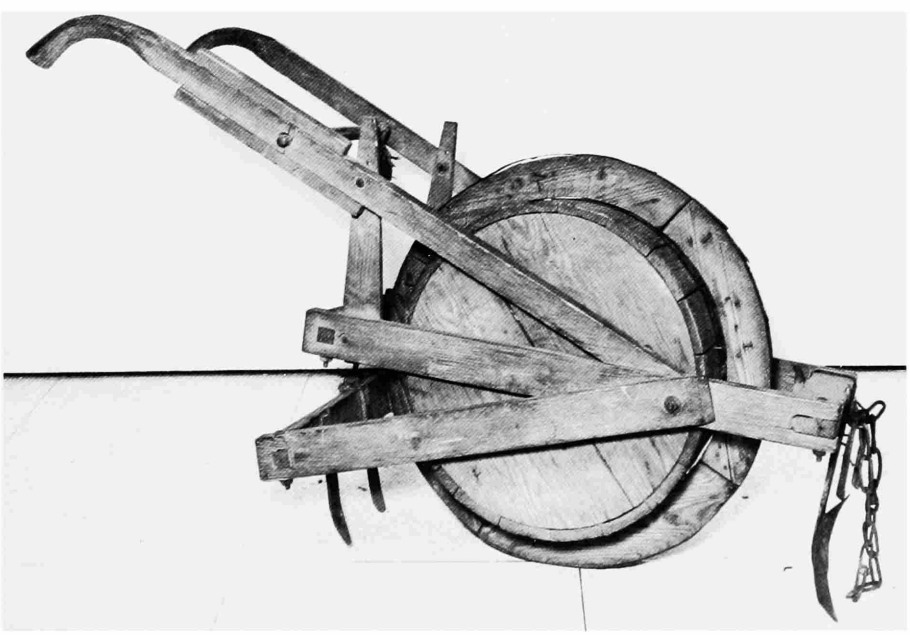

FIGURE 4.—Cotton planter, about 1895. (Catalog No. 37.)

40. HAND-POWERED MILKING MACHINE, 1892. USNM 148530; 1938. Practical hand-pump milking machine designed and built in 1892 by William M. Mehring, who was granted patent 488282 on December 28, 1892. This milker, which injured cows when used rapidly, represents an effort to solve the problem of machine milking, although the use of human power also limited its usefulness. Gift of Mrs. Bessie D. Mehring, Keymar, Maryland.

41. OX YOKE, 1838. USNM 148675; 1938. Edward Scoville (1813-1887) used this ox yoke when driving an ox cart from Trumbull County, Ohio, to De Kalb County, Indiana, in 1838. Until well after the Civil War, oxen pulled most of the wagons going west, and this yoke is typical of all used in the westward migration, in the North as well as in the South. Gift of Reign Scoville, Poplar Bluff, Missouri.

42. DEERE PLOW, 1838. USNM 148904; 1938. John Deere made this plow, with steel share and polished wrought-iron moldboard, at Grand Detour, Illinois, in 1838. Joseph Brierton bought it and used it on his farm, and the Deer Company obtained it in 1901. It is one of three plows made by John Deere in 1838, and presumably it is identical to his first steel share plow, made in 1837 at Grand Detour. Called the singing plow, it proved especially effective in prairie country after the sod had been broken because the earth did not adhere to the share and moldboard. The implement could also be used as a breaking plow. Gift of Deere and Company, Moline, Illinois.

43. MODEL OF SULKY PLOW, 1899. USNM 156653; 1940. Working model of the Hy-Lift sulky plow invented by Niels O. Starks of Madison, Wisconsin, and made by the Fuller and Johnson Company around 1900. Starks received patent 616984 on January 3, 1899. The land wheel on this plow automatically raises and lowers the plow at the end of a furrow. Gift of S. O. Strucksberg, St. Joseph, Missouri.

44. BARBED RIBBON WIRE, 1879. USNM 159858; 1941. Specimen of barbed wire made with saw teeth cut out of twisted ribbon wire. Gift of B. F. Arthur, Winchester, Virginia.

45. CHINESE PLOW, date unknown. USNM 161555; 1941. This primitive, one-handled plow has an iron hook on the end of the beam. Apparently it had an iron shoe for a share, which is now missing. This style of plow is typical of the kind used in rice-growing sections of China. Gift of United States Department of Agriculture.

46. CAREY PLOW, about 1820. USNM 161555; 1941. The share and landside of this small cultivating plow are in one piece of wrought iron with sockets for the left handle and the standard bar share. It has a flat wooden moldboard. Used in Northumberland County, Virginia, until 1855 or 1860, for cultivating corn and other row crops. Gift of United States Department of Agriculture.

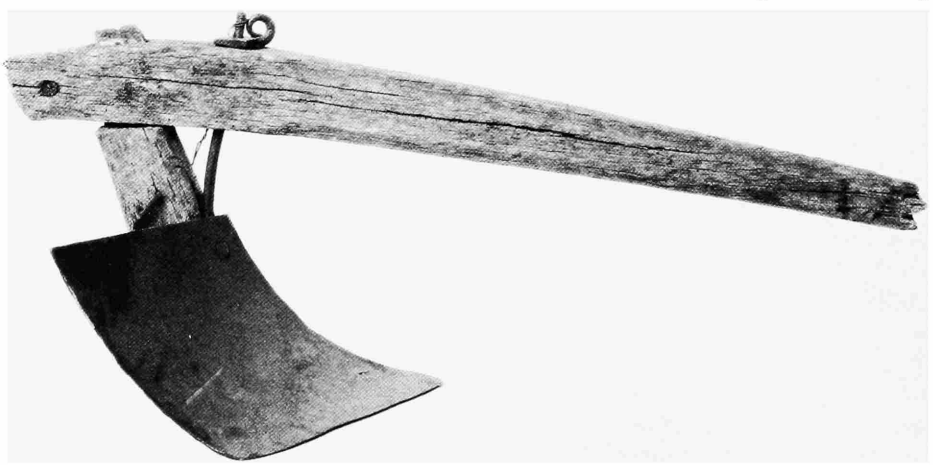

FIGURE 5.—John Deere plow, one of the three plows made by Deere in 1838. (Catalog No. 42.)

47. PLOW, about 1790. USNM 161555; 1941. Only the share, colter, and beam of this plow are original, the rest having been reconstructed. The original parts came from Northumberland County, Virginia. Gift of Edwin Brown, Brown's Store, Virginia.
48. OLD COLONY STRONG PLOW, 1740. USNM 161555; 1941. The moldboard of this plow is made of wood and covered with thick pieces of iron. The plow has a lock colter and wrought-iron share fitted on the end of a wooden beam. Pelatiah Kinsman of Ipswich, Massachusetts, had the plow made in 1740. It represents the New England open-drawn plows of that time. Gift of United States Department of Agriculture.
49. OLD COLONY PLOW, 1783. USNM 161555; 1941. This plow resembles the Old Colony Strong Plow (No. 48) but it is not as large and the moldboard is covered with uniform, narrow iron straps. Farmers used this plow for cross-plowing after initial breaking by the Strong Plow and for cultivating. It probably was drawn by oxen. John Foster, a corporal in the Revolutionary Army, had this implement made at Ipswich, Massachusetts, in 1783. Gift of United States Department of Agriculture.
50. TAVENNER PLOW, between 1810 and 1860. USNM 161555; 1941. The Tavenner plow has a cast-iron moldboard and a wrought-iron share and colter. Plows of this type were made and used widely in Loudon County, Virginia. Gift of United States Department of Agriculture.
51. SMITH PLOW, about 1800. USNM 161555; 1941. This sod-turning plow has its landside, moldboard, and colter in separate pieces. It was built on the lines of a plow patented by Robert Smith in 1800. Gift of United States Department of Agriculture.
52. GIDEON DAVIS PLOW, about 1825. USNM 161555; 1941. Gideon Davis received a patent in 1825 for his improvements of the Newbold plow patented in 1797. In tests in 1825 to determine the efficiency of different plows, the Davis plow took first place in a competition with five others. Gift of United States Department of Agriculture.
53. WOODCOCK PLOW, about 1848. USNM 161555; 1941. The Woodcock plow has separate landside, moldboard, share, cutter, and point. This plow has the first reversible point. Woodcock plows were first used in 1847, in Maryland. Gift of United States Department of Agriculture.
54. EAGLE PLOW, 1849. USNM 161555; 1941. The Number 25 Eagle Plow, which first appeared in the catalog of the J. Nourse Company in 1849, became the standard plow of New England after the middle of the 19th century. Its moldboard was based on a design worked out by Thomas Jefferson. Gift of United States Department of Agriculture.
55. MEXICAN PLOW, about 1890. USNM 161555; 1941. This Mexican bull tongue plow has an iron shoe on the point and it closely resembles Spanish plows of the 16th century. It was intended to be pulled by an ox and to break the soil for only three or four

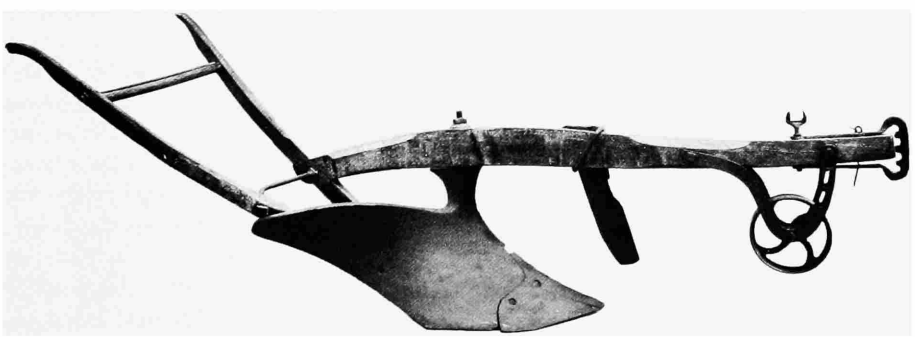

FIGURE 6.—Eagle plow, about 1849. (Catalog No. 54.)

inches at the most. Gift of United States Department of Agriculture.

56. BUTCHER'S SAW, 1879. USNM 130572; 1942. This saw is part of a set of butcher's tools (Nos. 56–67) presented to William H. Hoover by the Washington Light Infantry Corps in 1879. All the tools have a silver presentation plate on the handle and have nickel plating. A. Nittinger, Jr., of Philadelphia, made the set. Gift of N. Auth Provision Company, Washington, D. C.
57. SPLITTING CLEAVER, 1879. USNM 130572; 1942. Butcher's tool. Gift of N. Auth Provision Company, Washington, D. C.
58. CLEAVER, 1879. USNM 130572; 1942. Butcher's tool. Gift of N. Auth Provision Company, Washington, D. C.
59. MEAT AXE, 1879. USNM 130572; 1942. Butcher's tool. Gift of N. Auth Provision Company, Washington, D. C.
60. KNIFE, 1879. USNM 130572; 1942. Butcher's knife. Gift of N. Auth Provision Company, Washington, D. C.
61. KNIFE, 1879. USNM 130572; 1942. Butcher's tool. Gift of N. Auth Provision Company, Washington, D. C.
62. TRIANGULAR SCRAPER, 1879. USNM 130572; 1942. Butcher's tool. Gift of N. Auth Provision Company, Washington, D. C.
63. HAND MEAT HOOK, 1879. USNM 130572; 1942. Butcher's tool. Gift of N. Auth Provision Company, Washington, D. C.
64. MEAT HOOKS, 1879. USNM 130572; 1942. Butcher's tool. Gift of N. Auth Provision Company, Washington, D. C.
65. CARCASS SPREADER, 1879. USNM 130572; 1942. Butcher's tool. Gift of N. Auth Provision Company, Washington, D. C.
66. CARCASS SPREADER, 1879. USNM 130572; 1942. Butcher's tool. Gift of N. Auth Provision Company, Washington, D. C.
67. MEAT PINS, 1879. USNM 130572; 1942. Butcher's tools. Gift of N. Auth Provision Company, Washington, D. C.
68. BABCOCK BUTTERFAT TESTER, about 1895. USNM 173353; 1946. A machine used in determining the amount of buterfat in milk or cream. The Vermont Farm Machine Company of Bellows Falls, Vermont, made the centrifuge, which mixed sulphuric acid with the milk in order to produce a reading of the amount of butterfat tested. The Brighton Farm at Patuxent River, Montgomery County, Maryland, used this machine around 1895. Stephen M. Babcock developed this tester in 1890 and released it to the public, without patent, in 1891. The device had far-reaching effects in the dairy industry, because for the first time it allowed accurate payment to farmers for the actual amount of butterfat in their milk; also, it allowed farmers to test their cows to discover which ones produced the most butterfat. Gift of Sidney S. Stabler, Hyattsville, Maryland.

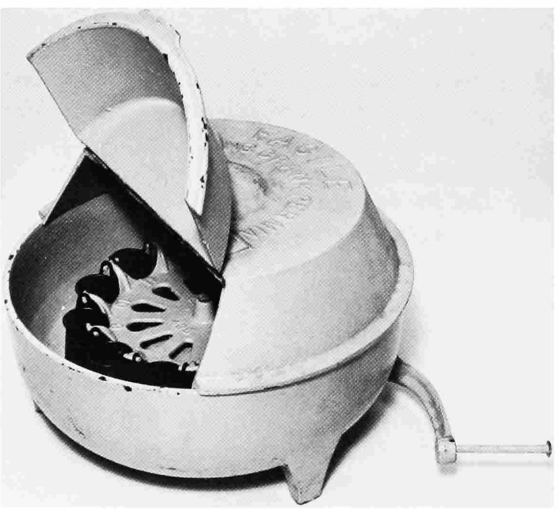

FIGURE 7.—Babcock butterfat tester, about 1895. (Catalog No. 68.)

69. BUGGY RAKE, 1840. USNM 175393; 1947. The buggy rake harvested grain after it had been cut with a cradle. The rake has handles and a wheel, like a wheelbarrow, with long wooden tines in front to scoop up the grain. When the binder stepped on a bar at the back of the buggy the tines would move up and allow the grain to slide back against the uprights in a convenient position for binding. Although it undoubtedly reduced the physical labor of binding, this rake would not have been very efficient and would have allowed the reaper to get far

ahead of the binder. Gift of F. B. Day, Owosso, Michigan.

70. Model of Plow, about 1885. USNM 179841; 1949. The model has a share, standard, and moldboard of metal with a gauge wheel on the beam. The beam pivots on the standard, allowing adjustments of the angle of draft. The end of the beam is fastened to a brace which extends to the back of the moldboard. The share and point are in one piece; and the moldboard is one piece. The model resembles the plows of James Oliver, which by 1885 had been widely known and were quite possibly copied. Donor unknown.
71. Diorama of Tropical Banana Plantation, late 19th century. USNM 186623; 1950. The diorama shows bananas being harvested and trees being cut. The banana bunches get to the railroad cars on burros. At the bottom, bananas are shown in various stages of growth and ripening. Gift of United Fruit Company, Washington, D. C.
72. Diorama of Tropical Coffee Plantation, late 19th century. USNM 186553; 1950. The diarama shows coffee berries being dried in the sun and in the shade in preparation for marketing the coffee. At the bottom, various stages of growth and ripening of the coffee berries are depicted. Gift of The Great Atlantic and Pacific Tea Company (A & P), New York, New York.
73. Food-Slicing Machine, mid 19th century. USNM 188878; 1950. Cutting knives, set in helix in a wooden axle, move the meat through the box, cutting it finer and finer. Gift of George Murphy, Washington, D. C.
74. Fanning Mill, about 1860. USNM 192872; 1951. A hand-crank operated the winnowing mill for separating grain from chaff and beans from hulls. A four-blade, wooden fan, shaped like a paddle wheel, blows a draft below oscillating screens. The chaff is blown off from the threshed grain, and the grain or beans fall from the screens into the path of the draft. The screens catch any straw left after threshing. Gift of Arden Wilson, Harrisville, West Virginia.
75. Two-Row Corn Planter, about 1854. USNM 193259; 1952. This hand-operated planter, of a type patented by S. Malone on January 3, 1854, was sold by William

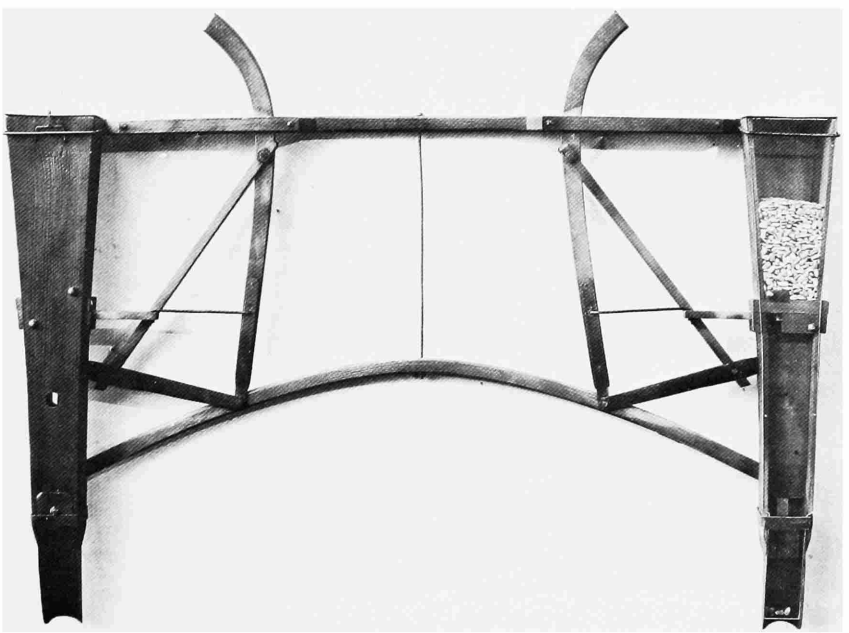

Figure 8.—Two-row corn planter, about 1854. (Catalog No. 75.)

M. Plant, a dealer in seeds, tools, and machines at St. Louis, Missouri. When the planter was dropped to the ground, the two handles moved about 8 inches in a slot toward the outside. This movement opened a space for the corn to drop into the shoe, where a small piece of wood opened and the corn fell to the ground. Gift of Warren Hammond, Fayette, Missouri.

76. Model of Ferguson Tractor, 1952. USNM 193939; 1952. This plastic and metal model of a Ferguson tractor operates a Ferguson hitch. Gift of Topping Models, Inc., Akron, Ohio.

