basin country beyond the cordillera found 160 unirrigated acres inadequate to support a family.

The busiest homesteading areas of the nineteenth century were Kansas, Nebraska, and the Dakotas, where more than 430,000 settlers had filed homestead claims by the end of 1895. The most spectacular burst of settlement occurred in the “Great Dakota Land Boom” between 1881 and 1885, when 67,000 settlers took up homesteads in the territory. Between 1896 and 1920, homesteaders were most common in Montana, North Dakota, Colorado, South Dakota, Oklahoma, and New Mexico, each attracting at least 125,000 land entrants. Almost 200,000 settlers poured into James J. Hill’s high plains railroad empire in Montana, the flood peaking in the years 1906–10. Of these states, only the Dakotas had seen comparable activity during the nineteenth century. Homesteading also increased after 1900 in the plateau and basin states as settlers moved into the cold desert of southern Oregon and into interior Washington, California to the east of the Sierras, and Arizona. Despite its size and the fact that homesteading began there in 1863, only 114,000 settlers filed homestead claims in California. Nowhere was Jefferson’s dream so obscured as in that state.

Gro Svendsen’s husband, Ole, was in error when he believed that he had to be naturalized in order to homestead land; he needed only to have declared his intention of becoming a citizen. In this respect, the Homestead Act was a generous one. Its application to the American Indians was ironic; few of them could utilize its provisions. But there were exceptions. During the summer of 1862, warfare blazed in the Minnesota-Dakota borderlands, where starving Santee Sioux rebelled against the exactions of traders and a corrupt Indian service. After a bloody uprising, thirty-eight Indians were adjudged guilty of rape or murder and were hanged. Others went to prison, and the tribe was moved into the Dakota Territory. In 1869, some twenty-five families from the tribe trailed into an unsettled area along the Big Sioux River in South Dakota, determined to live like white farmers. Others joined them; thus emerged the Flandreau Sioux colony, whose members asked to enter individual holdings under the Homestead Act. Friendly government officials and missionaries helped them do so, although the Flandreans were required at first to surrender their claims on the tribal assets.

Steven Arrow, Big Eagle, David Faribault, their fellows, and their families slowly developed a settlement of log cabins. Initially, they hired oxen from white neighbors, tilled with spades and hoes, and supplemented their husbandry with hunting and trapping. A Sioux Falls merchant reported that they “gave more indications of civilization and industry and ‘a show of living like white people than the same number of Norwegian families located a few miles below.’” Like other pioneer farmers, the Flandreau homesteaders faced killing frosts, grasshoppers, and a general shortage of livestock, equipment, and tools; in addition, the Indians confronted defections, factionalism, burdensome taxes, the threat of alcoholism, and the temptation to sell out to white men. But an Indian agent of the early 1880s wrote, “[They] pay their taxes promptly, their word can be relied upon, and they make good neighbors.” Few American Indians, however, were able to use the Homestead Act, although an amendment to the statute of the early 1870s was intended to make it generally possible.

The above only outlines the ways in which westering farmers acquired virgin land.
The options of any individual might be limited, but the federal system was varied when viewed in broader perspective. Although the rectangular units within the basic survey grid did not always allow an effective or conserving use of land, settlers found the federal survey easy to understand and, therefore, less a source of boundary disagreements with neighbors than were the haphazard metes-and-bounds surveys found in some older states. Still there were problems. During the early period, when purchase at federal land auction or by private entry prevailed, squatters pushed onto the public domain before land surveyors had completed their tasks. Although such incursions were criticized in Congress and were contrary to law, squatters complained about rapacious speculators who thronged to the ensuing land sales and threatened to bid on claims that the settlers had improved. Among the frontier settlers there were also rascals ready to jump claims. To protect each other’s holdings, squatters formed claim clubs or associations. They either ousted claim jumpers or forced them to purchase the claim in question. Club members attended land sales en masse, carrying sturdy walking sticks and threatening unwary capitalists. The squatters’ clubs also allowed early settlers to engross land beyond their farming needs and to force latecomers to buy squatters’ titles.

With the passage of the general preemption law in 1841, settlers no longer needed to fear speculators. But often thereafter, when land titles were uncertain, claim clubs appeared. In the upper valley of the Des Moines River during the 1850s and 1860s, the assignees of a river-improvement grant found their titles challenged by both a land-grant railroad and settlers hoping to acquire title through the preemption or homestead laws. A settlers’ association denounced the other claimants. When the courts ruled on the title to these Des Moines River lands, the squatters learned, to their dismay, that they had to buy their lands from the river lands assignee or the railroad. During the 1850s, settlers poured into eastern Kansas before the federal land surveys, and free state and proslavery settlers used claim clubs to reinforce their positions. Settlers’ associations on former Indian reserves and railroad lands in Kansas battled for preemptive rights into the 1870s, and such organizations were common in Nebraska and present in Colorado.

