CHAPTER TWO.

HARVESTING

The technology and culture of farming evolve in curious disregard of North American federalism. The experiment stations, agricultural colleges, extension services, and similar institutions of the United States and Canada define their territories according to political lines irrelevant to agricultural practice. That is why the publication of "Farm Practices in Growing Wheat" in the United States Department of Agriculture's Yearbook of 1919 was so remarkable.\(^1\) In the article, the authors, J. H. Arnold and R. R. Spafford, presented information they had gathered by questionnaire from about seven thousand wheat farmers. They organized the grass-roots data geographically; state lines meant nothing in their analysis of tillage, planting, and harvesting. They viewed such practices as if from a satellite, with at least a national, if not a continental perspective, and as they did so, patterns appeared on the landscape, patterns they could map. This broad view, they said, showed that farm practices should be analyzed and evaluated "by considering them in the light of the climatic, soil, and topographical features of the area where they have been developed." It was obvious, they observed, "that practices suitable for any given area can not be transplanted unmodified to another."\(^2\)

The Arnold-Spafford approach was astute in that it outlined the relationships among environment, technology, and culture. It was limited, however, in that it studied these things at only one point in time. A historical approach to some of the same phenomena Arnold and Spafford studied in 1919 not only confirms their findings but also adds recognition of the evolution of practices through time, an evolution deriving from causes other than environment. Such, at least, is the case with the history of harvesting small grains on the Great Plains of North America. There were patterns such as those Ar-
Doukhobor women harvesting with sickles in western Canada, ca. 1900. (Provincial Archives of British Columbia)

old and Spafford saw, but they were dynamic patterns only partially portrayed on a static, two-dimensional map, and they derived, as had been so since antiquity, from a complex of forces.

Although the patterns of harvesting practices took shape rapidly on the plains, the earliest settlers in any particular area often temporarily employed anachronistic technologies. Until railroads should connect them to implement manufacturers and central markets, these pioneers fell back upon previous cultural or ethnic experiences to handle small crops. "Harvesting and threshing in the early years was accomplished in many instances by what now seem primitive means," reported the compiler of a survey of pioneer farm practices in western Canada. Old-timers on those northern plains recalled common use of cradles, scythes, and even sickles. Ukrainians and other eastern European immigrants were accustomed to using sickles and hand-tying sheaves in their homelands, and they transplanted such customs to Canada. Sickles were scarce (as were eastern Europeans) on the American plains, but cradles were common pioneer implements. A Kansan recalled cradle harvesting at the rate of one-half acre to two acres per day, "depending upon the man who was swinging it," and then tying bundles with straws selected from the piles of grain the cradler had left. Reminiscences from Washington County, Kansas, confirmed that when residents harvested their first wheat crop in 1861, their only implements were two cradles. Pioneers of the Texas Panhandle, too, cradled grain. Some also, before they obtained
binders, used reapers or mowing machines to cut loose grain and even rigged up clever devices of cowhide or other material to collect the grain into piles.  

Plainspeople were no antiquarians, however, and as soon as possible they imported what they considered respectable, up-to-date harvesting implements—binders. “The farmer used the binder as it came to him,” wrote James C. Malin, Kansas’ premier historian of the plains, “without modifying it through new inventions, or through adaptation to new uses.” At least as early as 1876 farmers in the Golden Belt of central Kansas were getting Marsh and Wood wire binders from local dealers, and by 1880 they could buy twine binders. To the west, in Pawnee County, a farmer-diarist recorded that settlers in his locality harvested their first wheat crop in 1875 with his binder.  

As in Kansas, so it went throughout the North American plains: Binders constituted a universal stage in development that would make historians of the successive-frontiers school, concerned with the successive stages of frontier development, proud. In large subregions of the plains, however, settlers took measure of this humid-area implement. Where winter wheat culture challenged the more arid parts of the region, farmers found the binder wanting and turned instead to the header. The binder, they said, cut too narrow a swath (seven or eight feet), missed bundles on rough ground, and, worst of all, performed poorly in the short crop of a dry year. Some might object that grain stacked directly from heading rather than first shocked was
likely to spoil; but on the dry plains, this problem seemed remote. As Malin found, “The dry years 1880, 1881, confirmed fully the dominant position of the header as the necessary Plains harvesting machine.” The header, like the binder, was available to farmers on the plains almost from the outset, and, given the choice, farmers made the environmentally sound decision. The header handled short crops just fine. Furthermore, it missed no bundles because it tied none; it took a wide swath (commonly twelve feet) with no side draft because it was pushed from behind; and it saved the labor of shocking, a decided advantage inasmuch as labor was chronically scarce on the plains.