77. Model of Two-Disk Plow, 1952. USNM 193939; 1952. A plastic and metal model of a two-disk plow for a Ferguson tractor. Gift of Topping Models, Inc., Akron, Ohio.

78. Model of New Idea Mower, 1952. USNM 193939; 1952. A cast-iron model of a New Idea mower with an operating pitman for use behind a tractor. Gift of Topping Models, Inc., Akron, Ohio.

79. Model of New Idea Manure Spreader, 1952. USNM 193939; 1952. A plastic and metal model of a New Idea, tractor-drawn manure spreader. Gift of Topping Models, Inc., Akron, Ohio.

80. Model of New Idea Corn Picker, 1952. USNM 193939; 1952. A plastic and metal model of a one-row, tractor-drawn corn picker. Gift of Topping Models, Inc., Akron, Ohio.

81. Tiling Spade, 1952. USNM 193940; 1952. This hand-forged steel spade has a bit with three tines. This style spade was invented around 1895 and was widely used for digding trenches for drain tiles on sticky or mucky soil. The Osmundson Forge Company of Webster City, Iowa, made these spades as late as 1952. Gift of A. G. Osmundson, Webster City, Iowa.

82. Glass Churn, about 1900. USNM 193941; 1952. This German-made churn, of 4-liter capacity, has a hand crank which drives a metal propeller at the bottom in one direction while paddles on the shaft turn in the other direction. Gift of A. G. Osmundson, Webster City, Iowa.

83. Cedar Sap Spouts, about 1800. USNM 194893; 1952. Sap spouts, made of cedar, about 15 inches long. Spouts like these were made and used by settlers of upper New York about 1800 to gather the maple sap after the trees had been tapped. Gift of Frank E. Olmstead, Potsdam, New York.

84. Cedar Sap Spouts, about 1800. USNM 194893; 1952. Sap spouts for maple tree tapping, about 15 inches long and made of cedar. The maple syrup and sugar industry provided some income for frontier farms, as well as providing sugar for domestic use. Although maple syrup often sold at high prices, the industry never achieved major importance even in the localities where it flourished. These spouts are of the sort used in the pioneer period in New York. (See also Nos. 83, 85–87.) Gift of Frank E. Olmstead, Potsdam, New York.

85. Iron Sap Spout, possibly late 19th century. USNM 194893; 1952. A cast-iron maple sap spout, about 3 inches long, used for gathering the sap into buckets. Possibly factory-made and used later than the frontier period, after maple syrup manufacture had become a commercial enterprise. The leading areas for maple syrup have long been Ohio, New York, Vermont, and New Hampshire. Gift of Frank E. Olmstead, Potsdam, New York.

86. Iron Sap Spout, possibly late 19th century. USNM 194893; 1952. A thin, metal trough, plated, and about 3 inches long, used to convey maple sap from the tap in the tree to the sap bucket. This is the type spout most commonly used today in those areas where farmers supplement their income with maple syrup production. Gift of Frank E. Olmstead, Potsdam, New York.

87. Sap Bucket Spikes, possibly late 19th century. USNM 194893; 1952. Hand-made iron spikes used to hold buckets for maple tree sap. They had to be hooked somewhat so the bucket could hang on them well. Gift of Frank E. Olmstead, Potsdam, New York.

88. Diagram of Jefferson Moldboard, 1798. USNM 198605; 1953. A three-dimensional wire diagram, at half scale, illustrating Thomas Jefferson's design of a plow mold-

FIGURE 9.—Grain cradle in use in the field. International Harvester Corporation photo. (Catalog No. 91.)

board as he described it in a letter to Sir John Sinclair in 1798. In the same year Jefferson read a paper to the American Philosophical Society that was titled "Description of a Mold-Board of the Least Resistance and of the Easiest and Most Certain Design." The wire diagram was constructed by the Division of Crafts and Industries, Smithsonian Institution.

89. Model of Jefferson Moldboard, 1798. USNM 198605; 1953. The model consists of four separate blocks of wood cut to show the progressive steps in the construction of the Jefferson moldboard: (1) the block of wood marked for sawing with the rear section cut out, and in two parts; (2) the block of wood sawed on two diagonals, with the rear section cut out, and in three parts; (3) the block of wood sawed transversely on guide lines down to the diagonals, with the wood between the transverse cuts removed and leaving the face of the moldboard roughly shaped; (4) the rear surface of the board produced in the same manner as the front, resulting in a completed moldboard. The models were constructed by the Division of Crafts and Industries, Smithsonian Institution, after Jefferson's original moldboard, located at the Natural History Museum, Paris, France.

90. Wooden Curd Breaker, about 1860. USNM 198617; 1953. This curd breaker is made of wood with iron pegs in the cylinder and hopper. Gift of Laurence Hathaway, Easton, Maryland.

91. Grain Cradle, about 1844. USNM 198620; 1953. Caleb Paul Duval used this cradle on his Glen Echo farm near Baltimore, Maryland. Gift of Virginia Duval, College Park, Maryland.

92. Barrel Churn, about 1860. USNM 198620; 1953. A wooden barrel churn with iron crank and paddles. Such churns were of too small volume to be used on commercial dairy farms, and they were not at all useful in creameries, which first appeared in 1861. Gift of Virginia Duval, College Park, Maryland.

93. Cookie Roller, about 1860. USNM 198620; 1953. A wooden, grooved, one-handled cookie roller, about 14½ inches long and about 3¼ inches in diameter. The roller added an esthetic touch to home-made cookies but was of little importance in the history of commercial food processing. Gift of Virginia Duval, College Park, Maryland.

94. Meat Grinder, 1859. USNM 198620; 1953. This iron, hand-cranked meat grinder was patented August 2, 1859. Gift of Virginia Duval, College Park, Maryland.

95. Butter Prints, about 1860. USNM 198620; 1953. Two butter prints. One is circular, with a tri-lobed leaf design and about 3 inches in diameter; the other is a box mold with two five-point star designs and about 5 inches long, 2½ inches wide, and 4 inches high. The butter was pressed into these molds before being served, or, sometimes, before being rolled in paper and sold in towns. This aspect of farm dairying quickly disappeared after the creamery dominated the industry. Gift of Virginia Duval, College Park, Maryland.

96. Shoe Last, possibly mid 19th century. USNM 196820; 1953. A small last, to fit either foot, for a shoe about 8¾ inches long and 2¼ inches wide. Such an implements were useful in frontier communities and generally were owned by itinerant cobblers who went from house to house. Gift of Virginia Duval, College Park, Maryland.

97. Model of Fanning Miill, 1857. USNM 198620; 1953. This is a working model of a fanning mill invented by Joseph and James Montgomery and covered by patents 10324, issued in 1853; 13062, issued in 1855; and 16447, issued in 1857. The crank handle and the slide, which governed the flow into the hopper, are missing. James Montgomery took the model on sales trips as a demonstrator. Gift of Ruth Montgomery, Peoria, Illinois.

98. Model of McCormick Reaper, 1831. USNM 121526; 1953. A scale model of the 1831 reaper of Cyrus McCormick, built long afterwards from descriptions by the inventor. Gift of McCormick Historical Association, Chicago, Illinois.

99. Bee Colony, 1953 (renewed yearly). A 3-

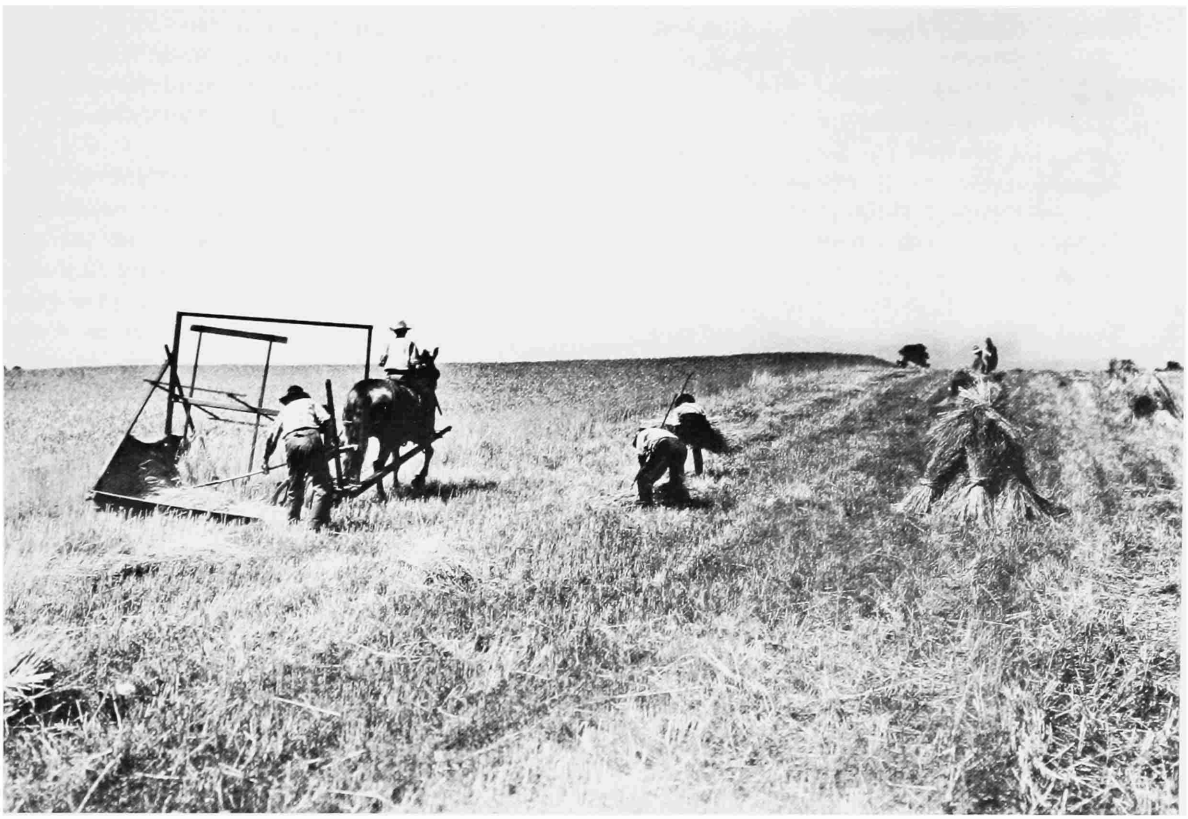

FIGURE 10.—McCormick reaper (1831) in use in the field. Photo courtesy of International Harvester Corporation. (Catalog No. 98.)

story bee hive with about 60,000 bees. The hive was designed by experts at the Department of Agriculture Research Station, Beltsville, Maryland. The United States Department of Agriculture donated the hive and the Italian bees.

100. MODEL OF OX-POWERED SUGAR CANE MILL, 1925. USNM 200380; 1954. Model of a mill of a type used in Puerto Rico as early as 1523. It took ten men and four yoke of oxen to operate the mill, which could crush about four tons of cane in a 12-hour day. This type of mill extracted about 40 to 45 percent syrup based on the weight of the cane, compared to 80 to 85 percent extracted by modern mills. Gift of Daniel Thompson, Petersburg, Virginia.

101. MODEL OF WATER-LIFTING WHEEL, 1884. USNM 200380; 1954. A model of a wind-driven waterwheel used for raising water into the evaporating beds in salt works. This type of device lifted water from the ocean in Puerto Rico. Gift of Daniel Thompson, Petersburg, Virginia.

102. MODEL OF GRIST MILL, 1883. USNM 200380; 1954. This model of a water-powered grist mill resembles those used throughout America in the 19th century before the discovery of the gradual reduction process and the consequent centralization of the milling industry. This particular mill, known to have operated from 1883 to 1940, ground corn in Puerto Rico. Gift of Daniel Thompson, Petersburg, Virginia.

103. FARM COPYBOOK, about 1840. USNM 209042; 1955. Wells Forbes, who had a farm near Alexandria, Virginia, kept this book for about a year in the 1840s. Gift of Bessie W. Palm, Washington, D. C.

104. GRAIN CRADLE, about 1900. USNM 210597,

1956. Grain cradle used before 1900. Gift of Jennie Sabrosky, Sturgis, Michigan.

105. Model of Hussey Reaper, 1833. USNM 212910; 1956. A model of the 1833 reaper patented by Obed Hussey and based on the specifications of the patent. Constructed by the Office of Exhibits, Smithsonian Institution.

106. Horse Spurs, possibly late 19th century. USNM 211312; 1956. Gift of Catholic University of America, Washington, D. C.

107. Bridle Bits, possibly late 19th century. USNM 211312; 1956. A rugged type of bridle bit with steel rings used to control horses. This particular bridle bit may have been used in Texas and Mexico in the cattle industry. Gift of Catholic University of America, Washington, D. C.

108. Cow Bell, possibly late 19th century. USNM 211312; 1956. Gift of Catholic University of America, Washington, D. C.

109. Braided Whip, possibly late 19th century. USNM 211312; 1956. A home-made horsewhip. Gift of Catholic University of America, Washington, D. C.

110. Tobacco Clips, possibly late 19th century. USNM 211312; 1956. Seven clips, each different, denoting a brand for labeling tobacco. Gift of Catholic University of America, Washington, D. C.

111. Bar Share Plow, 1807. USNM 214608; 1957. A left-handed wooden moldboard plow. Most American plows cast the furrow to the right. The Reverend Christian Lesher brought this rare sort of plow from Lancaster County, Pennsylvania, to Washington Township, Pennsylvania, in 1807. Gift of Daniel Lesher, Waynesboro, Pennsylvania.

112. Sausage Stuffer, about 1820. USNM 213816; 1957. This hand-lever sausage stuffer, mounted on a bench, may have been made in England in the early 19th century and later brought to Brampton, Ontario. Not all parts are of the same age. The replaced parts seem to be those most subject to wear and tear. This style sausage stuffer was quite common in the 18th and 19th centuries. Gift of Tee-Pak, Inc., Chicago, Illinois.

113. Meat Grinder, about 1830. USNM 312816;

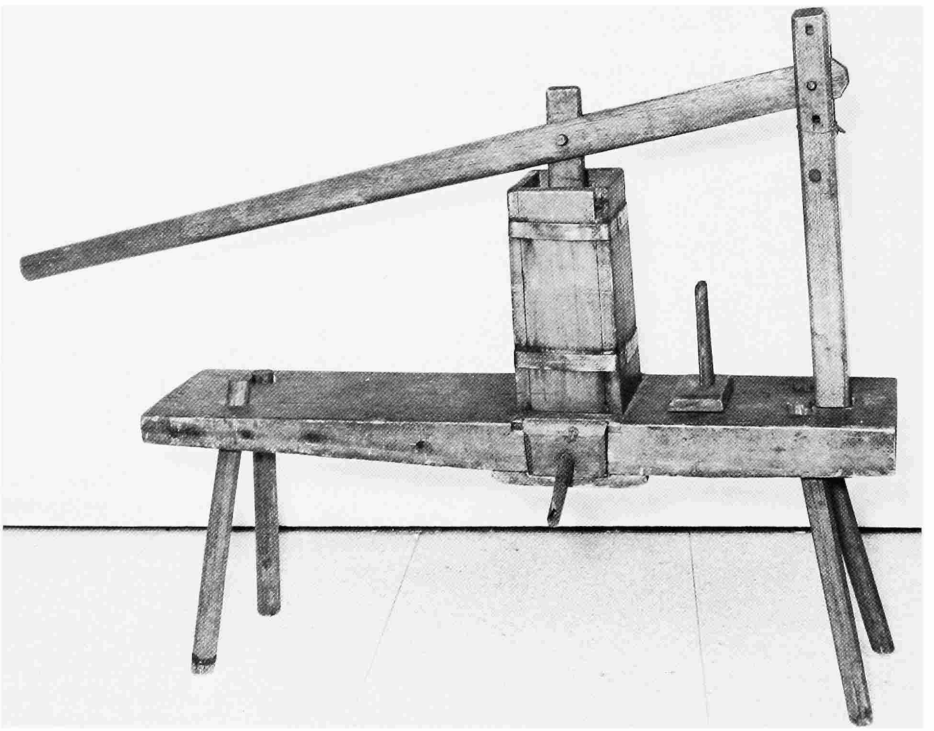

Figure 11.—Sausage stuffer, early 19th century. (Catalog No. 112.)

1957. A hand-cranked meat grinder made of wood with iron slugs to push the meat against stationary knives. Overall, 14 inches long, 10 inches wide, and 10 inches high. Gift of Tee-Pak, Inc., Chicago, Illinois.

114. SAUSAGE STUFFER, early 19th century. USNM 213816; 1957. This hand-cranked sausage stuffer, made of wood and with an iron screw, fits on a small bench with lard press. It is 20 inches long, 8½ inches wide, and 11 inches high. Gift of Tee-Pak, Inc., Chicago, Illinois.

115. LARD PRESS, late 19th century. USNM 213816; 1957. A lard press made of cylindrical perforated metal, with a screw press to be mounted on a small bench. The press is 11 inches in diameter and 10 inches high. The bench is about a yard long, 8 inches wide, and 18 inches high. Gift of Tee-Pak, Inc., Chicago, Illinois.

116. BUTCHER'S TABLE, late 19th century. USNM 213816; 1957. A heavy, low table made of two thick slabs of wood with a gutter cut along the edges of the table. Used in cutting up animal carcasses. Some 6 feet long, 34 inches wide, and 24½ inches high. Gift of Tee-Pak, Inc., Chicago, Illinois.

117. CHOPPING BOWL, late 19th century. USNM 213816; 1957. Eliptical wooden chopping bowl, some 30 inches long, 17½ inches wide, and 7 inches high. Gift of Tee-Pak, Inc., Chicago, Illinois.

118. THRESHER, about 1855. USNM 214890; 1957. A threshing machine marked "J. and P. Flickinger, Hanover, Pa., No. 41." It once had a drive for a vibrating straw separator. Gift of James W. Brown, Brookeville, Maryland.

119. GRAIN CRADLE, about 1870. USNM 214890; 1957. A grain cradle made at Brighton, Maryland, by William Nickerson, Jr. The cradle fingers are of ash, and the braces of hickory. This type of cradle continued in use in many places even after the advent of harvesting machinery. Farmers with only small acreages in bread grains or who farmed rough or hilly soil could not effectively use the reapers and harvester of the middle 19th century. Gift of James W. Brown, Brookeville, Maryland.

120. BINDER'S RAKE, about 1870. USNM 214890; 1957. The binder followed the cradler. This hand rake, used by the binder for gathering the grain before binding and later shocking, had teeth rived out of hickory. Such a rake could also be used by a binder who followed those the early reapers used before the invention of the twine binder. Gift of James W. Brown, Brookeville, Maryland.