In California, conflict over land titles was complex and confusing. Although farmers were responsible for the first trickle of American overland immigration into California, the gold strikes brought migrants hoping for quick riches. Meanwhile, Congress grappled with the slavery issues attendant on the Mexican Cession and neglected California’s land problems. The United States did not establish a California land office until 1853, and the first federal land sales did not occur until 1858. Settling the status of the lands that the Spanish or the Mexican government had granted to individuals was difficult. There were some eight hundred such grants, embracing eleven million acres, and the United States had pledged protection of the property rights of the grantees. Typically, the grants lay in attractive agricultural areas, and in many cases, their boundaries were vague.

The U.S. Congress established a claims commission in 1851 to determine the validity of the Mexican titles. The commission was generous in approving claims, even some of dubious validity; but evaluation proceeded slowly and was further complicated by federal court rulings. In the meantime, squatters settled on undeveloped parts of the grants—some in ignorance of the pending Mexican title, others either believing that the
claims were fraudulent or hoping to win preemptive rights to their holdings. California officials complicated the situation by failing to identify state swamplands clearly and by claiming tracts that settlers were already trying to homestead or preempt. The locations of the state agricultural college lands further constricted the acreage available to settlers wishing to use the federal land laws. The allocation of railroad grant lands in areas already occupied by pioneers exacerbated the situation. The Californios were ill prepared to cope with the aggressive, Anglo-American businessmen, legal costs, and tax burdens associated with U.S. sovereignty. Anglos with capital acquired title to all or portions of many of the Mexican grants while others accumulated large holdings of state or railroad lands or of federal lands subject to private entry. Such individuals often refused to acknowledge that squatters had any rights, and the courts became mired in land litigation. In self-defense, the settlers formed claim associations, retained lawyers, and threatened violence against law officers seeking to evict them. Near San Jose in 1861, more than five hundred settlers confronted a posse seeking to evict squatters from the Chabolla grant. Some California farmers were still living on lands with clouded titles in the 1870s.

The New Mexican story of land disposal is even more depressing. Here were hundreds of Hispanic grants, most lying in the corridor of settlement along the Rio Grande and its tributaries but some extending into latter-day Colorado and Arizona. Under these titles a few rich families claimed ownership of large domains, and the Hispano masses held some form of title to modest acreages, with rights to share adjacent range with their neighbors. In New Mexico, grantees submitted their claims to the territorial surveyor general for approval. His rulings, however, could be challenged in the courts, and individuals with resources could beseech the U.S. Congress to confirm titles. Predatory Anglo lawyers and businessmen purchased claims, obtained shares in grants in payment for legal services, and tried to expand the boundaries of their holdings. Exemplified in Stephen B. Elkins and Thomas B. Catron of the “Santa Fe Ring,” the Anglo wheeler-dealers found rich pickings, despite charges of corruption. Meanwhile, stockmen used dummy entrymen to obtain control of great stretches of New Mexico range. When Grover Cleveland’s advisers considered the administration of public lands, they found widespread belief that “swindling cattle kings, surrounded by a gang of swindling herders, all of whom are in collusion with swindling surveyors, have swallowed our Western acres as a gourmand swallows oysters.” New Mexico was the cesspool of the public land system.

With their range rights disregarded and the parent grants within which they lived frequently discredited, Hispanic smallholders often hesitated to submit evidence of title and so lost their lands, surviving as hired laborers or renters. Anglo ranchers and settlers manipulated the federal homesteading system more successfully than did the Hispanics. When Congress finally established the Court of Private Land Claims in 1891, the Hispanic land base had already been subjected to four decades of plundering. The court confirmed title to only 2 million of the 37.5 million acres in claims presented.

Spanish Americans did not always suffer the assaults on their land base passively. After fence-building Texas cattlemen invaded the Las Vegas community grant, Hispanic residents, enshrouded in white, responded with night raids. Directed by Juan José
Herrera, "Las Gorras Blancas" (The White Caps) cut fences and burned Texan improvements. The movement was the seedbed of New Mexican populism, and although unsuccessful, this protest contributed to the incorporation of the Las Vegas grant and its continuing occupation by longtime residents.