121. HARPOON HAYFORK, late 19th century. USNM 214890; 1957. A double-harpoon hayfork and pulley for lifting hay from a wagon to a barn hayloft. Power was supplied by horse or mule. The small barbs on the harpoon could catch and hold a surprising amount of hay. Gift of James W. Brown, Brookeville, Maryland.

FIGURE 12.—Harpoon hayforks. (Catalog Nos. 121, 123.)

122. GRAIN SACK, 1842. USNM 214608; 1957. A grain sack of homespun linen made from flax grown on the John Lesher farm near Waynesboro, Pennsylvania. Woven at a roadside mill, the sack has a capacity of three bushels and is marked "John Lesher, No. 26, 1842." Prior to the advent of and widespread use of the elevator system of grain handling, nearly all grain was moved in sacks that had to be shifted about by hand and stored in warehouses. The elevator system began in Buffalo, New York, in 1842, but reached a position of prominence only in the 1870s when it began flourishing in Chicago and Milwaukee. Thereafter the grain sack became virtually a curiosity. Gift of James W. Brown, Brookeville, Maryland.

123. SINGLE-HARPOON HAYFORK, about 1895. USNM 216224; 1957. A hay harpoon, commonly called a hay needle, about 35½ inches long. Gift of Cora E. Robinson, Schenectady, New York.

124. TRACTOR ENGINE STARTER, 1930. USNM 218874; 1958. The starting device could be bolted to the rear wheel hub of an automobile. An extendible shaft went from the wheel-fitting to the crank on the tractor. The car engine then could turn over the tractor engine. The starter was made by C. O. Goodrich, who marketed it for about eight years in five midwestern states. Self starters on tractors eventually ended the need for the device. Gift of C. O. Goodrich, Plymouth, Indiana.

125. FORDSON CRANK, about 1925. USNM 218874; 1958. This device was used to crank the engine on Fordson tractors. Gift of C. O. Goodrich, Plymouth, Indiana.

126. MILKING MACHINE, 1896. USNM 220004; 1958. A Mehring foot-powered milking machine. Gift of Earl J. Waybright, Gettysburg, Pennsylvania.

127. CAREY PLOW, about 1800. USNM 220005; 1958. A type of plow widely used in the late 18th and early 19th centuries in the United States. This particular plow was a one-horse, single-bottom, walking type, with wooden handles, beam, stock, and moldboard. The share point is of iron. All wooden joints are joined with wooden pegs. There is a bolt-type brace from beam to stock and a small iron brace with a larger wooden brace between the handles. Gift of International Harvester Co., Albany, New York.

128. HOE, possibly mid 19th century. USNM 213356; 1958. Only the blade remains of this socket-type hoe. Gift of New York Historical Association, Cooperstown, New York.

129. LOG ROLLER, late 19th century. USNM 213356; 1958. Oxen drew this roller in preparing seed beds. The roller crushed clods and compressed the soil, leaving a firm, compact seed bed. It was useful, obivously, only on certain types of soil in fairly humid areas. The roller is made of four log sections, each 23 inches long and 14 inches in diameter. The logs are set in a weighted frame measuring 35 inches by 9 feet, with a tongue about 13 feet long. Gift of New York Historical Association, Cooperstown, New York.

130. GRAIN CRADLE, late 19th century. USNM 213356; 1958. A form of scythe used for harvesting grain before the reaper came into use, or used in places where the reaper proved uneconomical or technologically inappropriate, as rough or hilly land. This specimen has four wooden fingers, or tines, that are 45 inches long and spaced 7 inches apart. The blade is 2 inches wide and as long as the fingers. Gift of New York Historical Association, Cooperstown, New York.

131. SELF-RAKE REAPER, 1895. USNM 213356; 1958. A McCormick Daisy Reaper of 1895 in which the operator sat on a seat mounted on the axle of the left wheel. Two horses drew the reaper. Three rotating arms with 3-inch projections raked, bound and shocked the grain. The cutter bar, over 5 feet long, has three triangular sickle blades which oscillate through the guard teeth, as in Hussey or modern cutter bars. Gift of New York Historical Association, Cooperstown, New York.

132. BARLEY FORK, possibly late 19th century. USNM 213356; 1958. A rectangular

wooden barley fork with a one-eighth-inch-gauge wire guard for holding the barley on the four tines. The guard was needed because of the nasty stings that the beard could give the worker. Gift of New York Historical Association, Cooperstown, New York.

133. BRUSH HOOK, late 19th century. USNM 213356; 1958. A typical iron sickle, called a hook because of its general shape. It has a circular tip on the end of the blade so that it could be used for cutting brush. Gift of New York Historical Association, Cooperstown, New York.

134. FANNING MILL, late 19th century. USNM 213356; 1958. An early fanning mill with pulley and leather belt. Gift of New York Historical Association, Cooperstown, New York.

135. SCYTHE, late 19th century. USNM 213356; 1958. A crooked-handled scythe used for cutting grain before the cradle, and thereafter for cutting hay. Gift of New York Historical Association, Cooperstown, New York.

136. FLOP-OVER HAY RAKE, about 1895. USNM 213356; 1958. A rake for piling hay that would be carried from the field or put into a mow. This sort of implement was used as early as 1820. The farmer walked behind the horse-drawn rake and raised the handle when the rake was full; this caused the double set of teeth to revolve, releasing the hay in a pile and putting the second set of teeth into position to rake more hay. The older method involved using small hand rakes and required considerable time and effort in a very disagreeable task. Gift of New York Historical Association, Cooperstown, New York.

137. VICTOR MOWING MACHINE, 1880. USNM 213356; 1958. A one-horse, front-cut mowing machine similar to the Buckeye mower. The cutter bar can be raised and lowered parallel to the ground for desired cutting heights, and it can be lifted and fastened in an upright position for transport to and from the field. Mowers cut more rapidly and lower than did reapers, and thus they used a different gear ratio; however, farmers sometimes used reapers for mowing. Gift of New York Historical Association, Cooperstown, New York.

138. SPRING-TOOTH HAY RAKE, late 19th century. USNM 213356; 1958. A sulky rake with spring teeth designed to jump over obstructions in the field. Gift of New York Historical Association, Cooperstown, New York.

139. "RAILWAY HORSE POWER," about 1885.

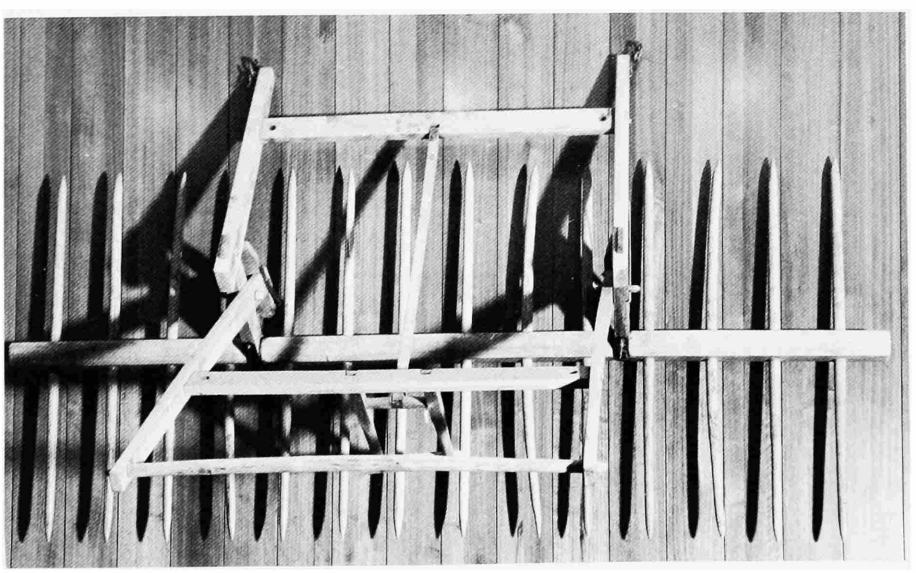

FIGURE 13.—Flop-over hay rake. (Catalog No. 136).

USNM 213356; 1958. A horse-powered treadmill made chiefly of wood, with metal parts where the wear would be greatest. It was used to produce power for belt-driven equipment such as threshers or fanning mills. The machine is set in motion by putting a horse in the pen and releasing the brake. The weight of the horse causes the slats to move endlessly, which in turn rotates the belting wheel. Two-horse treadmills also were used, but such machines, although portable, worked less efficiently than the sweep-power machines. This treadmill was made in Vermont. Gift of New York Historical Association, Cooperstown, New York.

140. Dog-Powered Churn, 1881. USNM 213356; 1958. H. M. Childs of Utica, New York, patented this dog-powered churn in 1871, with improvements patented in 1881. A dog, tied or strapped into the pen, ran forward and so moved the slats of the treadmill which in turn rotated a flywheel. Attached to the flywheel is a pitman rod which raises and lowers a churn dasher. Devices of this sort had appeared earlier for use in the farm-dairy industry. The change of direction effected by the pitman rod caused some loss of energy; in any case, a revolving barrel-churn proved more efficient in the long run. Gift of New York Historical Association, Cooperstown, New York.

141. Winnowing Basket, about 1800. USNM 213356; 1958. The winnowing basket was used to work off the chaff from the threshed grain. When the grain was tossed into the air, the wind would blow away the chaff

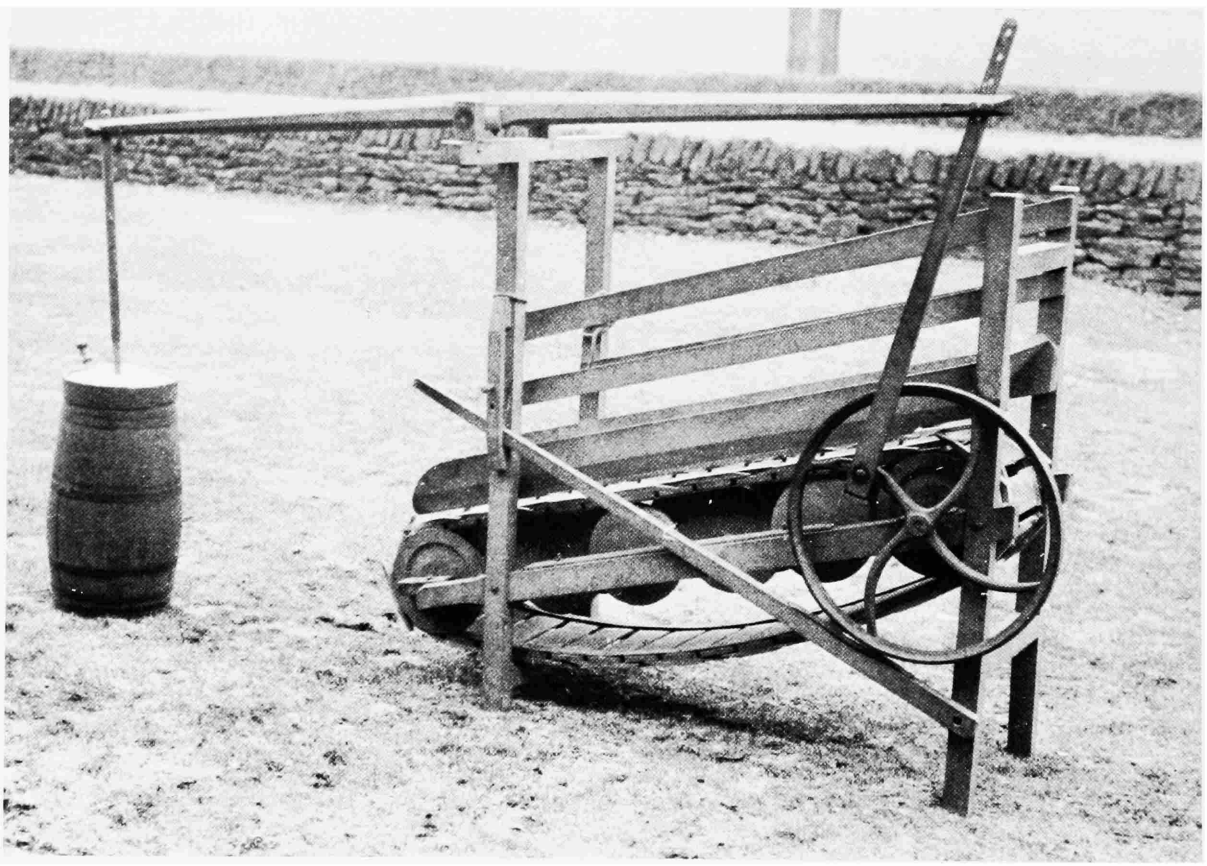

Figure 14.—Dog-powered churn, 1881. (Catalog No. 140.)

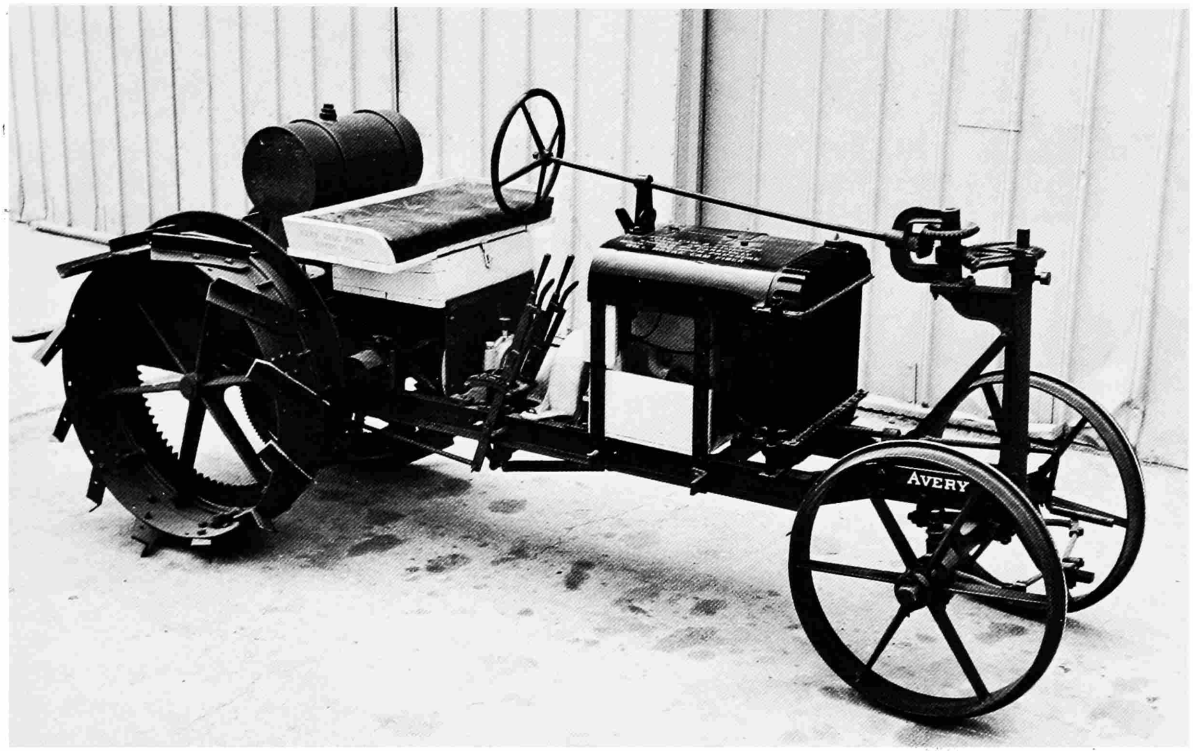

FIGURE 15.—Avery Bulldog tractor, about 1919. (Catalog No. 142.)

and the grain would fall back into the basket. Sometimes the grain would be poured from another basket into a winnowing basket, with the wind doing the winnowing. Gift of New York Historical Association, Cooperstown, New York.

142. AVERY BULLDOG TRACTOR, 1919. USNM 222860; 1958. This is one of the several makes of tractors which set a trend toward lighter tractors about the time of World War I. It was designed for light field work such as cultivating but could also be used for belt drive. It developed 5 to 10 horsepower. Sold by Everett Noirot, Freehold, New York.

143. GRAIN CRADLE, about 1870. USNM 230323; 1958. This grain cradle resembles a scythe, with modification by the addition of a light wooden frame of four fingers with braces. Gift of Massachusetts Society for Promoting Agriculture.

144. SCYTHE, about 1840. USNM 230323; 1958. A straight-handled scythe, probably handmade, that largely was used for mowing, although it could be used for reaping grain. Gift of Massachusetts Society for Promoting Agriculture.

145. HARNESS VISE, probably mid 19th century. USNM 230323; 1958. This wooden device could be used to pry open the jaws of a recalcitrant horse. More often, it held parts of the harness as the saddler worked. Gift of Massachusetts Society for Promoting Agriculture.

146. WOODEN HAND FORK, late 19th century. USNM 230323; 1958. A wooden pitchfork for handling hay, straw, and the like. The metal pitchfork gradually replaced these wooden forks between the middle and end of the 19th century. Gift of Massachusetts Society for Promoting Agriculture.

147. HORSE-DRAWN HAYFORK, late 19th century. USNM 230323; 1959. The fork was driven into the hay and the handle compressed until it latched. A rope was attached to the fork, run up over a pully in the barn,

and then down to a horse. In this way the hay could be lifted into the barn. Gift of Massachusetts Society for Promoting Agriculture.

148. HORSE-DRAWN PLANTER, 1856. USNM 230323; 1958. E. C. Fairchild of Deerfield, Massachusetts, made this planter, which has compartments for seeds and fertilizer. As the drive-wheel pulled a sliding bar back and forth, seeds and fertilizer alternately dropped into the ground. The spacing of seeds and fertilizer could be set by adjusting the metal bar. Gift of Massachusetts Society for Promoting Agriculture.

149. FANNING MILL, mid 19th century. USNM 230323; 1958. A machine for winnowing grain after it had been threshed. Grain fed into the machine landed on vibrating screens which permitted the kernels to fall into the path of a draft of air which blew off the chaff and debris. The clean grain fell into a container beneath the mill. The operator turned a crank which operated both the screens and the fan. Gift of Massachusetts Society for Promoting Agriculture.

150. HOE, mid 19th century. USNM 230322; 1958. A small hand hoe used for cultivating. Gift of Farmer's Museum, Hadley, Massachusetts.

151. TILE KNIFE, late 19th century. USNM 230322; 1958. This knife, resembling a small spade, was used to cut the trench in which tile was laid. It has a triangular metal cutter at right angles on the right side, and this gave the trench a straight edge on one side and perhaps helped keep the trench straight. Gift of Farmer's Museum, Hadley, Massachusetts.

152. HAND HAYFORK, about 1895. USNM 230322; 1958. Farmers used this metal fork for pitching hay, straw, and possibly manure. Gift of Farmer's Museum, Hadley, Massachusetts.

153. GRAIN SICKLE, 19th century. USNM 230322; 1958. This hand tool for harvesting grain has not changed in design for the last thousand years. The sickle has a curved blade some 22 inches long. The reaper would grab a handful of stalks and cut them with the blade. One man could cut up to an acre of grain by this method. Gift of Farmer's Museum, Hadley, Massachusetts.

154. GRAFTING KNIFE, possibly 20th century. USNM 230322; 1958. A knife especially designed to make the cuts necessary for grafting branches onto fruit trees. Gift of Farmer's Museum, Hadley, Massachusetts.

155. MANURE FORK, possibly 20th century. USNM 230322; 1958. A typical manure fork. Gift of Farmer's Museum, Hadley, Massachusetts.

156. OX MUZZLE, about 1830. USNM 230322; 1958. Threshers used the muzzle to prevent the ox from stopping to graze while pulling equipment or from eating the grain while treading on it in a threshing operation. This muzzle is made of thin strips of wood. Gift of Farmer's Museum, Hadley, Massachusetts.

157. HAY CUTTER, 20th century. USNM 230322; 1958. A knife made with the handle and serrated blade as one piece, all of metal. A wooden stock with a handgrip is fastened to the metal handle. This tool obviously was intended for cutting very small amounts of hay. Gift of Farmer's Museum, Hadley, Massachusetts.

158. NARROW HOE, probably mid 19th century. USNM 230322: 1958. This is a typical cultivating hoe. Farmers used hoes of this type for cultivating crops until the innovation of plows and harrows. Gift of Farmer's Museum, Hadley, Massachusetts.

159. OX YOKE, about 1830. USNM 230322; 1958. This yoke, for a single ox, probably was used in pulling small agricultural implements such as cultivating plows. Gift of Farmer's Museum, Hadley, Massachusetts.

160. GRAIN FLAIL, about 1840. USNM 230322; 1958. This type flail was used to beat grain free from unbound bundles of grain scattered about on the barn floor. The harvesters then threw the straw to one side and swept up the grain and chaff. The grain then had to be winnowed. Gift of Farmer's Museum, Hadley, Massachusetts.

161. CURD BREAKER, late 19th century. USNM 230322; 1958. This machine has a wooden

roller with projecting wooden pegs which, when rotated, broke up cheese curds. Gift of Farmer's Museum, Hadley, Massachusetts.

162. HORSE-DRAWN CULTIVATOR, late 19th century. USNM 230322; 1958. This triangular cultivator was used for stirring the soil and removing foreign vegetable matter. It is adjustable and has five teeth spaced from 12 to 14 inches apart. Gift of Farmer's Museum, Hadley, Massachusetts.

163. ICE SAW, late 19th century. USNM 230322; 1958. This steel-bladed saw cut ice in lakes, ponds, and streams. Gift of Farmer's Museum, Hadley, Massachusetts.

164. PORTABLE STEAM ENGINE, 1877. USNM 211811; 1958. Portable steam engines provided belting power on farms to run threshing machines, circular saws, etc. This Frick model steam engine operated regularly from 1877 to 1949. Gift of Frick Company, Waynesboro, Pennsylvania.

165. BROADCAST SEEDER, 1930. USNM 230573; 1958. The operator saddles this implement from his shoulder by means of a strap fastened to the seed pack. By turning the crank at a normal pace, seeds are scattered from a spinning disk. The seeder is equipped with a gauge which can be set to sow prescribed amounts of seed per acre. Gift of Mrs. Arnold Miles, Washington, D. C.

166. CIGAR FORMERS, about 1885. USNM 230573; 1958. These instruments consist of two pieces of wood dowelled together with twenty holes that taper from 7/16 inch to 3/16 inch. The name "Miller Burial and Pliers Co." is stamped in the wood. Gift of Mrs. Arnold Miles, Washington, D. C.

167. MANURE FORKS, about 1895. USNM 230573; 1958. Two steel manure forks. Gift of Mrs. Arnold Miles, Washington, D. C.

168. WOODEN HAYFORK, 19th century. USNM 230573; 1958. A typical wooden hayfork of the 19th century. Gift of Mrs. Arnold Miles, Washington, D. C.

169. MODEL OF MANNING MOWER, 1831. USNM 230438; 1959. William Manning of Plain-

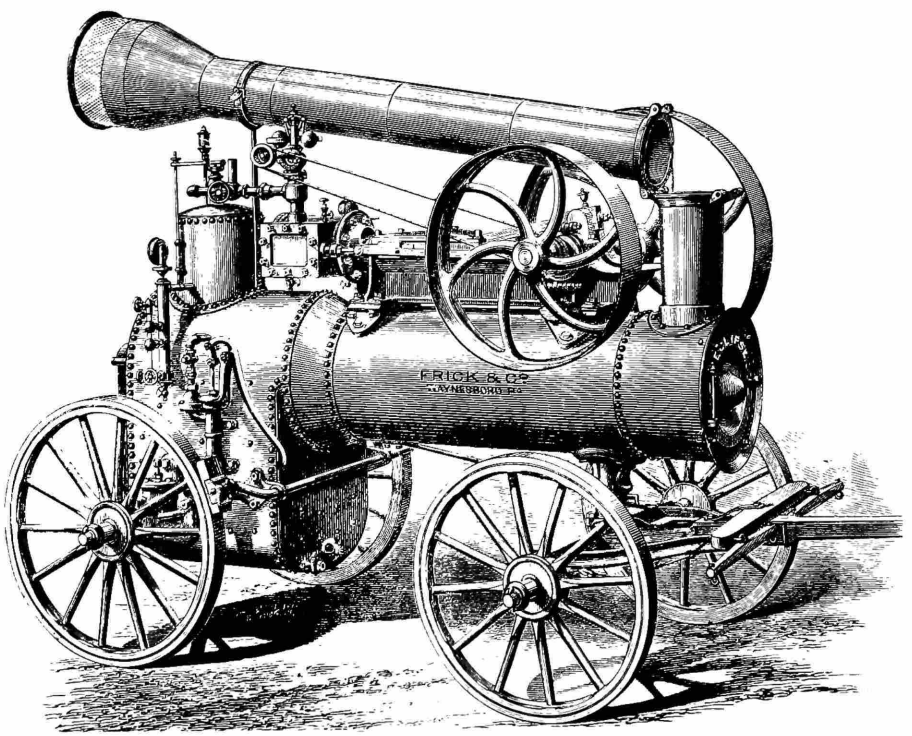

FIGURE 16.—Frick portable steam engine of 1877. (Catalog No. 164.)

field, New Jersey, invented this mower in 1831. The cutter bar, suggestive of Hussey's, has triangular knives which vibrate over long fingers. Constructed by Office of Exhibits, Smithsonian Institution.

170. MODEL OF BAILEY MOWER, 1822. USNM 230438; 1959. This mower, invented in 1822 by Jeremiah Bailey of Pennsylvania, has a rotating disk that serves as the cutter. The cutting disk, which can be raised to avoid obstacles, is geared from the axle. Constructed by Office of Exhibits, Smithsonian Institution.

171. MODEL OF GALLIC REAPER, first century A.D. USNM 230438; 1959. This is a model of a reaper as described in use in Gaul in the first and second centuries A.D. A donkey or an ox pushed the reaper through the grain; the heads of the grain were ripped off by the blade and fell into the box. Constructed by Office of Exhibits, Smithsonian Institution.

172. MODEL OF HUSSEY REAPER, 1833. USNM 230438; 1959. The first Hussey reapers were crude two-wheel mowers with a platform attached to the rear right side of the machine. The sickle or cutter bar was made of a series of triangular knives riveted to a flat bar that oscillated back and forth between guard teeth. The action was initiated by means of a gear mounted on the main axle. The raker stands on the platform to remove the cut grain. Constructed by Office of Exhibits, Smithsonian Institution.

173. MODEL OF HUSSEY REAPER, 1850. USNM 230438; 1959. This is a one-eighth scale model of the Hussey reapers built between 1845 and 1850. Constructed by Office of Exhibits, Smithsonian Institution.

174. MODEL OF BELL REAPER, 1828. USNM 230438; 1959. On this machine a reel pressed the grain against the cutters and made it fall back on an apron. The apron could be set to run in either direction to deposit the cut grain at the side, out of the way of the machine on the next trip around. The reaper was invented by the Reverend Patrick Bell, Carmyllie, Scotland. The model was constructed by Office of Exhibits, Smithsonian Institution.

175. MODELS OF LANDIS ECLIPSE THRESHER, 1907. USNM 230438; 1957. Constructed by Office of Exhibits, Smithsonian Institution.

176. MODEL OF NEW ENGLAND STRONG PLOW, about 1780. USNM 230438; 1959. Constructed by Office of Exhibits, Smithsonian Institution.

177. MODEL OF MAHLON SMITH PLOW, about 1825–1840. USNM 230438; 1959. Constructed by Office of Exhibits, Smithsonian Institution.

178. CHECK ROW CORN PLANTER, about 1870. USNM 230441; 1959. This machine planted two rows at a time and required two men to operate. One man drove the horses and the other operated a lever for dropping the corn at the point desired. Patents for "check" row planters were issued in 1853, 1855, and 1857. Gift of Clayton Kanter, New Knoxville, Ohio.

179. ONE-ROW HAND "CORN JOBBER," mid 19th century. USNM 230441; 1959. Seed corn is released by means of a lever. Gift of Clayton Kanter, New Knoxville, Ohio.

180. WIDE SINGLE-SHOVEL PLOW, about 1840. USNM 230574; 1959. Farmers in the western part of the United States in the 1840s used this type of plow to cultivate corn. Gift of John Offenbacker, Sidney, Ohio.

181. DOUBLE-SHOVEL PLOW, about 1850. USNM 230574; 1959. This plow, with shovels

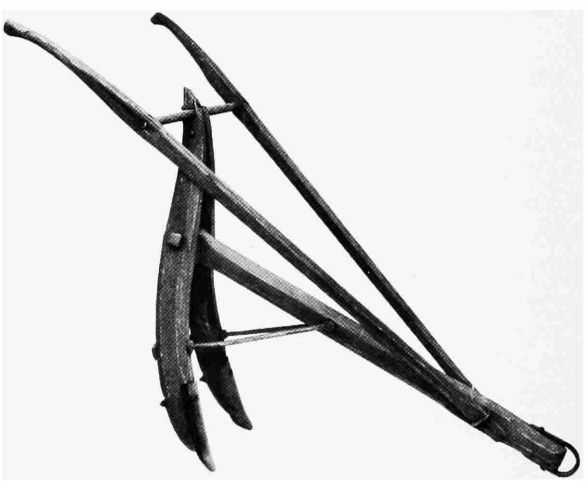

FIGURE 17.—Double-shovel plow. (Catalog No. 181.)

placed in a staggered position, was commonly used for cross-plowing or cultivating. Gift of John Offenbacker, Sidney, Ohio.

182. DOUBLE-SHOVEL PLOW, about 1850. USNM 230574; 1959. This double-shovel plow has the shovels placed opposite one another. Gift of John Offenbacker, Sidney, Ohio.

183. A-FRAME HARROW, mid 19th century. USNM 230574; 1959. This triangular harrow has wooden beams with 22 ten-inch iron spikes driven through them. This type of harrow pulverized and leveled plowed land, covered the seed, and cultivated between rows of corn. Triangular harrows worked better than square types because the triangles had greater strength on newly cleared land. Gift of John Offenbacker, Sidney, Ohio.

184. TROLLEY CARRIER FOR HAYFORK, about 1875. USNM 230574; 1959. This steel trolley carrier supported a one-horse hayfork. A pulley attached to the trolley carrier lifted and lowered the hayfork. The first trolley carriers for hayforks were invented by J. E. Porter of Ottawa, Illinois, in 1869 and 1872. They were made of wood and iron. The first steel carriers were patented by Jacob Ney, Canton, Ohio, and (in 1886) by P. A. Myer, Ashland, Ohio. Gift of John Offenbacker, Sidney, Ohio.

185. RIDING DISK CULTIVATOR, late 19th century. USNM 230574; 1959. This cultivator has two sections, each with three 15-inch disk wheels spaced 5¾ inches apart. It has handgrip levers for making cutting adjustments. This machine worked best on ground between row crops. Gift of John Offenbacker, Sidney, Ohio.

186. SINGLETREE, late 19th and early 20th centuries. USNM 230574; 1959. This singletree is made of wood. The trace chains of the team of horses could be attached to the hooks on the singletree. Gift of John Offenbacker, Sidney, Ohio.

187. DOUBLETREE, late 19th century to early 20th century. USNM 230574; 1959. A doubletree made of wood. The doubletree served as a lever on which to mount two singletrees. This arrangement distributed equally the pull of a load between two horses. Gift of John Offenbacker, Sidney, Ohio.

188. SINGLETREE, late 19th century. USNM 230574; 1959. The trace chains of two horses are attached to this home-made, wooden singletree. The tongue of a machine would be hooked to the center of the tree. Gift of John Offenbacker, Sidney, Ohio.

189. GRAIN FORK, about 1870. USNM 230574; 1959. This three-tine iron fork was used to move bundled grain. Gift of John Offenbacker, Sidney, Ohio.

190. ONE-ROW, HAND "CORN JOBBER," late 19th century. USNM 230574; 1959. Gift of John Offenbacker, Sidney, Ohio.

191. DOUBLE-HARPOON HAY FORK, about 1870. USNM 230574; 1959. S. E. Harris patented this double-harpoon, iron hayfork in 1867. Gift of John Offenbacker, Sidney, Ohio.

192. GROUND HOG THRESHER, about 1830. USNM 230579; 1959. This early thresher did not separate the grain from the chaff. Grain fed into the trough passed into a compartment with a rotating iron cylinder filled with finger-like projections which broke the grain into its component parts. A fanning basket then separated the grain from the chaff. Purchased from George Rhoades, Greenville, Ohio.

193. SWEEP HORSE POWER, late 19th century. USNM 230579; 1959. This type of horse power operated by the horse pulling a shaft in a circular motion that set iron gears into motion. The gears connected to a pulley for operating grain threshers, flour mills, saws, and the like. Purchased from George Rhoades, Greenville, Ohio.

194. MARKER SLED, possibly late 19th century. USNM 230579; 1959. This wooden sled marked rows for future planting. The sled could mark three rows approximately 34 inches apart. Purchased from George Rhoades, Greenville, Ohio.

195. LARGE HAND RAKE, late 19th century. USNM 230579; 1959. Made entirely of wood. Purchased from George Rhoades, Greenville, Ohio.

196. JOINTED, WOODEN HARROW, mid 19th century.

USNM 230579; 1959. This two-sectioned, rectangular wooden harrow has five wooden beams per section, each section having 18 rounded teeth. Very primitive. Purchased from George Rhoades, Greenville, Ohio.

197. WHEELED CULTIVATOR, early 20th century. USNM 230579; 1959. This cultivator has individual levers for setting each set of teeth and contains a neck yoke, singletree, and guard shields. This type of cultivator improved on the one-horse type, which required harrowing one side of a row at a time. A variety of teeth could be used on this machine. Purchased from George Rhoades, Greenville, Ohio.

198. DOUBLE A-FRAME HARROW, 19th century. USNM 230580; 1959. This wooden, triangular harrow has iron teeth driven through the beams. Purchased from Ruth Brown, Sardinia, Ohio.

199. WHEELED CULTIVATOR, early 20th century. USNM 230580; 1959. This riding-type cultivator has two sections with three teeth each. It differs from most wheeled cultivators by having iron bars for setting teeth depth, with one lever to elevate and lower the teeth. It has a neck yoke and a singletree. Purchased from Ruth Brown, Sardinia, Ohio.

200. FLOP-OVER HAYRAKE, about 1895. USNM 230580; 1959. A flop-over rake used as early as 1820. Purchased from Ruth Brown, Sardinia, Ohio.

201. SIDE HILL PLOW, late 19th century. USNM 230581; 1959. One of several types of plows used for plowing along hillsides. The moldboard and share could rotate on a horizontal axis. At the end of each furrow the farmer could reverse it and hook in position so that the plow cast each furrow in the same direction. Purchased from Albert Knecht, Lancaster, Ohio.

202. GRAIN DRILL, about 1850. USNM 230581; 1959. This drill was made by the Eagle Machine Company of Lancaster, Ohio. It has a double bar, singletree, neck yoke, one grain compartment with eight grain boots, and a packing wheel for each boot. It

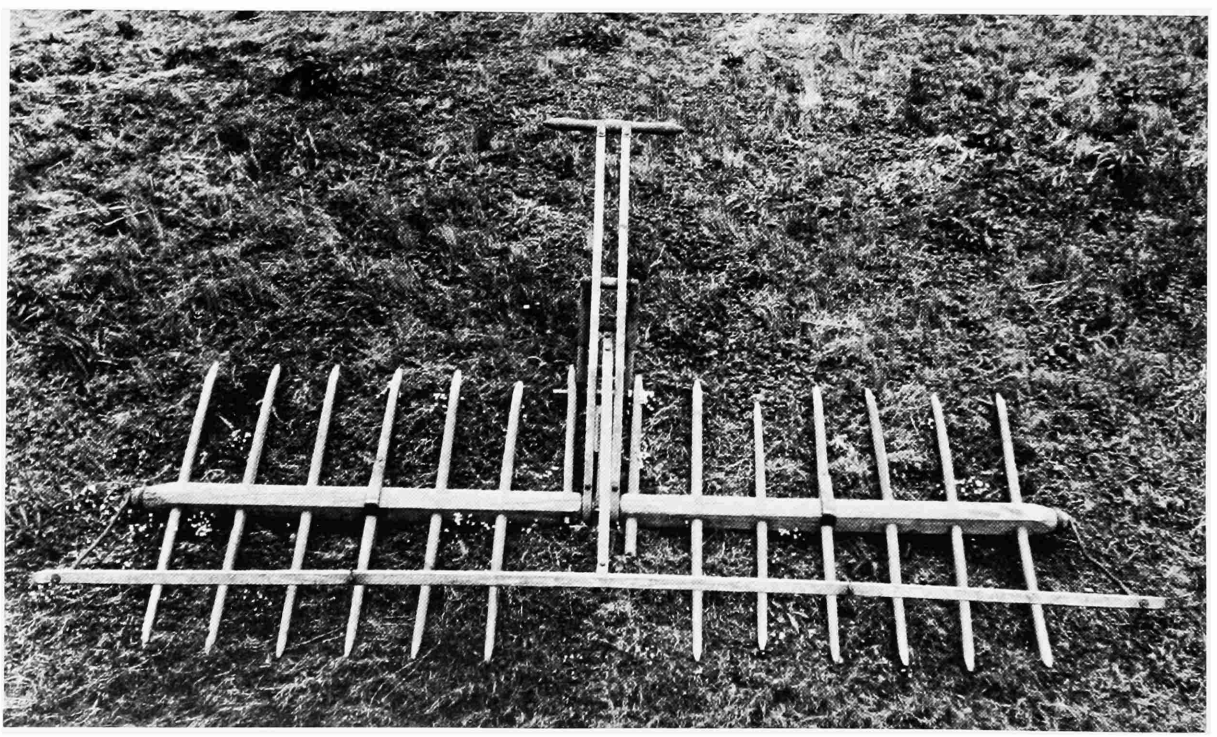

FIGURE 18.—Flop-over hayrake, mid 19th century. (Catalog No. 204.)

sowed eight rows at a time, 6 inches apart. Drills of this type became popular in the 1850s. Purchased from Albert Knecht, Lancaster, Ohio.