Federal land disposal in Utah also had unique features. Most farmers here practiced irrigation and lived in villages from which they tended neighboring fields or livestock. In federal eyes, however, the Mormons were, initially, squatters. Not until 1869 did American officials open a land office in the Utah Territory. Meanwhile, church officers supervised settlement and land distribution. With the federal system in place, the Saints moved rapidly to ensure possession of the lands they had occupied, utilizing the Preemption Act, the Homestead Act, the Timber Culture Act, and the Desert Land Act. Many Mormon holdings were less than 160 acres in size, and although the practice was technically illegal, church officers often acquired the acreages allowable under the acts and apportioned them to the settlers occupying them. Wives in polygamous relationships sometimes entered homesteads as family heads and transferred title to their spouses, and villagers evaded the residency requirements of the Homestead Act by periodically camping on their claims. Thus did social realities overcome the technicalities of federal land statutes.

In much of the trans-Mississippi West today, roads, crops, and field boundaries delineate for airborne travelers the checkerboard squares of the federal surveys. Land records in hundreds of county courthouses still show evidence of large holdings.
amassed in the settlement period, as well as the tendency of ethnic groups to keep and to extend family holdings. In general, the government patent was only one transfer of title on any piece of rural property; there might be many more thereafter. Indeed, in some areas, a quarter-section homestead might be sold several times by relinquishment before the patentee occupied it. Many frontier settlers never acquired land from the government, obtaining their farms from original owners or the latter’s assignees. Some of this churning represented the failure of settlers to become independent owners, but in other cases, it tells us that pioneers believed better opportunities lay elsewhere.

Some came to the frontier without means to acquire land. They found landholders willing to rent land to them, and hence, tenancy settled on the frontier along with the freehold farmer. Tenancy also developed because aging pioneers or widows used it in transferring farms to the next generation. For some young farmers, tenant status was a step in their progress toward debt-free farm ownership. But tenancy also indicated that not everyone could enjoy full fellowship in the smallholder’s republic lauded by Thomas Jefferson. When the federal enumerators of 1880 counted farm tenants for the first time, they discovered that 24 percent of Iowa farmers were tenants, as were 16 percent of Kansas farmers; in California the rate was also 16 percent. Twenty years later the numbers had risen to 35, 35, and 23 percent.

Mechanization

When American farmers moved into the trans-Mississippi West in the early nineteenth century, their implements were much the same as those used by colonial farmers. Two-wheeled carts or crude wagons, mold-board plows of wood with an iron point and—perhaps—share, drags of heavy planks or tree trunks, harrows of wooden spikes set in triangular plank frames, double-shovel plows for row crops, harnesses, ox yokes, and fittings—these were the major items, along with smaller tools such as scythes, sickles, forks (often of wood), shovels, and coopered pails. The husbandman of the early nineteenth century broadcast his seed from a bag slung over his shoulders; he cut the ripened crop with a sickle or a scythe while others raked it into sheaves and bound them with knotted grain stalks. Eventually, the farmer flailed the grain, taken from barn mow or stack, and winnowed it on a canvas. The settler planted Indian corn with a hoe or, if the crop was sod corn on new breaking, sometimes used an ax. Gathering techniques varied by region; but however it was gathered, ripened corn was stored in cribs while the stalks and leaves provided fodder.

As settlement spread into the prairie states, mechanization accelerated. By about 1820, Jethro Wood had developed the prototype of the walking plow, with all of its earth-turning parts made of iron. Though Wood’s plow was an improvement, the dense, matted prairie grass and forb roots defied conventional plows and, once turned, revealed soils that clogged iron-mold boards. Prairie blacksmiths developed massive beamed plows to break the sod, and during the 1830s and 1840s, John Deere and William Oliver led in manufacturing plows with mold boards of steel or polished chilled iron to which these soils did not adhere.

The agricultural inventors worked wonders in reducing work hours for the harvest of wheat and other small grains, hitherto cut with scythe or cradle and bound into sheaves
by hand. Cyrus H. McCormick and other machinist-inventors mechanized and melded several processes. For the scythe's short cutting blade, they substituted a long cutting bar with serrated edges set within a framework of metal guide teeth, or fingers, attached to the front of a platform on wheels and pulled by draft animals. In forward motion, gearing motivated by a drive wheel at one end of this platform caused the cutting bar to whicker-snicker within its frame and cut the stalks of grain a few inches above the ground as an elevated reel and guide teeth steered them to the blade. A worker with a rake followed McCormick's contraption of the 1830s, periodically clearing the table of cut grain; but soon this worker was replaced by automatic devices.