203. WHEELED CULTIVATOR, about 1860. USNM 230581; 1959. This walking-type cultivator, divided into two sections, has three plow teeth per section with guard shields attached. The name J. Deere is printed on the toolbox. Purchased from Albert Knecht, Lancaster, Ohio.

204. FLOP-OVER HAYRAKE, mid 19th century. USNM 230581; 1959. Wooden, horse-drawn rake which the farmer could flop over to empty as he walked behind it. Purchased from Albert Knecht, Lancaster, Ohio.

205. WHEELED CULTIVATOR, early 20th century. USNM 230575; 1959. This McCormick Deering, wheeled cultivator has one lever for lowering and elevating the plow teeth and two levers for setting the depth of the plow teeth. Gift of Mrs. Lucy F. Robinson, Chandlersville, Ohio.

206. GRUBBING HOE, about 1920. USNM 230576; 1959. This narrow grubbing hoe resembles a pick. It broke up soil and removed obstructions such as roots and shrubs. Gift of Mrs. Harley Climpson, Bethesda, Maryland.

207. MODEL OF 18TH-CENTURY AMERICAN MOWER. USNM 230437; 1959. A copy of a model reaper on display at the American Philosophical Society, Philadelphia, Pennsylvania. Purchased from Mrs. L. C. Eichner, Clifton, New Jersey.

208. BARBED WIRE, about 1890. USNM 230572; 1959. A stamped zigzag ribbon between two twisted wires. Gift of Don Holst, Washington, D. C.

209. BARBED WIRE, about 1890. USNM 230577; 1959. A stamped, ribbon-type wire with barbs on one edge and with the ribbon twisted. Gift of John Blake, Washington, D. C.

210. NARROW HOE, date unknown. USNM 230578; 1959. Blade from a socket-type hoe. The words "Bedsteel Oil Tempered" are stamped on the blade. Gift of James W. Rutherford, Springfield, Ohio.

211. WALLIS TRACTOR, 1919. USNM 230439; 1959. A Model K Wallis tractor of a series made from 1919 to 1924. It succeeded the 1913 Wallis Cub and the 1916 Wallis Cub, Jr. Gift of Massey-Ferguson, Inc., Racine, Wisconsin.

212. SINGLE-SHOVEL PLOW, about 1840. USNM 240816; 1959. This type of shovel plow cultivated corn in the western part of the country in the 1840s. This specimen resembles a row-buster for opening rows to plant seed, etc. Gift of Andrew W. Frye, Woodstock, Virginia.

213. FIDDLE-BOW BROADCAST SEEDER, late 19th century. USNM 240745; 1959. The operator saddled the seeder on his shoulder by means of a strap fastened to the seed sack. Sliding the bow back and forth caused the seeds to be broadcast from a spinning disk. A gauge on the seeder could be set to sow a prescribed amount of seeds per acre. Gift of Benjamin Lambert, Woodstock, Virginia.

214. GRAIN RIDDLE, mid 19th century. 1959. Sieve for sifting grain. Constructed by Office of Exhibits, Smithsonian Institution.

215. BROAD HOE, mid 19th century. 1959. Constructed by Office of Exhibits, Smithsonian Institution.

216. MINIATURE PLOW, late 19th century to early 20th century. 1959. This plow, made entirely of steel, was found in Alexandria, Virginia.

217. MATTOCK, 19th century. USNM 230440; 1960. This is an implement for grubbing and digging. Gift of Veikko Jarvis, Negaune, Michigan.

218. FODDER CUTTER, 1872. 1960. This hand-cranked machine could cut all kinds of fodder—hay, straw, and corn stalks—with ease and rapidity. Called the "Improved Baldwins American," it was patented in 1867 and 1872. Gift of Thomas W. Bein, Bethesda, Maryland.

219. OLIVER CHILLED PLOW, 20th century. 1960. Steel share, moldboard, and coulter, with wooden beam, frame, and handles. Gift of Oliver Corporation, South Bend, Indiana.

220. HART-PARR TRACTOR, 1903. USNM 230442; 1960. The third internal combustion trac-

FIGURE 19.—Hart-Parr tractor of 1903, the third in line of the first commercial tractors. (Catalog No. 220.)

tor built by the company founded earlier by Charles Hart and Charles Parr. The Hart-Parr tractor could pull gangs of plows or drive large threshers. Oil circulating through the pipes in the square stack cooled the engine. Gift of Oliver Corporation, South Bend, Indiana.

221. CORN GRINDER, about 1890. USNM 233465; 1960. This iron corn grinder has "#17" printed on the grease caps of the axle. Gift of Walter A. Hitchcock, Warrenton, Virginia.

222. CIDER MILL AND PRESS, late 19th or early 20th century. USNM 234465; 1960. This wooden-frame mill has iron parts, with a feeder-trough and two tubes for draining the apple cider. It was operated by means

of a hand crank. Gift of Walter A. Hitchcock, Warrenton, Virginia.

223. Model of John Deere Plow, 1960. Received in 1961. An example of a typical plow of the 1960s. Gift of John Deere Company, Moline, Illinois.

224. Model of John Deere Tractor, 1960. Received in 1961. An example of a typical tractor of the period. Gift of John Deere Company, Moline, Illinois.

225. Sample Fertilizers, 1960. USNM 238503; 1961. Samples of 22 types of fertilizers in common use at the time. Gift of Dr. John B. Blake, Washington, D. C.

226. Sample Fertilizers, 1960. USNM 238503; 1961. Samples of six types of fertilizer in common use at the time. Gift of Dr. John B. Blake, Washington, D. C.

227. Sample Fertilizers, 1960. USNM 238503; 1961. Samples of eight types of fertilizer in common use at the time. Gift of Dr. John B. Blake, Washington, D. C.

228. Sample Fertilizers, 1960. USNM 238503; 1961. Samples of six types of fertilizer in common use at the time. Gift of Dr. John B. Blake, Washington, D. C.

229. Sample Fertilizers, 1960. USNM 238503; 1961. Samples of thirteen types of fertilizers in common use at the time. Gift of Dr. John B. Blake, Washington, D. C.

230. Cast-Iron Centrifuge, 1960. USNM 238503; 1961. A centrifuge used for running the Babcock milk test, which determined the percentage of butterfat. Gift of Dr. John B. Blake, Washington, D. C.

231. Insecticide, 1960. USNM 238503; 1961. A sample of a Pyrox insecticide in common use in 1960. Gift of Dr. John B. Blake, Washington, D. C.

232. Hoe, 20th century. USNM 239136; 1961. A socket-type, three-tine hoe used to weed vegetable gardens, tobacco, and similar row crops. Gift of Mrs. Henry H. Byrne, Washington, D. C.

233. One-Row Planter, about 1870. USNM 237951; 1961. The gears from the drive-wheel mesh with a set of gears that turn the seed plate. The distance for dropping the seed could be determined by the size of the gear used on the drive-wheel. Gift of H. C. Cole, Crestline, Ohio.

234. Portable Gasoline Engine, 1903. USNM 240546; 1961. This machine provided belting power for operating feed mills, cream separators, wood saws, etc. It generated 2 hp at 300-600 rpm. It was covered by two patents dated April 7, 1903. Gift of New Holland Machine Co., New Holland, Pennsylvania.

235. Cotton Planter, 20th century. USNM 240545; 1961. This one-row, horse-drawn cotton planter drilled cottonseed in rows by means of a revolving wooden drum with one-inch holes spaced around the center of the drum. Gift of Lester Souter, Boerne, Texas.

236. Wooden Spade, about 1840. USNM 240543; 1961. This wooden spade has a metal cutting edge. Purchased from Mrs. H. J. Cummings, Washington, D. C.

237. Model of McCormick Reaper, 1831. USNM 236710; 1961. A full-scale model of the 1831 McCormick reaper. Gift of Franklin Institute, Philadelphia, Pennsylvania.

238. Hoe, date unknown. USNM 239502; 1961. This is a socket-type hoe with a half-moon cutting blade. Gift of Dr. Ivor Cornman, Miami, Florida.

239. Curd Breaker, mid 19th century. USNM 239502; 1961. This tool for cutting cheese curds has four 15-inch parallel blades. Gift of Dr. Ivor Cornman, Miami, Florida.

240. Wooden Brace, possibly mid 19th century. USNM 239502; 1961. This implement was used to hold open the split carcasses of hogs. Gift of Dr. Ivor Cornman, Miami, Florida.

241. Holt Combine, 1887. USNM 236419, 1961. Benjamin Holt made this combine around 1887. Its main feature is the use of linked, wrought-iron chain belts for the drive rather than a system of gears as commonly found on combines of that day. Gift of Mrs. C. Parker Holt, Stockton, California.

242. Waterwheel and Shafting, mid 19th century. USNM 238174; 1961. Components of a one-blade, sash sawmill. Purchased from Robert E. Clement, Chester Springs, Pennsylvania.

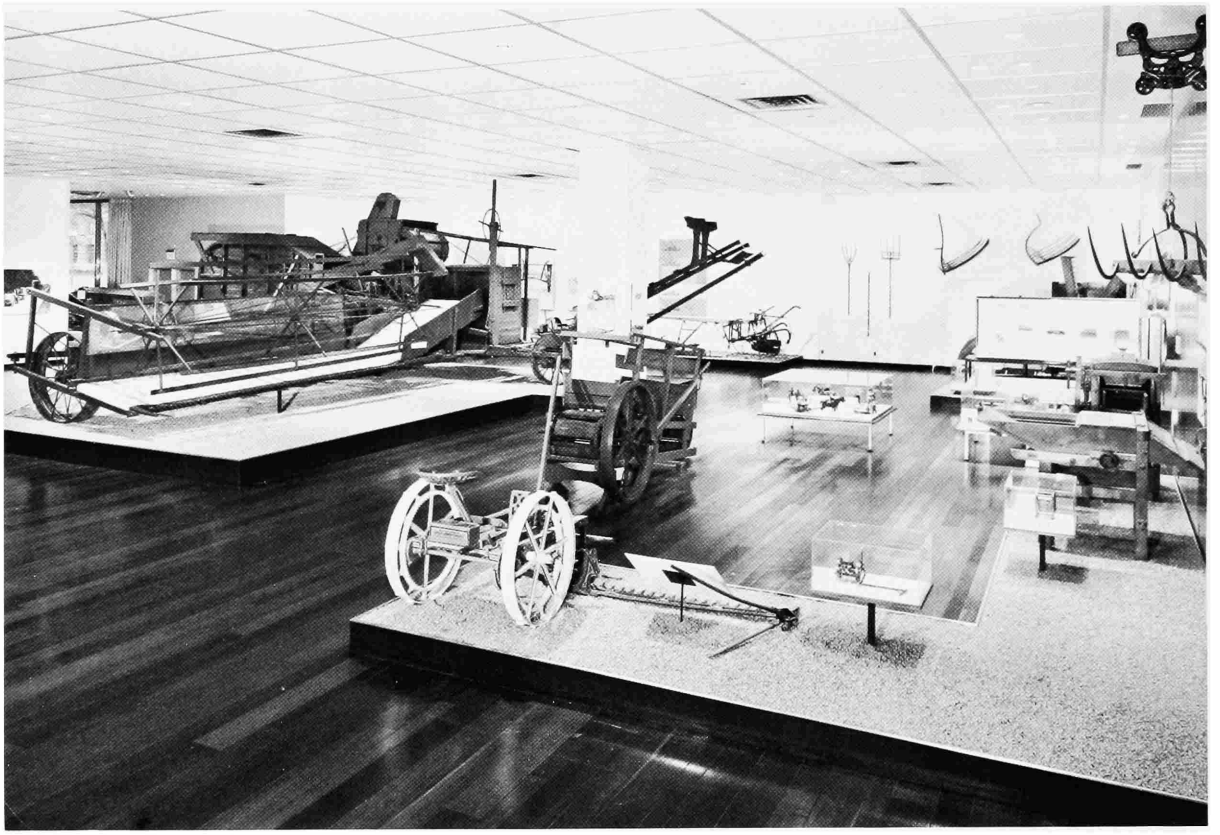

FIGURE 20.—A view in the Hall of Farm Machinery, National Museum of History and Technology. The Holt combine in 1887 (Catalog No. 241) is at left. The Victor mowing machine of 1880 (Catalog No. 137) is in right foreground.

243. APPLE PARER, about 1760. USNM 240544; 1962. The operator sat on the wooden seat and turned a crank which rotated the apple fastened to a spindle. When held at the proper contact, the knife peeled the rotating apple. Purchased from Mrs. Gladys Harbst, Butler, Ohio.

244. MINIATURE PLOW, mid 19th century. USNM 239068; 1962. This plow was caught in a fisherman's net in the Susquehanna River near Havre-de-Grace, Maryland, in 1924. It probably was a display piece for the manufacturer. Purchased from F. P. Leithiser, Milford, Delaware.

245. SULKY PLOW, about 1920. USNM 239073; 1962. An all-steel John Deere sulky plow. Purchased from Irwin Vette, Westboro, Missouri.

246. TOBACCO TRANSPLANTER, late 19th or early 20th century. USNM 239063; 1962. The driver sat on a wooden water barrel on this horse-drawn tobacco transplanter. The men who set the plants in the furrow used the two seats in the rear. Gift of Pollitt Grayhill, Diver, Kentucky.

247. ICE CREAM FREEZER, 1870. USNM 241690; 1962. Thomas Mills and Brothers of Philadelphia made this 40-quart commercial ice cream freezer which was patented on March 15, 1870. Gift of John G. Mills, Philadelphia, Pennsylvania.

248. BARBED WIRE, about 1890-1900. USNM 230572; 1962. A sample of ribbon barbed wire. Gift of Don Holst, Washington, D. C.

249. MOLINE UNIVERSAL TRACTOR, 1918. USNM 242414; 1962. This Model D is particularly unique in that it could be adapted as

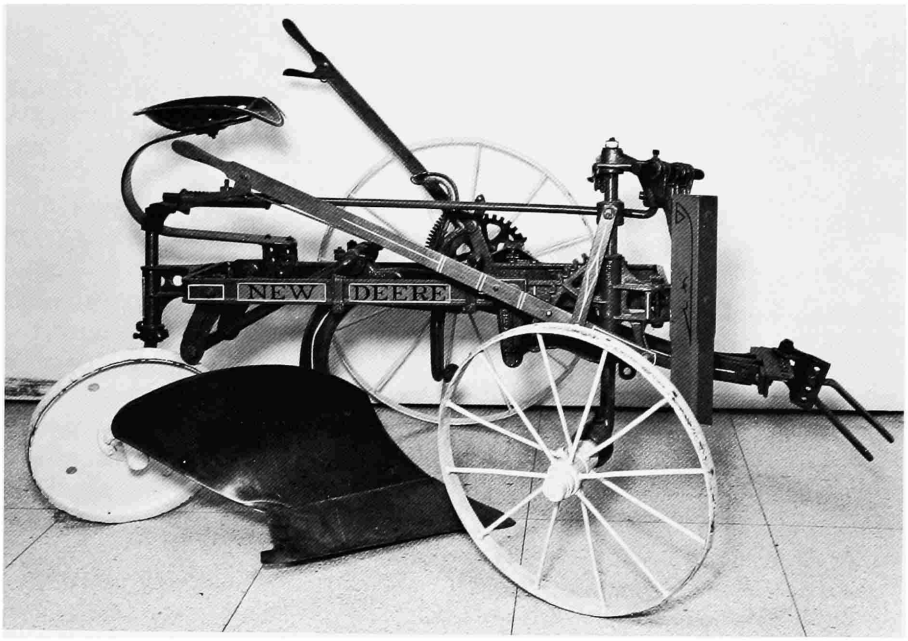

FIGURE 21.—John Deere sulky plow, about 1920. (Catalog No. 245.)

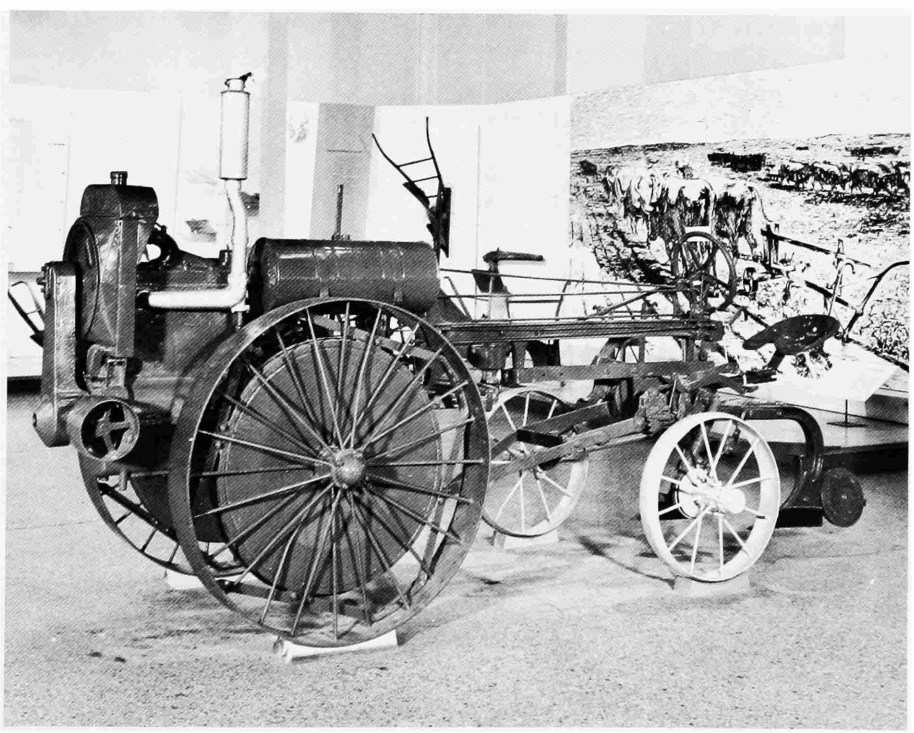

FIGURE 22.—Moline Universal Tractor, Model D, of 1918, in the Hall of Farm Machinery, National Museum of History and Technology. (Catalog No. 249.)

horse-drawn equipment and could be operated from its seat. It is light and versatile and equipped with front pulley drive and head lights. Gift of Minneapolis-Moline, Inc., Hopkins, Minnesota.