The Marsh harvester of the 1870s revolutionized the shearing and binding process by introducing moving canvases that elevated the cut grain over the drive wheel and dropped it on a shelf for sheaf binders standing on a step attached to the machine. These workers vanished with the introduction of an automatic twine knitter. The resulting grain binder was found in many harvest fields of the trans-Mississippi West by the 1890s. Such binders reduced field labor still more when manufacturers attached sheaf carriers that accumulated the bound bundles. When the driver judged that there were enough to make a stook of grain, he tripped the device.

The final process of separating the grain from the straw had long since left the flail or tramping-floor stage. By the 1840s, crude grain separators that flailed the grain and blew away the chaff and straw with internal fans were in use. Initially, horse treadmills and circular horsecarriages drove such machines, but by the 1880s, Pitts or Case threshing machines were trundling down western roads behind steam engines, followed in turn by a horse-drawn water wagon to keep the engine puffing. In the Far West, imaginative rural inventors consolidated the stages of grain harvest; by the 1870s, huge, cumbersome combines drawn by twenty or thirty horses were rattling through the grainfields in the central valley of California, leaving a trail of filled grain sacks behind them. At the turn of the century, combines were conquering the hilly wheat fields of interior Washington. The binder-driver of the plains country encouraged his three or four horses with imprecations and a long whip; the driver of the combine's multiple hitch hung a pail of rocks under his elevated seat and threw them at lazy members of his huge team.

Meanwhile, mechanization proceeded in other areas of husbandry. Practical, if not always reliable, horse-drawn broadcast seeders, grain drills, mowing machines, rakes, and hay loaders had appeared by the 1850s. Plows and cultivators were enlarged and made available as riding machines, and rollers and other tilling machinery also appeared in larger sizes that were stronger and more efficient. The Indian corn crop seems, at first glance, to have benefited less from mechanization than the small grain harvest. Although mechanical planters and twin-row riding cultivators entered the cornfield in the 1860s, handpicking into a horse- or mule-drawn wagon was the general practice until the 1920s. In John Herbert Quick's *The Hawekeye* (1923), Fremont McConkey described the process during the late 1870s:

*Forget the sky, the clouds, the blood drawn by rosebrier or the sharp tips of the kernels of the “hackberry” ears; forget everything but the economy of movement, the making of every second count. Make sure that you do not fail to tear the ear from the stalk and throw it into the wagon by a single movement of the muscles; see to it that*
when the right hand returns from the throw, the body has moved forward if necessary
to another proper position, and that the left hand has seized another ear and holds it
ready for the husking peg; and do not fail to remember that if you husk your hundred
bushels in a day, the steady "clump, clump, clump" against the throw-board must
continue hour after hour, even while the trained horses are making the turn at the end
of the field.

The settlement era was past when mechanical corn pickers became common in the
Middle West during the 1920s.

Mechanization was not the only factor contributing to the efficiency of agricultural
production west of the Mississippi during the nineteenth century. The fertility of
western soils, improvement of hand skills in tasks such as corn picking, and the tendency
of farmers to specialize also enhanced production. But the decline, for example, in the
number of work hours expended per hundred bushels in the production of wheat
between 1840 and 1900—from 233 to 108 hours—and in the production of corn—from
276 to 135—reflected the use of more sophisticated machinery. By the latter date also,
steam, the electric generator, and gasoline engines had begun supplying the energy
hitherto provided by Buck and Bright, Fan and Pomp, and Sam and Jenny—the oxen,
horse, and mule teams that powered animal-drawn farm machinery.

Climatic Adaptation

The pioneer farmer of the Genesee Valley chopped his farm from a mixed deciduous
forest, extending the ramparts of stumps and rail by a few acres each year. His son or
nephew in central Illinois came to understand the fertility of the tallgrass prairies but
preferred a farmstead amid the trees along streams or in the prairie groves, where he
found timber for firewood, rails, and lumber. If he moved into the prairie interiors, he
might buy a woodlot beside a stream. A generation or two later, settlers on the central
or high plains drove their teams as far as forty miles to cut wood. But by this time the
railroads were aiding farm making by transporting lumber, milled from logs originating
in the pineries of the Great Lakes states—raw material for grassland houses, barns, and
fences.

Other western pioneers experienced drastic revisions of their childhood experiences.
In the Great Basin of the Mormons, mountainsides to the east were forested, mountain
crests glistened white for much of the year, and springtime streams ran full with
snowmelt. But the Saints discovered that their accustomed crops of the Mississippi
Valley needed supplemental moisture or would fail in all but the most unusual years.
Those pioneers who pressed into the coastal regions of upper Washington experienced
annual precipitation of seventy inches or more—what the Kansas farmer might expect
in several years. In the Central Valley of California, the situation seemed even stranger.
One historian imagined the newcomer's first reactions: "The absence of summer rains
seemed to prove that the valley was unfit for agricultural purposes. How could crops be
raised where there was only a wet and a dry season? How could one farm where the grass
turned green in the winter and died in the summer?"

For the farmer who left the Mississippi Valley, a transformation from forest man to
grassland man was necessary. The Texan Walter P. Webb dramatized this story: "The
whole technique of pioneering and the ways of living which had become habitual with
the people and had proved so effective as to become standardized broke down completely when carried from the Eastern Woodland region into the Great Plains.” Webb argued that only after waiting from 1825 to 1860 for industrial America to develop such inventions as the six-shooter, barbed wire, and the windmill did pioneer farmers establish themselves beyond the ninety-eighth meridian in the plains country.

No demography demonstrates Webb’s claim. The westward march did not stall at the central grassland until the army was equipped with six-shooters and a new technology of settlement adopted. During the 1850s, settlement was incomplete in the states adjacent to the Mississippi. In that decade, preparations for opening the lands beyond the Missouri began—midwestern Indian tribes were moved, formal relations with the Plains Indians were initiated, and territorial governments were established west of Iowa and Missouri. Still, in part, Webb spoke the truth. The pioneer farmers adapted to subhumid environments as they moved westward. Forest man, however, first accepted the challenge of becoming Webb’s “new man” on the bluestem prairies of the “prairie triangle,” that lazy V of grassland, striped with wooded watercourses, that flares from its apex on the Wabash prairies through northern and central Illinois to include much of southern Wisconsin, more of Minnesota and Missouri, and all of Iowa before merging into the plains proper.

The problem of aridity was manifest in various ways, including home construction. The dominant feature of any new farmstead was the house. The first dwelling of the pioneer was typically the log cabin, which settlers in the grasslands preferred. During the first months of settlement, however, some families lived in lean-tos, or even canvas-topped carts or wagon boxes. Once families could build, cultural influences became apparent, such as the differences between the Yankee and the southern sides of settlement. The well-built, southern-style log cabin had a breezeway through the center. Henry Ise took his bride, Rosie, to a simpler structure near the ninety-ninth meridian. But the dwellings that Rosie saw in the last stages of the journey were mostly dugouts, scooped from the sides of draws or creeks, with front walls of sod, though there were some frame or stone buildings. Elsewhere on the plains, the genuine sod house was common, with walls and usually the roof constructed from rectangles of tough, matted sod.

If many settlers used soddy, few lived in them for long. As the Ises prospered and the family grew, they added a wing to their cabin and built a new house of local stone. More commonly, as railroad lines laced the postbellum West, settlers obtained scantlings, planks, and boards to build claim shanties or the second house that denoted improved circumstances. The new houses were “sawed” rather than “sod” dwellings, one historian notes. When Elinore Plaisted’s mother, Em, took her children to the Dakota wheat country late in the century, her husband proudly drove them to a two-story, wooden, framed house where a few years earlier there had been only waving grass. Less-affluent folk lived in wooden shacks, sometimes with an additional coating of tar paper nailed to the board walls, slight shelter against blizzards. Within, the farm wife might stoke her stove with buffalo chips, twisted hay, or stalks of sunflowers or other woody plants if creek-bed wood or coal was unavailable.

On washdays, Em Plaisted carried water from a nearby slough to fill her tubs, but few farms could continue without a good well. Under much of the trans-Mississippi West lay aquifers, but the depth of the water table varied. Sometimes the well-digging
The idealized agrarian image of Currier & Ives' "western farmer's home" reflected eastern sensibilities, not western reality. In the trans-Mississippi West, settlers such as this young Nebraska mother or these African-American homesteaders often started out in simple temporary structures. But dugout homes and claim shanties were not easily incorporated into the popular images that romanticized life on the western farmers' frontier.


A. P. Stowring (fl. 1831). Homestead of a Family near Gallie, Oklahoma Territory. Photograph, ca. 1885. Western History Collections, University of Oklahoma Library, Norman.
udder might reach water in less than thirty feet; other times he labored with pick and shovel to greater depths, running the risk that the windlass rope might break or that he might be overcome by well gas.

Loessial in origin and fortified with humus, grassland soils were highly productive if adequate moisture was available. But since the rainfall diminished in amount and increased in variability meridian by meridian, settlers obtained lower average yields per acre as they moved farther west and were compelled to cultivate larger units. The uncertainties of plains country weather also dictated that work be done when conditions were favorable. Larger and stronger farm machinery, illustrated by two and three bottom plows and wider harrows, provided a partial solution to this problem. The trend culminated in the big hitches in which several sturdy teams were combined to pull massive arrays of tillage machinery and in the introduction of the tractor on the high plains wheat frontier of the early twentieth century.