250. TWO-BOTTOM PLOW, 1918. USNM 242414; 1962. This plow is attached to the Moline Universal Model D tractor of 1918. Gift of Minneapolis-Moline, Inc., Hopkins, Minnesota.

251. SULKY PLOW, 1880. USNM 242414; 1962. A Moline two-wheeled sulky plow. Three horses drew the plow, which has three singletrees and one doubletree. Gift of Minneapolis-Moline, Inc., Hopkins, Minnesota.

252. GRAIN BINDER, 1935. USNM 422427; 1962. This McCormick-Deering grain binder cut the grain and, by means of an apron, carried it through a bundling and tying mechanism. The bundles of grain fell into a set of forks which the operator released. The machine is covered by Patents 1,328,781 and 1,464,736. It is similar to binders used in the 1880s. Gift of J. D. Major, Belton, South Carolina.

253. DEHORNER, about 1920. USNM 242977, 1962. This implement, used to trim cattle horns, works like a gigantic clipper. Gift of Newton E. Wiat, Arlington, Virginia.

254. PORTABLE STEAM ENGINE, 1869. USNM 246139; 1962. The first portable steam engine built by the J. I. Case Company in 1869. It burned wood and developed 8 hp. Gift of J. I. Case Company, Racine, Wisconsin.

255. JAPANESE CULTIVATING MACHINE, 1960. USNM 242908; 1962. This Japanese Model KF850 power cultivator has a detachable rotary hoe and a diesel engine with direct drive.

FIGURE 23.—Cattle dehorner. (Catalog No. 253.)

256. WOODEN GRAIN FORK, about 1870. USNM 252786; 1963. A four-tined wooden fork for handling bundles of grain. It was used by the donor's grandfather on his farm in Maryland. Gift of C. Gordon Dentry, Washington, D. C.

257. MODEL OF LAWN MOWER, 1962. USNM 256817; 1963. A model of the Suburbia 38, a riding mower powered by a 5¾-hp gasoline engine with three speeds between ½ mph and 4½ mph. Gift of Herman Becker, Washington, D. C.

258. BROADCAST SEEDER, about 1892. USNM 257164; 1964. A hand-cranked seeder. Gift of Milton J. Brandon, Silver Spring, Maryland.

259. TOBACCO AXE, mid 20th century. USNM 257163; 1964. A tobacco axe used to harvest sun-cured tobacco in the Connecticut Valley region. Gift of Minner J. Cooper, Windsor, New York.

260. DAVEAT MILK STERILIZER, 1959. USNM 259871; 1964. An autoclave combined with vacuum chambers and other devices that sterilized and canned milk or other liquid dairy products. The process preserved the product with a minimum loss of nutritional value and without causing coagulation. Patent 2,899,320 granted to Elmer S. Davis, August 11, 1959.

261. HAY BALE HOOKS, 19th century or later. USNM 260120; 1965. Two bale hooks. Gift of E. Peterkin, Forest Heights, Maryland.

262. MODEL OF HUBER STEAM TRACTOR, 1901. USNM 261334; 1965. An operable scale model of a 1901 Huber steam tractor. Gift of Raymond Stout, Washington, D. C.

263. HAND CULTIVATING HOE, 20th century. USNM 262244; 1965. A three-tine, curved cultivating hoe probably used in vegetable gardening. Gift of Arnold Miles, Bethesda, Maryland.

264. CAST-IRON IMPLEMENT SEAT, about 1890. USNM 262243; 1965. A cast-iron seat typical of those found on late-19th and early-20th-century farm implements. Gift of K. E. Clark, Los Angeles, California.

265. GRAIN FLAIL, 1840. USNM 262250; 1965. A typical flail used in Wisconsin in 1840 for threshing grain. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

266. TURKEY COLLARS, late 19th century. USNM 262250; 1965. Small leather collars, with bells attached, placed on turkeys at a time when farmers typically let their poultry run loose. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

267. BRANDING IRON, 20th century. USNM 262250; 1965. A #30 branding iron, circle W, used to mark cattle. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

268. RIDING SPURS, 1890 or later. USNM 262250; 1965. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

269. HARNESS HAMES, early 20th century. USNM 262250; 1965. Brass knobs from the collar of a horse's harness. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

270. REAPER HOOK, about 1860. USNM 262250; 1965. A hand sickle used for harvesting grain. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

271. IRON POT HOOKS, late 19th century. USNM 262250; 1965. Pot hooks made of two pieces of heavy wire hinged on the ends. The hook fastened onto pots to remove them from open fires. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

272. IRON SPIKE, late 19th century. USNM 262250; 1965. An iron spike, probably from a harrowing device such as a triangular beam harrow. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

273. FLAX HACKLE, late 19th century. USNM 263350; 1965. This hackle consists of a piece of wood, 6 by 12 inches, with square iron nails protruding from one side. The homemade hackle shredded flax in preparation for making linen cloth. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

FIGURE 24.—Flax hackle. (Catalog No. 273.)

274. BARLEY FORK, late 19th or early 20th century. USNM 262250; 1965. A wooden, four-tined fork used for handling barley. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

275. WOODEN WHEELBARROW, 20th century. USNM 262250; 1965. All parts of this wheelbarrow are homemade. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

276. WOODEN WHEEL, 19th century. USNM 262250; 1965. A wooden wheel used on a wheelbarrow. Seven separate parts to the wheel illustrate the general construction of wooden wheels. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

277. GRAIN SACK, about 1865. USNM 263077; 1965. Peter Brugler Snyder used this grain sack about 100 years ago on his farm near Montour Falls, New York. The initials P. B. S. appear on the sack. Gift of Howard S. Rappleye, Washington, D. C.

278. CORN SHELLER, about 1898. USNM 264779; 1965. A corn sheller that was operated by means of a hand crank. Gift of Dr. Stephen Lang, San Fernando, California.

279. BARBED-WIRE DISPLAY PANEL, about 1940. USNM 264475; 1966. Display panel of 78 different types of barbed wire. Gift of Dr. Frank Horsfall, Blacksburg, Virginia.

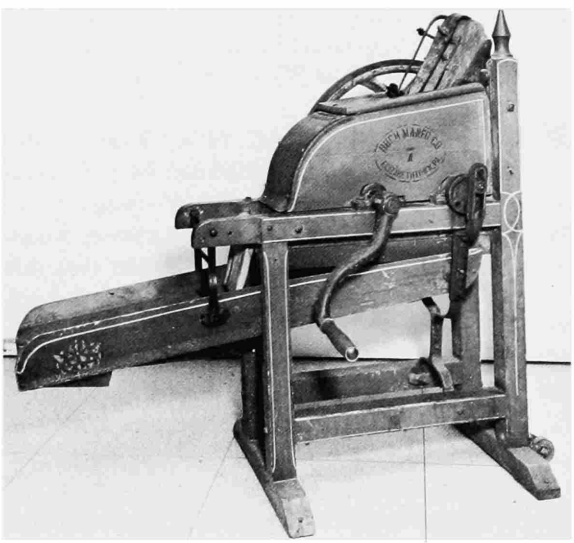

FIGURE 25.—Corn sheller. (Catalog No. 278.)

280. BARBED WIRE, about 1878. Eight pieces of "Brotherton Barb," a wire patented by J. Brotherton of Ames, Iowa, in 1878; Patent 207,710. It became very popular, and was second only to Glidden's "The Winner" in sales. It had nonslipping barbs and was easy to make.

281. BARBED WIRE, about 1882. "Baker Perfect," a barbed wire invented by George Baker of Des Moines, Iowa. It was popular and widely used but never patented.

282. BARBED WIRE, about 1881. From Jefferson County, Iowa. Patented by Edward M. Crandall of Chicago, Illinois, in 1881; Patent 247,540.

283. BARBED WIRE, about 1876. Two pieces of "Twist Oval," a wire patented by Josiah F. Glidden of De Kalb, Illinois, in 1876; Patent 181,433. The use of oval wire shows an effort to prevent slipping of the barb.

284. BARBED WIRE, about 1877. From Nodaway County, Missouri. Patented by Henry M. Rose of Waterman, Illinois, in 1877; Patent 198,688.

285. BARBED WIRE, about 1878. From Jefferson County, Iowa. Patented by Michael Daley of Waterman, Illinois, in 1878; Patent 209,467.

286. BARBED WIRE, date unknown. From Jefferson County, Iowa. A handmade specimen made with a tool in this collection.

287. BARBED WIRE, about 1875. "Dobbs and Booth," patented by John Dobbs and Benjamin Booth of Victor, Iowa, in 1875; Patent 171,105.

288. BARBED WIRE, about 1877. From southwestern Arkansas. Patented by J. F. Glidden.

289. BARBED WIRE, date unknown. From Nodaway, County, Missouri. A claim that this wire was patented by J. F. Glidden has not been verified.

290. BARBED WIRE, about 1878. From Jefferson County, Iowa. Patented by Spencer St. John of Cedar Rapids, Iowa, in 1878; Patent 205,697.

291. BARBED WIRE, date unknown. Standard cattle barbed wire patented by J. F. Glidden and made by Republic Steel Wire Company.

292. BARBED WIRE, date unknown. Standard hog barbed wire patented by J. F. Glidden and made by Republic Steel Wire Company.

293. BARBED WIRE, about 1878. From Atchison County, Missouri. Patented by William H. Frye of Marshalltown, Iowa, in 1878; Patent 204,312.

294. BARBED WIRE, about 1883. From Nodaway County, Missouri. Patented by Joseph Goss of Beloit, Wisconsin, in 1883; Patent 282,453.

295. BARBED WIRE, about 1885. Two pieces of "Brink-Martelle," a wire patented by John J. Brinkerhoff of Auburn, New York, in 1885; Patent 324,211. The round wire lacks its barbs.

296. BARBED WIRE, about 1883. From Nodaway County, Missouri. Patented by William S. Bate of Boston, Massachusetts, in 1883; Patent 273,245.

297. BARBED WIRE, about 1879. "Champion," or "Zig-Zag," patented by Edward M. Crandall of Chicago, Illinois, in 1879; Patent 221,158.

298. BARBED WIRE, about 1881. Two pieces of "Buckthorn" (modified), patented by T. V. Allis of New York, New York, in 1881; Patent 244,726.

299. BARBED WIRE, about 1878. From Nodaway County, Missouri. Patented by Ole O. Kittleson of Milan, Illinois, in 1878; Patent 203,349.

300. BARBED WIRE, about 1881. Two pieces of "Brink Flat," patented by Jacob and Warren M. Brinkerhoff of Auburn, New York, in 1881; Patent 241,601.

301. BARBED WIRE, about 1884. Four pieces of "Decker Spread," patented by Alexander C. Decker of Bushnell, Illinois, in 1884; Patent 299,916.

302. BARBED WIRE, about 1879. "Brink Twist," patented by Jacob and Warren M. Brinkerhoff of Auburn, New York, in 1879; Patent 214,095.

303. BARBED WIRE, about 1877. "Ladder Barbed Wire," patented by Alexander Decker of Bushnell, Illinois, in 1877; Patent 186,716.

304. BARBED WIRE, about 1876. From Nodaway County, Missouri. Patented by Elijah Sims of Aurora, Illinois, in 1876; Patent 178,195.

305. BARBED WIRE, about 1884. "Sunderland Kink," patented by L. E. Sunderland of Joliet, Illinois, in 1884; Patent 303,406. This wire has nonslipping barbs.

306. BARBED WIRE, about 1892. From Caldwell County, Missouri. Patented by J. W. Griswold of Troy, New York, in 1892; Patent 486,179.

307. BARBED WIRE, about 1883. "Stubbe Plate," patented by John Stubbe of Pittsburgh, Pennsylvania, in 1883; Patent 287,337. This wire carried a patch so animals could see it easily.

308. BARBED WIRE, about 1875. "Haish 'S'," patented by Jacob Haish of De Kalb, Illinois, in 1875; Patent 167,240.

309. BARBED WIRE, about 1874. "Kennedy Barbs," patented by Charles Kennedy of Aurora, Illinois, in 1874; Patent 153,965.

310. BARBED WIRE, about 1868. "Thorny Fence," patented by Michael Kelly of New York, New York, in 1868; Patent 74,379.

311. BARBED WIRE, about 1874. "The Winner," patented by Josiah F. Glidden of De Kalb, Illinois, in 1874; Patent 157,124. This was the most successful and most popular barbed wire. It neither slipped nor twisted.

312. BARBED WIRE, about 1939. War wire (World War II) from the Australian shoreline.

313. BARBED WIRE, about 1880. "Haish 'S'" (modified).

314. BARBED WIRE, about 1939. War wire (World War II) from Bizerta, Tunis, North Africa.

315. BARBED WIRE, about 1939. War wire (German or Italian, World War II) from Naples, Italy.

316. BARBED WIRE, about 1881. "Brink Flat," patented by Jacob and Warren M. Brinkerhoff of Auburn, New York, in 1881; Patent 241,601. This piece has a factory splice.

317. BARBED WIRE, about 1875. "Corsicana Clip," patented by Daniel C. Stover of Freeport, Illinois, in 1875; Patent 164,947.

318. BARBED WIRE, about 1883. From Nodaway County, Missouri. Patented by Andrew J. Upham of Syracuse, Illinois, in 1883; Patent 284,261.

319. BARBED WIRE, about 1883. From Nodaway County, Missouri. Patented by William M. Clow of Wheatland, Illinois, in 1883; Patent 285,014.

FIGURE 26.—Haish barbed wire and advertisement. (Catalog No. 316.)

320. BARBED WIRE, about 1882. From Galloway County, Missouri. Patented by Joseph H. Connelly of Pittsburgh, Pennsylvania, in 1882; Patent 254,278.

321. BARBED WIRE, about 1882. "Dodge and Washburn," patented by Thomas H. Dodge and Charles G. Washburn of Worcester, Massachusetts.

322. BARBED WIRE, about 1879. "Ross's Four Point," patented by Noble S. Ross of Chicago, Illinois, in 1879; Patent 216,294. This wire was very common in the prairie states.

323. BARBED WIRE, about 1878. Two pieces of "Billings' Simple," patented by Frank Billings of Cleveland, Ohio, in 1878; Patent 205,234. This wire hurt the animals but it was cheap and easy to make.

324. BARBED WIRE, about 1881. "Shinn's Four Point," patented by Milton Shinn of Burlington, Iowa, in 1881; Patent 238,447.

325. BARBED WIRE, about 1879. Two pieces of "Four Point Wager" from Andrew County, Missouri. Patented by J. F. Glidden of De Kalb, Illinois, in 1879; Patent 214,211.

326. BARBED WIRE, about 1877. "Burnell's Four Point," patented by Arthur Burnell of Marshalltown, Iowa, in 1877; Patent 192,225.

327. BARBED WIRE, about 1876. Two pieces of "Hold Fast," or "Merrill Twirl," patented by John C. Merrill of Turkey River, Iowa, in 1876; Patent 185,688.

328. BARBED WIRE, about 1876. "Lazy Plate," patented by W. Watkins of Joliet, Illinois, in 1876; Patent 184,486.

329. BARBED WIRE, about 1879. From Nodaway County, Missouri. Patented by John S. Crowell of Springfield, Ohio, in 1879; Patent 215,888.

330. BARBED WIRE, about 1883. From Nodaway County, Missouri. Patented by James B. Oliver of Pittsburgh, Pennsylvania, in 1883; Patent 286,147.

331. BARBED WIRE, about 1875. "Split Diamond," patented by Henry Frentress of Dunleith, Illinois, in 1875; Patent 171,008.

332. BARBED WIRE, about 1876. "Jayne-Hill," patented by William Jayne and James Hill of Boone, Iowa, in 1876; Patent 176,120. The barbs clamp very firmly in this wire.

333. BARBED WIRE, about 1874. From Andrew County, Missouri. Patented by Josiah F. Glidden of De Kalb, Illinois, in 1874; Patent 150,683.

334. BARBED WIRE, about 1939. War wire used by the British army in World War II.

335. BARBED WIRE, about 1914. War wire used by the U. S. Army in World War I.

336. BARBED WIRE, date unknown. "Glidden No. 51," a wide-faced cattle wire made by Republic Steel Wire Company.

337. BARBED WIRE, date unknown. "Glidden No. 50," a closed-face hog wire made by Republic Steel Wire Company.

338. TOOL FOR BARBED WIRE, about 1875. Device for making barbed wire on the farm. Patented by John Dobbs and Benjamin Booth in 1875; Patent 166,511.

339. BARBED WIRE, 1881. USNM 265912; 1966. "Brink Flat," patented in 1881. Gift of Mrs. Miles McPeek, Washington, D. C.

340. STUMP PULLER, 20th century. USNM 266811; 1966. A one-man, hand-operated stump puller. The machine consists of several pulleys, a length of wire cable, and a rachet mechanism to give leverage. Gift of A. E. McMechan, Joplin, Missouri.

341. PLOWSHARE, about 1840. USNM 268949; 1966. A wrought-iron fragment from a plowshare said to have been used for cultivating cotton in South Carolina. It appears to be from a "duck foot" type plow. Gift of Great Plains Museum, Lawton, Oklahoma.

342. SADDLER'S BUCK, late 19th century. USNM 268199; 1966. A small bench with a wooden vise to hold leather and parts of saddles. Gift of Museum of Science and Industry, Chicago, Illinois.