In their eagerness to produce, pioneer farmers managed to raise a half crop of corn on fresh breaking by hacking holes for the seed in the turned sod. During the 1880s, settlers in the Dakotas found that flax grew well as a first-year crop. Beyond the line of the Missouri, however, was a belt of territory where corn thrived during the moist years but where wheat was more dependable in dry periods. When the spellbinding Populist orator Mary Elizabeth Lease exhorted farmers of this region to “grow less corn and raise more hell,” she was at least half right on the basis of agronomic principles. During the 1870s and early 1880s, farmers in “The Golden Belt” of central Kansas learned that the hard, red winter wheat that Mennonite settlers had brought from the Russian plains was their most dependable cash crop. Improved milling techniques expanded the market for this grain, which came to dominate a winter wheat region on the central plains. To the north, farmers discovered that spring wheat was more satisfactory. During the dry years of the late nineteenth century, farmers on the high plains found that in their area, sorghums provided a drought-resistant crop.

There were other illustrations of climatic adaptation in the mechanization process. To some Kansas and Nebraska farmers, the droughts of the late nineteenth century revealed the beneficial effects of using liser drills, which allowed the planting of wheat in trenches that ran at right angles to the direction of the prevailing winds. Many plains country farmers adopted the grain header, which cut the small grains just below the seed heads and elevated them into an accompanying wagon for transport to a threshing machine. Thus, they took advantage of the fact that the moisture content of the harvested grain was low and did not need to dry in the shock.

As native timber was consumed, pioneer farmers sought alternatives to rail fences. Herd laws, restricting the stock owner’s right to allow his animals to roam at will, were only a partial solution. The prickly Osage orange tree (bois d’arc) provided a popular substitute for fences. If planted thickly and pruned properly, it made a formidable hedge. During the 1850s and 1860s, farmers planted miles of hedge throughout the Middle West but later adopted the more effective barbed wire that northern Illinois inventors had developed. Along with less-punitive wire-mesh fences, barbed wire solved the grassland farmer’s fencing problem, but in a way that required an outlay of cash rather than labor.
Real estate agents, officers of land-grant railroads, state officials, and immigration agents assured the farmers who moved into the plains country during the 1870s and 1880s that "rain followed the plow." During some years of those decades this appeared to be true. But the late 1880s and the early 1890s revealed the cruel variability of the grassland climate. Hardy Webster Campbell's gospel of dryland farming sustained the thronging homesteaders after 1900. Publicized by the railroads during the first decade of the twentieth century, the Campbell system dictated that fields be fallowed while moisture accumulated in packed subsoil, topped with a dust mulch. Dubbed "scientific farming," at the urging of railroad executives, dry farming was not complete nonsense. Properly managed, fallowing conserved moisture, but Campbell's system could not withstand a succession of dry years. After 1900, settlers attempted to build a dry-farming empire on the northern high plains served by the Great Northern and the Northern Pacific railroads. From 1917 onward, they suffered recurrent droughts, and many failed, bitterly repeating the aphorism "Dry farming works best in wet years."

Yet, some western farmers grew wheat successfully in areas of low rainfall, unaided by either irrigation or the charlatan rainmakers who preyed on gullible husbandmen during the 1890s. During California's transition from ranching to a varied commercial agriculture, both operators with large mechanized operations and small-scale farmers grew bumper wheat crops on a dryland basis in the Central Valley. After 1900, the farmers of central Washington successfully grew wheat in a region where rainfall was less than twelve inches per year. The timing of the precipitation explains such successes. Although the mountain ranges of the West drained eastward-moving cloud masses and created tributary areas of low rainfall, they also accumulated magnificent snowpacks that created rushing rivers in the spring and early summer. Irrigation, thought visionaries, might create a western oasis. Looking across the heat-shimmering reaches of their kingdom, the Mormons had little choice; if the faithful were to be gathered and to survive, man needed to assist the heavens. In 1847, Mormon farmers in the Salt Lake Valley diverted water to their crops from City Creek. Although some initially tried to harvest crops without irrigation, the Saints built their first highline canal in 1850.

In Deseret, community structure was also church structure, simplifying the mobilization of community effort essential to building an irrigation system. Church officers supervised the construction of the stream diversions and canals and apportioned water quotas. The Saints were, however, human. One pioneer Mormon lurked in the dark near the ditch that provided water for his acres, rock in hand, poised to repulse any neighbor from down the valley who might try to drop the headgate before watering was completed. For a generation and more, Utahns advised residents in other water-scarce regions of the West. There was much to learn about laying out canal systems, constructing impoundments and gates, caring for particular crops, and distributing water evenly. But Utah's irrigation system was a relatively simple one with few elaborate reservoirs or lengthy canals.

In the pursuit of precious minerals, the miners of western regions used water in great quantities. Their activities encouraged the development of agriculture, as onetime farmers realized that eggs at fifty cents apiece and meat and flour at equivalent prices were as rewarding as flakes of gold. With the water rules of the miners in mind, western irrigationists overturned centuries of European and eastern precedent, enunciating a
doctrine of prior appropriation in place of riparian rights. The first user was entitled to
the amount taken prior to the arrival of others, rather than sharing a right in common
with adjacent users and being obligated to return diverted water to streams. During the
1870s, the lawmakers of Colorado and other western states wrote prior appropriation
into constitutional and statutory law, although elements of riparian rights lingered,
particularly in California.

John Wesley Powell, the intrepid runner of the Colorado canyons and director of
the U.S. Geological Survey, was the first government scientist to understand fully the
climatic challenges of the West. At the close of the 1870s, he suggested that federal land-
disposal laws be revamped—the irrigation farmer needed less than a quarter section to
make a good living, whereas the stockman needed more. In the summer of 1889, he told
the North Dakota Constitutional Convention, “One year with another, you need a little
more [rainfall] than you get.” After western developers and politicians drove Powell
from the Geological Survey because of his conservative approach to irrigation issues, he
continued to perfect his ideas for the development of the West’s irrigable lands under
a system of self-governing hydrographic basins. As for promoters who dreamed of
irrigation as a quick fix, he wrote: “Terpsichorean, sacrificial, and fiduciary agencies fail
to change the desert into the garden, or transform the flood-storm into a refreshing
shower. Years of drought and famine come and years of flood and famine come, and the
climate is not changed with dance, libation or prayer.” Still, western community
builders were convinced that reclamation could help them build populous states. In
response, the federal government passed the Carey Act of 1894, providing for the
transfer of lands to western states for irrigation purposes. The law was ineffectual.

For the first time in 1890, the federal census takers noted irrigation farmers. They
found 54,136 in sixteen western states and territories, one-quarter of them in California.
Despite such figures and the success of private developments like the Greeley Colony
in Colorado, private or state efforts to develop irrigation were marred by the failures of
optimistic entrepreneurs and by land speculators who monopolized reservoir sites or
irrigable land. Obviously, argued westerners, the federal government should play a
larger role. When Congress passed the National Reclamation Act of 1902, creating the
Bureau of Reclamation, the western settler had a new option—homesteading on
reclamation developments, as in Arizona’s Salt River Project or the Truckee-Carson
district of Nevada. In reclamation districts, settlers paid water-user fees that were
expected to return the project costs to a revolving reclamation fund from which other
developments might be funded. Even federal homestead land was never free, given the
farm-making costs involved. Land was certainly not free in the early reclamation
projects. By 1923, there were 34,276 farms on twenty-eight western reclamation
districts, and in only one district had the settlers met all of their payments.

Commercialization

We can look to the American past and imagine the subsistence farmer, a sturdy fellow
living on an isolated farm from which he and his family satisfied all their needs. This
individual never existed. But the colonial farmer resembled him more than did the
agriculturist of 1850, and the colonial frontier farmers were much more subsistence-
oriented than were the farmers of the older settlements adjacent to the markets of
colonial ports. In contrast to the self-sufficient husbandman, we can also visualize the commercial farmer, who concentrated on producing the crops that had the greatest market value and who purchased all other necessities.

By the early nineteenth century, American farmers had moved significantly toward the commercial end of the continuum between subsistence and commercial farmers. But even where capitalism had most influenced agricultural production—on the slave plantation—field crops were grown, gardens were tended, and some clothing was made at home. Before the 1820s, in the West, homespun was still common, buckskin was not unknown, and farmers cultivated numerous crops and raised various animals and fowl. Beginning in the 1820s, the transportation system of the United States was revolutionized, expanding the markets for farm produce and making a broad range of manufactured articles generally available. Although nineteenth-century depressions left a residue of failed or financially embarrassed farmers in the less-established communities of the West, agriculturists in general seized market opportunities provided by the expanding economy. In 1863, California's most eminent authority on agriculture reported, "The farmers generally are anxious to make as much money as possible, and as soon as possible." When the railroad vitalized the economy of the hitherto isolated Cache Valley community in Utah, a settler reported, "The jingle of coins was stimulating." Through the last forty years of the nineteenth century, farmers in many western townships or counties supported the purchase of railroad bonds by their local governments in order to amplify that stimulating jingle.