343. FLAX BREAKER, mid or late 19th century. USNM 268199; 1966. A rectangular bench measuring about 3 feet long, 3 feet high, and 3 feet wide. The operator pulled a hinged arm of slats down on the bench, which also has slats. The flax stems broke between the slats. Gift of Museum of Science and Industry, Chicago, Illinois.

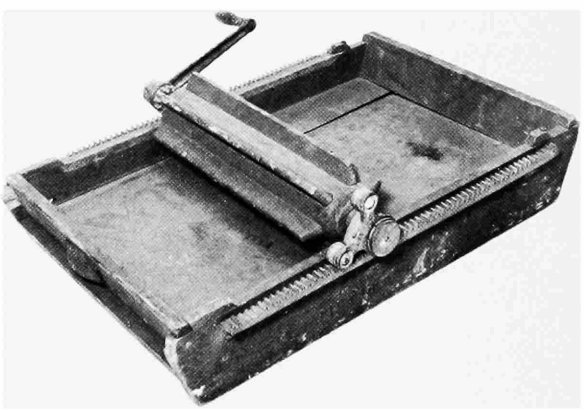

FIGURE 27.—Butter worker, 19th century. Catalog No. 345.)

344. PRAIRIE SOD PLOW, late 19th century. USNM 268199; 1966. This heavy plow with an 8-foot beam broke virgin prairie soil. The long fingers of the moldboard helped break the sod further. Gift of Museum of Science and Industry, Chicago, Illinois.

345. BUTTER WORKER, late 19th century. USNM 268199; 1966. This butter worker consists of a wooden tray (3 feet by 2 feet) and a grooved wooden roller. The roller is passed over the butter in the tray by means of a hand crank, thus working the excess water to the top of the butter where it could be poured off. Gift of Museum of Science and Industry, Chicago, Illinois.

346. GRAIN SCOOP, late 19th century. USNM 268199; 1966. This wooden grain scoop, or possibly flour scoop, measures 12 inches by 18 inches and has a 4-foot handle. Gift of Museum of Science and Industry, Chicago, Illinois.

347. BARREL CHURN, 1876. USNM 268199, 1966. This rocking churn consists of a wooden barrel of 5-gallon capacity and a wooden "X" type stand. It was in use in 1876. Gift of Museum of Science and Industry, Chicago, Illinois.

348. PLUNGER CHURN, late 19th century. USNM 268199; 1966. A small (1 gallon) plunger-type butter churn which consists of a wooden barrel and a wooden paddle attached to a 3-foot handle. Gift of Museum of Science and Industry, Chicago, Illinois.

349. TOBACCO HOGSHEAD, 1869. USNM 249254; 1966. A tobacco hogshead reconstructed from a picture appearing in *Harper's Weekly* of December 11, 1869. The hogshead, constructed of rough lumber, is 6 feet long and 4 feet in diameter. A horse or mule was hitched to the hogshead. Gift of Laross & Bros. Co., Richmond, Virginia.

350. FORDSON TRACTOR, 1918. USNM 268896; 1966. The 1918 Fordson was the first tractor marketed by the Ford Motor Co. for domestic use. Its four-cylinder gas engine developed 20 hp. The tractor measures 42 inches across the rear wheels and 28 inches across the front. The rear wheels, of steel, have riveted lugs. A winch has been added in the front. Gift of Thomas A. DeLong, New York, New York.

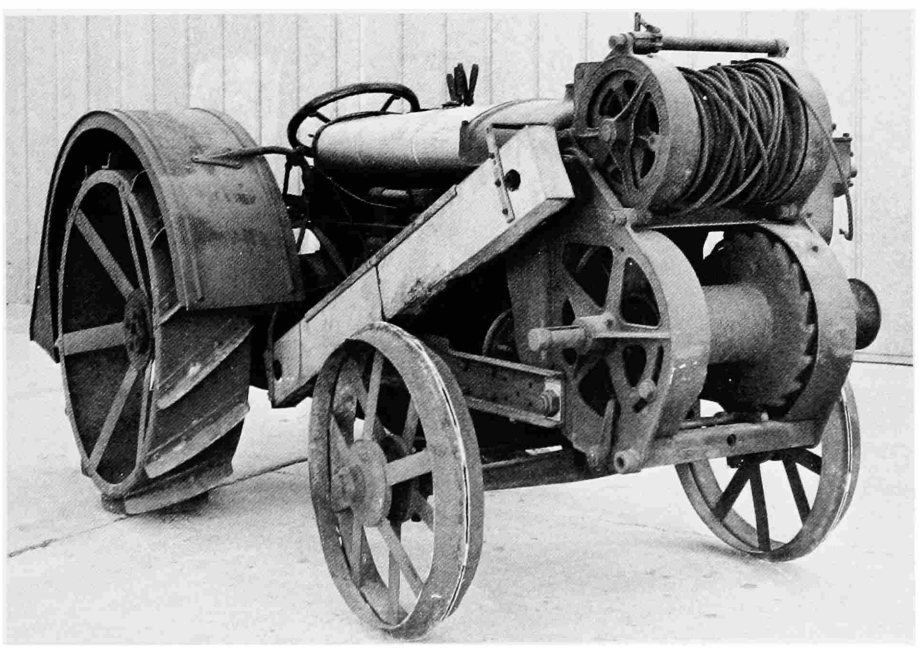

FIGURE 28.—Fordson tractor (1918) before restoration work. The winch and wheel fenders were added by the tractor's owners. (Catalog No. 350.)

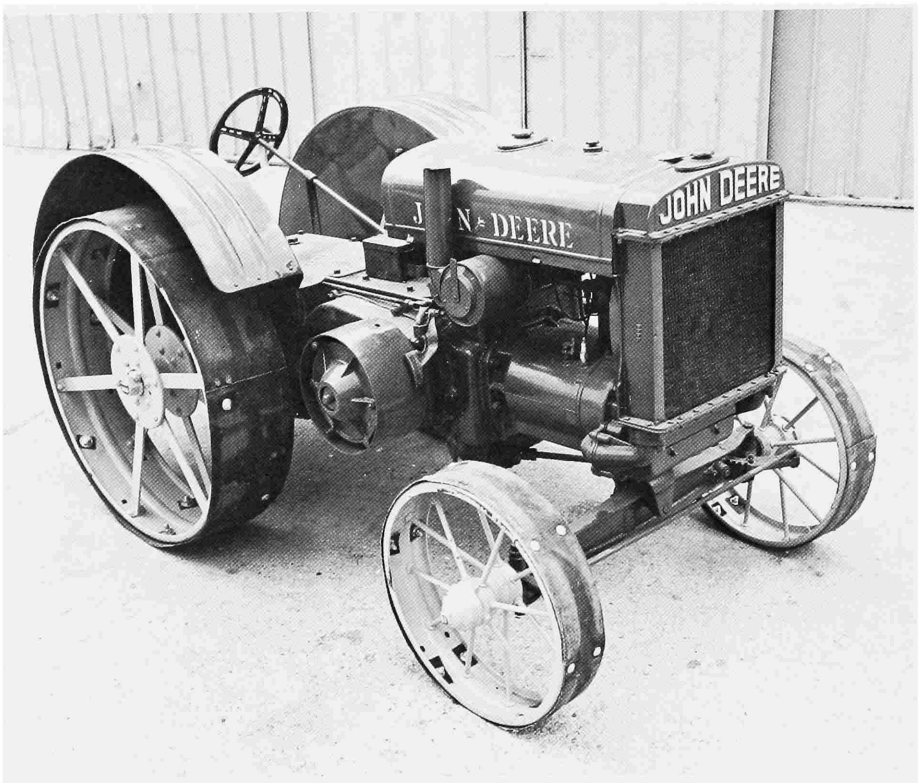

FIGURE 29.—John Deere Model D tractor, 1923. (Catalog No. 362.)

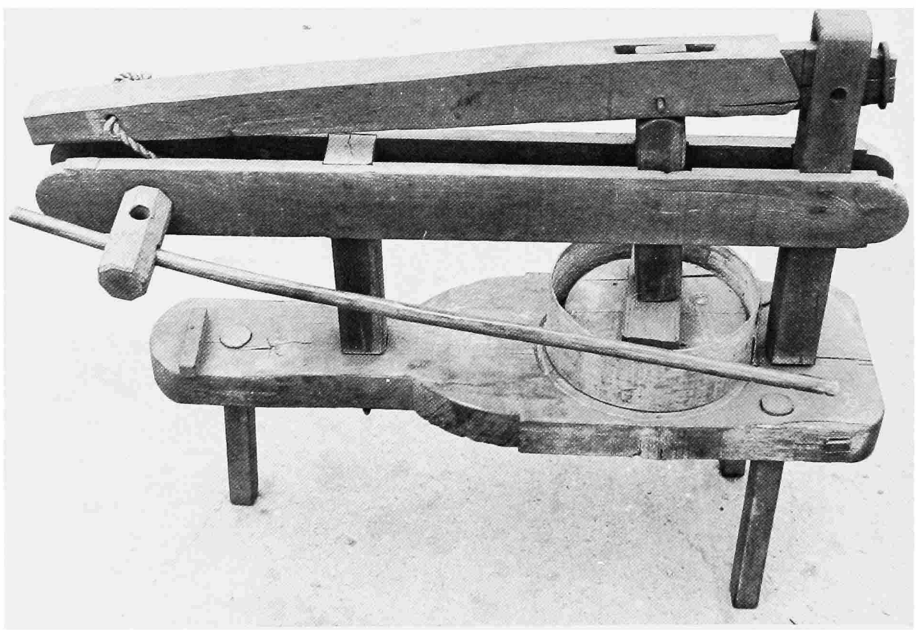

FIGURE 30.—Cheese press. (Catalog No. 364.)

351. STEEL BEAR TRAP, 1876. USNM 4882; 1966. This is a typical bear trap of the late 19th century. It has steel jaws with a spread of 11¾ inches and a wrought-iron pan. It weighs 17 pounds. Gift of Oneida Community, New York.

352. STEEL DEER TRAP, 1876. USNM 4772; 1966. This is a No. 4 steel deer trap manufactured by the Oneida Community in the late 19th century. It has steel jaws with a spread of 6½ inches, a wrought-iron pan, and a double spring. Gift of Oneida Community, New York.

353. STEEL BEAVER TRAP, 1876. USNM 4772; 1966. A double-springed, steel beaver trap. Gift of Oneida Community, New York.

354. STEEL OTTER TRAP, 1876. USNM 4772; 1966. This trap has a double spring and a jaw spread of 5½ inches. Gift of Oneida Community, New York.

355. STEEL FOX TRAP, 1876. USNM 4772; 1966. This steel, No. 2 fox trap has a double spring and a jaw spread of 4⅞ inches. Gift of Oneida Community, New York.

356. STEEL MINK TRAP, 1876. USNM 4772; 1966. This trap has a single spring and a jaw spread of 4⅞ inches. Gift of Oneida Community, New York.

357. STEEL MUSKRAT TRAP, 1876. USNM 4772; 1966. This muckrat trap has a single spring and a jaw spread of 4 inches. Gift of Oneida Community, New York.

358. STEEL RAT TRAP, 1876. USNM 4772; 1966. This trap has a single spring and a jaw

FIGURE 31.—Fitzhenry-Guptill power sprayer (1908), seen here spraying for elm leaf beetles on the grounds of the U.S. Capitol, May 1911. (Catalog No. 366.)

spread of 3½ inches. Gift of Oneida Community, New York.

359. BOTTLE OF 2,4-D HERBICIDE, 1944. USNM 268668; 1966. This bottle contains a small amount of the original purchase of 2,4-D by the U. S. Department of Agriculture from the American Chemical and Paint Company of Ambler, Pennsylvania, in 1944. It cost $12.50 a pound at the time. Scientists at the Department of Agriculture used the material in extensive experiments on plant growth inhibitors. Subsequently, 2,4-D became the most common chemical used for weed killing. Gift of Dr. J. W. Mitchell, University of Maryland, through Gale Peterson, University of Maryland.

360. WINNOWING MACHINE, mid 19th century. USNM 270009; 1966. Typical mid-19th-century fanning mill with vibrator cleaner. Gift of Mrs. Henry C. Slunt, Hyattsville, Maryland.

361. WINNOWING MACHINE, mid 19th century. USNM 270009; 1966. Typical mid-19th-century fanning mill with screen vibrator cleaner. Gift of Mrs. Henry C. Slunt, Hyattsville, Maryland.

362. JOHN DEERE MODEL D TRACTOR, 1923. USNM 270865; 1967. The John Deere Model D was the first tractor of the line bearing that name. The Waterloo Tractor Works, Waterloo, Iowa, made the tractor in 1923. Gift of Deere & Company, Moline, Illinois, through George F. Neiley.

363. WATERLOO BOY MODEL N TRACTOR, 1918. USNM 270864; 1967. The Waterloo Boy tractor was manufactured first as Model R, in 1914, and then as Model N, beginning in 1918. The Waterloo Gasoline Engine Company of Waterloo, Iowa, made the Waterloo Boy. It was the first tractor marketed by the John Deer Company, which acquired the Waterloo Gasoline Engine Company in 1918. The Waterloo Boy continued to be produced by John Deere Company until 1923, when that company brought out its own Model D. Gift of Deere & Company, Moline, Illinois, through George F. Neiley.

364. CHEESE PRESS, late 19th century. USNM 170886; 1967. Small, wooden, hand-operated cheese press, dating from the late 19th century but not unlike those in use a century before. Gift of Carlton M. Gunn, Sunderland, Massachusetts, through Allister F. MacDougall.

365. GAS-TURBINE TRACTOR, 1965. USNM 274549; 1967. This HT-340 experimental gasoline turbine tractor operates with a hydrostatic transmission. It is air-cooled and has no brakes, gears, or clutch. The 90-pound motor produces 85 hp. It tended to rear back because of its excessive power and so could not be put into commercial production until a less-powerful engine had been developed. Gift of International Harvester Company, through John J. Dierbeck.

366. FITZHENRY-GUPTILL POWER SPRAYER, 1908. USNM 275103; 1967. This is the first power sprayer used by the U. S. Department of Agriculture. It was built in 1908 and used to spray for gypsy moths in New England. It was horse-drawn and had a 2-cylinder mounted engine to furnish power for the sprayer. Gift of U. S. Department of Agriculture, through E. D. Burgess.

367. TRUCK SEAT, about 1921. USNM 276080; 1967. This truck seat, invented and manufactured by the Bostrom Corporation, is significant because of its suspension system, which gave greater comfort and convenience to the driver and came to be used in many truck and tractor lines of several manufacturers. Gift of Bostrom Corporation, Milwaukee, Wisconsin, through Karl Bostrom.

368. TRACTOR SEAT, about 1921. USNM 276080; 1967. A suspension seat for tractors produced by the Bostrom Corporation in 1921. It was used first on the Oliver tractor. All seats now used on tractors derived from this basic design. Gift of Bostrom Corporation, Milwaukee, Wisconsin, through Karl Bostrom.

369. HOG SNOUTER, late 19th century. USNM 275604; 1968. The snouter is a scissors-like device for clamping a ring in the pig's nose. The ring prevents the animal from rooting under or against fences. Gift of Mr. and Mrs. George E. Morgenstern of Lake Forest, Illinois.

370. ONE-WAY DISK PLOW, about 1924. USNM 277629; 1968. Invented in the 1920s but declared unpatentable by the Patent Office, the one-way disk plow became commonplace in the dry farming areas of the Great Plains. The disks, set at an angle, cast less furrow than a moldboard plow. This specimen is a reconstruction of the original. Gift of Francis Angell, Plains, Kansas.

371. WINE PRESS, about 1884. USNM 279451; 1968. The donor's father brought this wine press to the United States from Rheinfeldon, Switzerland, in 1884. Gift of Mrs. Clara Bieber, Washington, D. C.

372. MILL PICKS, late 19th century. USNM 279452; 1968. Steel picks used to repair and sharpen grooves in millstones. Gift of C. W. Wimberly, San Marcos, Texas.

373. SEAMLESS FLOUR SACK, late 19th century. USNM 279452; 1968. A fairly typical flour sack of the time, although sacks with seams were more common. Gift of C. W. Wimberly, San Marcos, Texas.

374. SORGHUM CANE MILL, late 19th century. USNM 280276; 1968. A steel, horsepowered mill, about 4 feet high and 3 feet in circumference, for crushing sorghum stalks to produce syrup; factory made. Gift of Mrs. Emery L. Stout, Lost Creek, West Virginia.

375. MIDGET INCUBATOR, about 1945. USNM 280277; 1968. Midget incubator and literature pertaining to it. This incubator was patented by E. A. Braun in 1945 (Patent 2,583,993). It was made for educational purposes for schools and laboratories and for use in private homes to germinate seeds, miscroscopic organisms, etc. Gift of E. A. Braun, Chatham, New Jersey.

376. TEN-GALLON MILK CAN, 1920s or later. USNM 282324; 1968. An unexceptional milk can of about 1920, with the more common type of lid. It was found at the farm of Malcolm Brumback, near Belle Grove Plantation, Middleton, Virginia. Purchased.

377. HAND CORN SHUCKERS, late 19th century. USNM 282324; 1969. Seven hand corn shuckers, each consisting of a spike attached to a handle which fits over the hand. These are quite typical and of a type used for over a century. Gift of John N. Hoffman, Washington, D. C.

378. MODEL TOY TRACTORS, 1968. USNM 282697; 1969. Ten model toy tractors, authentic as to outward details: (1) Caterpillar D6, (2) A. C. Crawler, (3) Minneapolis-Moline, (4) Oliver, (5) Case, (6) Allis-Chalmers, (7) G-1000 Vista, (8) Ford, (9) I. H. Hay Baler, (10) Ford set. Gift of Ertl Company, Dyersville, Iowa, through Fred Ertl, Jr.

379. SIDEHILL PLOW (KNAPP), late 19th century. USNM 282926; 1969. Sidehill plow patented and manufactured by the Knapps. The plow can be flipped over at the end of the row to cast all the furrows in one direction when plowing on hills. One of several variations on the idea. This is a copy of a 19th-century plow. Gift of N. E. Knapp, through Leslie O. Merrill of San Mateo Historical Association, San Mateo, California.