Some historians believe that the early nineteenth century was an era of small-scale farms tilled by hardy republicans who lived a life of community marked by trading of labor and by barter until a subversive capitalism dragged them unwillingly into the marketplace. Trading butter and eggs and other farm products for store goods and bartering labor, goods, and services within the agricultural community was common during the early nineteenth century and continued into the twentieth century; but accounting was usually done in monetary units. Whether it was wheat, as on many frontiers, or oats in the Walla Walla Valley, or flax in the Dakotas, the pioneers sought a cash crop that produced a maximum return; they were perennially short of capital and forced to invest much labor in farm improvements from which benefits were derived only in the long run. The United States was born capitalist, and the attendant values did not change, though transformations in transportation, industry, and marketing substantially altered the pioneering process during the nineteenth century. And as farmers learned the peculiarities of their areas and the most remunerative combinations of crops, livestock, capital, and labor—sometimes involving practices that observers called wasteful or exploitive—agricultural regions and subregions emerged.

American institutions encouraged the frontier farmer to think in terms of dollars and cents. The Founding Fathers had established a federal land system that assumed the existence of a market economy. When squatters poured into the Black Hawk Purchase of eastern Iowa during the 1830s, they established claim clubs and purchased and sold claims. They understood also that they must pay the federal government for their claims in money. At the federal land auctions in Iowa, eastern capitalists or their agents made loans to them at 50 percent or more interest. Thus, commerce in land, down payments,
and interest charges made even squatters on the Iowa prairie think in terms of markets and cash crops. Once settlers had title to their lands, there were taxes to pay, and western counties did not take payment in kind, although road levies were typically worked off. Before the railroads, some newcomers were far in advance of organized markets. A few served military posts or Indian agencies. Others satisfied their needs for cash, for iron products, for salt, and for "luxuries" like coffee or cane sugar by selling surplus products to new settlers, by selling livestock to traveling drovers, or by transporting wagonloads of wheat or oats to distant market points.

What did it cost to establish a farm during the nineteenth century? The economist Clarence Danhof estimated the costs of developing a 40-acre farm on the midwestern frontier during the 1850s as "$50-$400 for land, $60-$800 for breaking the sod or clearing woodland, $112-$200 or more for fencing, $100 for implements, $150-$200 for livestock, $40-$80 for the first year's seed, and $25-$450 for housing." On the average, Danhof believed, the midwestern farmer of this era needed about $1,000. Labor shortages during the Civil War stimulated the mechanization process. In 1862, a farm editor published a list of equipment appropriate to a 150-acre holding; the value of the items amounted to $968.

Farmers seldom outfitted themselves completely at one time; some bought secondhand machinery, and others shared the cost of reapers or other more expensive machines with relatives or neighbors. The owners of custom breaking plows did a thriving business, and commercial threshers were a feature of rural life until the 1940s. But the average value of machinery on farms in Johnson County, Iowa, was four times greater in 1890 in constant dollars than it had been in 1860, and in the Ise family's Osborne County, Kansas, the average investment in machinery per farm increased two and one-half times between 1870 and 1890. Some settlers, however, did not initially own draft animals and hoped to work off the claim and thus accumulate farming equipment and stock. Others deferred investment in land by becoming tenants. As mechanization proceeded, the agents of implement manufacturers sold machinery on short-term credit, taking the farmer's note with a chattel mortgage as security.

Throughout the period of our study, the family farmer typified the rural community of the West. This does not mean that all western farmers had equal resources or status. Older farmers had had more time to accumulate property than had younger farmers. Luck, inheritance, business skills, education, good or ill health, and the number of family members all might be reflected in an individual's property holdings, as were the land-disposal systems, land-use patterns, and regional economic development in general. The most common size of farm in Iowa in 1860 was fifty to one hundred acres; in Kansas at that census date the typical holding was twenty to fifty acres; and in California the most common farm was one hundred to five hundred acres. In that year, the census reported seventy-six Iowa farmers who had holdings of five hundred or more acres, with eight such farmers listed in Kansas and eight hundred in California.

Californians developed an agriculture characterized by both small irrigated holdings under intensive cultivation and huge ranches and grain farms, but they were not alone in developing spectacular farm operations. During the 1870s, investors in the Northern Pacific Railroad Company exchanged company bonds on favorable terms for acreage in