380. CROP METER, about 1925. USNM 283306; 1969. This crop meter was developed in 1925 by the Department of Agriculture as an aid in estimating the acreage of cotton in Mississippi. The crop meter was attached to the dashboard of an automobile and connected by cable to the odometer. A circuitous route was followed through the cotton area, and when the driver came to the edge of a cotton field he pushed a button which started the meter measuring the frontage of the field. The total mileage registered could be interpreted in terms of the acreage. The meter method was later replaced by aerial observation. Gift of Statistical Reporting Service, U. S. Department of Agriculture, through Harry C. Trelogan.

381. COTTON BOLL WEIGHER, about 1930. USNM 283306; 1969. A cylinder, 2½ feet high, for measuring the size of a cotton boll by water displacement. When this device was used in conjunction with the crop meter, the actual fiber yield of a year's crop could be estimated. Gift of Statistical Reporting Service, U. S. Department of Agriculture.

382. VIKING GARDEN TRACTOR, about 1916. USNM 287592; 1969. A garden tractor with a

gasoline engine and equipped with cultivator prongs. The operator walked behind the tractor and guided it down the rows. Gift of Woodson High School, Fairfax, Virginia.

383. CLAM RAKE, mid 20th century. USNM 284898; 1969. A small rake, with tines about 10 inches long and a handle of about 2 feet, used by a clam digger on Cape Cod. Gift of Kurt Vonnegut, Jr., West Barnstable, Massachusetts.

384. MODEL OF AULTMAN-TAYLOR STEAM TRACTOR, 1892. USNM 285053; 1969. This scale model is fully operative and correct in every detail. It is about 3 feet long, 1 foot high, and 6 inches wide. Gift of Mrs. Raymond Stout, Washington, D. C.

385. MAPS OF U. S. NATIONAL FORESTS, 1908. USNM 284897; 1969. Eight maps. Regional maps of forest reserves in the U. S. and territories as of 1908. Transferred from Division of Mechanical and Civil Engineering, National Museum of History and Technology.

386. CORN SHELLER, late 19th century. USNM 285052; 1969. This factory-made implement is all wood except for the teeth and gears. It could handle only one ear of corn at a time and it was neither shaped properly nor adjustable enough to get the nubbins. Gift of Daniel Gartling, Cockeysville, Maryland.

387. GRASS MOWER, about 1930. USNM 285052; 1969. This mower, manufactured by International Harvester, has a gasoline engine. The cutters are similar to mower and reaper cutter-bars, but there is no protective cover on the cutting mechanism. Gift of Daniel Gartling, Cockeysville, Maryland.

388. SPRING-TOOTHED HARROW, early 20th century. USNM 285052; 1969. This was a commonplace implement of its type and period. The steel frame, measuring about 4 feet by 4 feet, was designed to be linked into gangs of harrows, of whatever size desired, and to be pulled by horses or tractors. Made by J. I. Case Company. Gift of Daniel Gartling, Cockeysville, Maryland.

389. MCCORMICK-DEERING CREAM SEPARATOR, 1920s. USNM 285052; 1969. A hand-powered, centrifugal cream separator com-

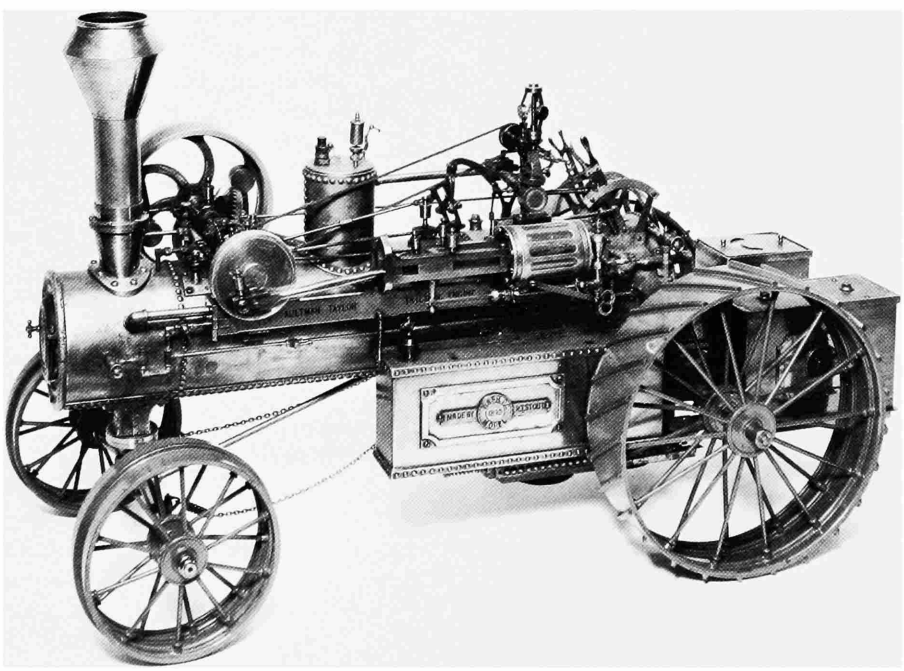

FIGURE 32.—Scale model of Aultman-Taylor steam tractor of 1892. (Catalog No. 384.)

monly found on dairy and other farms all over the country in the late 19th century and early 20th century. The original owner kept this specimen for replacement parts but he never needed it for that purpose. It is complete and fully operational. Gift of Daniel Gartling, Cockeysville, Maryland.

390. HAY BALER, mid 19th century. USNM 286522; 1969. A horse-drawn screw-press that packed the hay, which was then tied by hand. This baler, 7 feet square and 15 feet high, is similar to machines advertised in the 1850s that were largely superseded in the 1870s. Gift of John Hosford, Stone Ridge, New York.

291. GRASS SICKLES, about 1884. Received in 1969. Two ordinary grass sickles. Gift of T. H. Bean, Barnridge, Pennsylvania, in 1884. Transferred from Department of Anthropology, Smithsonian Institution.

392. GRAIN CLIPS, about 1894. Received in 1969. Gift of "D.E.T." in 1894. Transferred from Department of Anthropology, Smithsonian Institution.

393. WRIGHT'S PATENTED EXPANSION BIT, 19th century. Received in 1969. Woodworking tool, a drill. Gift of N. Materville of Connecticut Valley in 1917. Transferred from Department of Anthropology, Smithsonian Institution.

394. HEAVY KNIFE, late 19th century. Received in 1969. A knife for cutting hay and straw. From Beardsly Scythe Company. Transferred from Department of Anthropology, Smithsonian Institution.

395. GRAIN DRILL, 1900–1910. USNM 287135; 1969. This wheeled, wooden seed box, with metal disks to open the soil, drilled about seven rows at a time. The drill was designed to be horse-drawn, but this specimen has been modified to be pulled by a tractor. The brand name "Hoosier" appears on the box. Gift of Innes Saunders, Leesburg, Virginia.

396. MOWING MACHINE, 1900–1910. USNM 287135; 1969. A horse-drawn, McCormick-Deering sulky mower that later was modified to be pulled by a tractor. This mower is representative of machines in the last years of the horse era in American farming. Gift of Innes Saunders, Leesburg, Virginia.

397. CORN CULTIVATOR, 1900–1910. USNM 287135; 1969. A McCormick-Deering four-shovel corn cultivator with two arms for working two rows at once. Gift of Innes Saunders, Leesburg, Virginia.

398. CORN CUTTER, 1900–1919. USNM 287135; 1969. A McCormick-Deering, horse-drawn corn cutter. The rider grabbed the corn stalks in his arms while a blade cut the stalks on the ground. This implement was used chiefly to cut fodder for livestock. Gift of Innes Saunders, Leesburg, Virginia.

399. FANNING MILL, 1900–1910. USNM 287135; 1969. A hand-operated, wooden fanning mill with hurdle, screen, grader, and side spout. The separator and winnower are combined. Gift of Innes Saunders, Leesburg, Virginia.

400. HAY RAKE, 1900–1910. USNM 287135; 1969. A McCormick-Deering sulky rake with spring steel teeth and a hand-operated dumping mechanism. Gift of Innes Saunders, Leesburg, Virginia.

401. BOOK: *The Growth of Industrial Art,* 1892. USNM 287863; 1969. This 200-page book by Benjamin Butterworth was printed at the Government Printing Office, Washington, D. C., in 1892. It contains line drawings of many agricultural tools and implements, some of them ancient. Gift of William Perkins, Hyattsville, Maryland.

402. CORN HUSKERS, early 20th century. USNM 287593; 1969. These huskers fit over the hand like a glove without fingers. A steel hook in the palm removed the corn husks. Similar devices date back to at least the early 19th century. Gift of Melvin Deschner, Halstend, Kansas.

403. CORN HUSKERS, late 19th century. USNM 287591; 1969. Similar to the huskers in Number 402. Gift of Cecil Eberle, Newton, Kansas.

404. MILKING MACHINE, about 1950. USNM 287862; 1969. A McCormick-Deering milking machine with four suction cups that worked from a gasoline-powered vacuum pump. It is a machine typical of its time

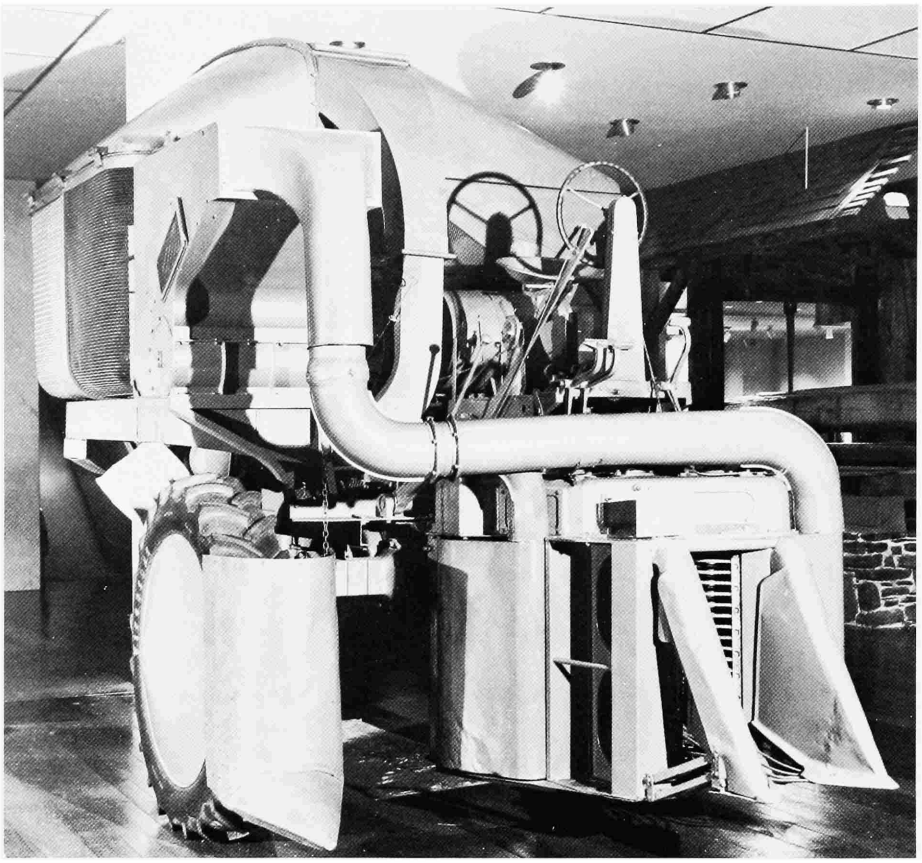

FIGURE 33.—International Harvester spindle cotton picker, 1942. (Catalog No. 405.)

and place. Gift of Conrad Lawlor, Madrid, Iowa.

405. MECHANICAL COTTON PICKER, 1942. USNM 288163; 1970. International Harvester Model H-10-H, single-row, spindle cotton picker of 1942. The Model H-10-H, developed in 1941, was the first commercially successful spindle picker. It is about 13 feet high and weighs about 4 tons. This machine and its successors completely transformed the cotton farming industry and led to the destruction of the share-cropping system. Gift of Producers Cotton Oil Co., Fresno, California, through International Harvester Corporation.

406. DUPLICATOR, late 19th century and early 20th century. USNM 290936; 1970. This duplicator, a tube about 2½ inches in diameter and about 12 inches long, was used to copy farm records. The user wrote on paper with an indelible pencil. The original paper and copy papers were placed between two water-soaked linen leaves and all was rolled up on a wooden spool. Then the spool was inserted in the tube and left for a few minutes until the penciled ink stained through the wet papers and thus made copies. This specimen was used on a farm in Virginia. Gift of Mrs. Arthur Z. Gardiner, McLean, Virginia.

407. ORCHARD LADDER, 20th century. USNM 290936; 1970. This ladder, about 9 feet high and with 10 steps, narrows toward the top. Adjustable legs allowed it to be moved forward or backward for the desired positions in fruit picking. Gift of Mrs. Arthur Z. Gardiner, McLean, Virginia.

408. TOBACCO, 1969. USNM 291350; 1970.

Leaves of tobacco, a plug of tobacco for chewing, and a leaf roll of tobacco. Gift of Mrs. Wanda White, Thurmond, North Carolina.

409. JOHN DEERE GARDEN TRACTOR, 1963. USNM 275276; 1970. The first garden tractor-riding lawn mower made by John Deere Company in 1963. Called the 110, it is a typical suburban tractor with a 7-horsepower engine and forward and reverse gears. Gift of John Deere Company, Moline, Illinois, through George Neiley.

410. MONTAMOWER LAWN MOWER, 1923. USNM 293356; 1970. This lawn mower, made by Montamower Co., Traverse City, Michigan, has 16 rotary blades that are about 2 inches in diameter. The blades are set in a frame and are geared to the same number of wheels on the ground. The machine was patented on August 21, 1923. Gift of Andrew Corle, Chevy Chase, Maryland.

411. "CYCLONE" SEEDER, early 20th century. USNM 292872; 1971. A crank-operated broadcast seeder that the farmer carried as he walked across the field. Gift of Mrs. Alice Wiser, College Park, Maryland.

412. STRAW BEEHIVE, 20th century. USNM 296260; 1971. This skep (a beehive made of woven straw) was made in the 1950s but is of a sort that has been used since ancient times. Gift of A. G. Woodson Company, Grand Rapids, Michigan.

413. APPLE CIDER PRESS, about 1875. Received in 1971. This "Buckeye" press, made mostly

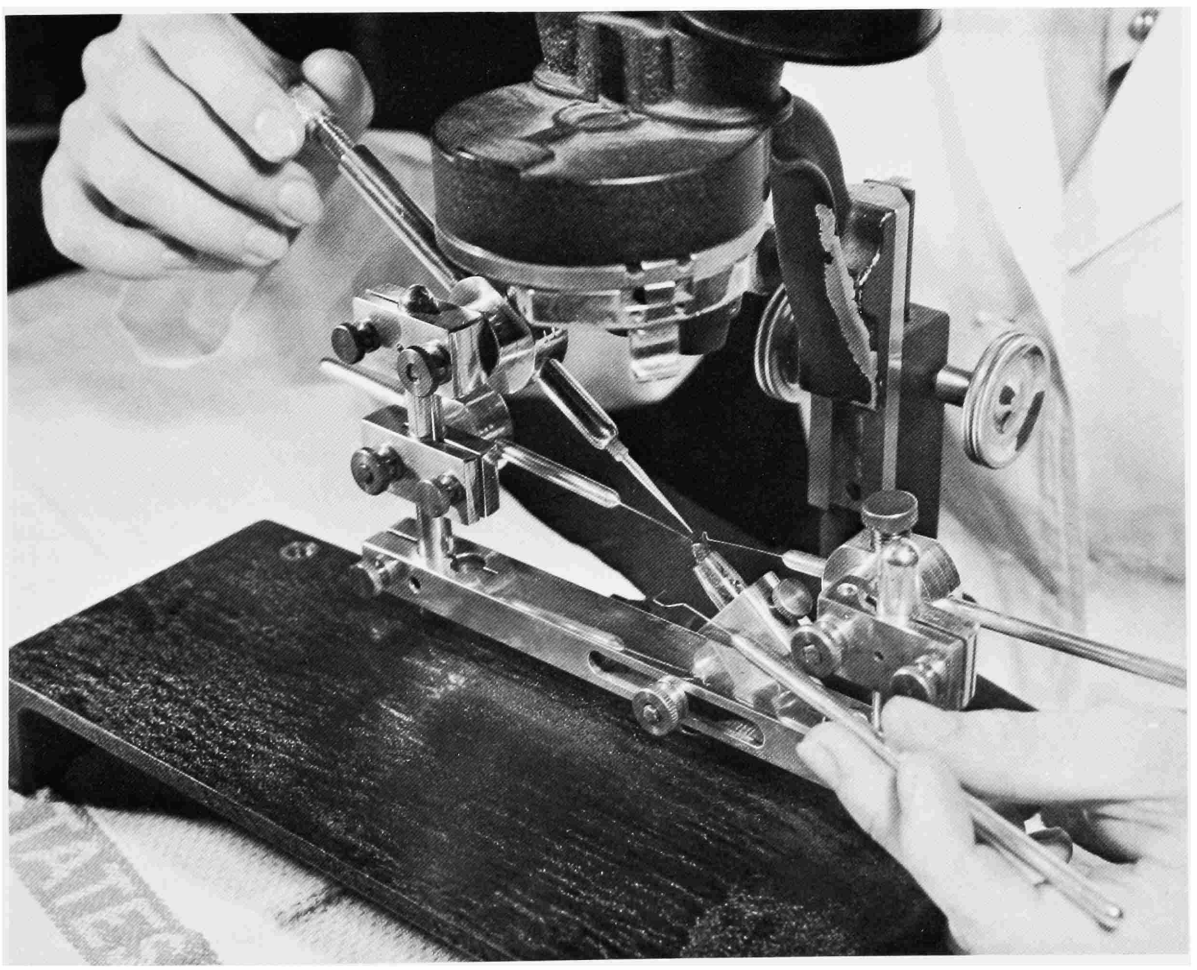

FIGURE 34.—Roberts-Mackensen bee insemination instrument, 1944. (Catalog No. 414.)

of wood, was manufactured by the P. P. Mast Company of Springfield, Ohio. Many presses of this design were used throughout the country. Gift of Mrs. S. D. Mottley, Marshall, Virginia.

414. ROBERTS-MACKENSEN BEE INSEMINATION INSTRUMENT, 1944. USNM 295414; 1971. This stainless steel device holds the queen bee while the technician performs the operation. Controlled breeding of bees has resulted in hardy and gentle breeds and greater production of honey. Gift of Dadant & Sons, Hamilton, Illinois, through Charles Dadant.

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