Arnold and Spafford in 1919 charted the areas where the header had displaced the binder as the predominant wheat harvesting implement. Their maps were inexact but clear: Although the binder predominated over most of the country, in certain parts of the plains, farmers much preferred the header (see Figures 2.1 and 2.2). The three concentrations of header preference were (in order of magnitude) the western reaches of the winter wheat belt on the southern plains, comprising the Texas Panhandle, northwestern Oklahoma, western Kansas, northeastern Colorado, and southwestern Nebraska; the heart of the spring wheat belt in the central Dakotas; and the winter wheat area of central Montana. “The header in particular adapted to areas where wheat usually develops a short, stiff straw and where the harvesting season is normally dry,” observed the two authors.

Whereas Arnold and Spafford provided the big picture, students of harvesting and threshing in the individual
states chronicled local conditions. A report from the Kansas State Board of Agriculture in 1920 divided the state into three sections—eastern, central, and western—and recorded relative use of headers and binders in each. In eastern Kansas 99 percent of the farmers preferred the binder over the header, but in central Kansas 62 percent preferred the header, and in western Kansas 96 percent preferred it. Although a clear trend existed, it had a slight deviation: It was common to begin cutting green wheat with binders and then to switch to headers as soon as the grain was ripe enough. Already in 1910 a federal bulletin had reported this practice throughout header country in Kansas, Nebraska, and the Dakotas. Obviously, farmers with binders did not scrap them when they got headers but rather used the binders to get a jump on the hectic harvest. Another consideration in the binder-header decision was the size and nature of the operation. As cereal scientists observed in Montana in 1916, large farms devoted mostly to small grains had the greatest use for headers, whereas small farms with diverse crops had the least. Such differing operations might exist side-by-side in the same lo-

cality, thus blurring the distinction between binder country and header country.9

Such lessons in agricultural geography were commonplace to farmers of the plains, who observed them through space and time. Michael Ewanchuk, a native of Gimli, Manitoba, confirmed the universal use of binders in the locality but also said that people knew about headers and considered them characteristic of points west, out in Saskatchewan, perhaps. Farmers in central Saskatchewan, however, had little use for headers. In twenty years of farming just south of Moose Jaw, from 1909 to 1928, Alexander Boan never recalled anyone using headers: “The crops were good enough that we didn’t need a header,” he explained, implying thereby that only a poor farming country required headers. The header country of western Canada lay west of Boan’s land, from Swift Current into eastern Alberta.10

George Hitz grew up just east of the header area of North Dakota, and his recollections showed the capacity of farmers to weigh the merits of the two implements. “My folks farmed ten miles west of New Rockford,” he said. “We always used binders, but at times
they were a headache when trying to have them make a decent bundle when grain was leaning badly or broken down. Durum wheat was bad when put on rich soil like summer-fallow. It practically all lodged down. Some years when the crop was on the lean side, especially barley, there was quite a bit of waste where a header would of been better.” From nearby Cathay, William J. Lies knew of the headers used in “drier territory” but expressed the local sentiment that “to cut with a binder and make bundles was a better process in particular if you got any rain, as the bundles stood upright and would dry out better than if there were just heads of grain stacked.” Use of the straw was another issue he raised: The straw saved from threshing bound grain was good bedding and even feed for livestock.¹¹ (A counterargument, naturally, was that the header left the straw in the field to return organic matter to the soil.)

The testimony of three Kansas natives also produced clues about folk attitudes toward the harvesting implements. Ernest Claassen, born in 1895 in the Mennonite country of Harvey County, Kansas, recalled (and recourse to personal diaries confirmed) that in his youth, his family and all the neighbors bound their grain. It was, however, a matter of local and recent preference; old, unused header barges standing around testified that an earlier generation had used headers. Harvey County was near the border between header and binder country in central Kansas, and evidently preferences there vacillated. Milo Mathews, who was a few years younger than Claassen, grew up around Waterville in north-central Kansas. He recalled that all of his neighbors also used binders, and he, too, thought of the home of the header as somewhere to the west. He subsequently followed the harvest and did custom threshing in the Dakotas; there he saw plenty of heading. Still, he observed, many farmers kept their binders, and in wet years, the header stood idle. A third, western Kansan, Guy Bretz, provided an antidote for the backhanded folk attitude of binder users that headers were machines of the poor hinterland. “In 1915 we had a good crop,” he recalled. “A little too much rain, but I think Father had the largest crew that was ever assembled on one farm. . . . It consisted of 3 headers, 6 barges, 18 men and 30 head of horses and mules.” Header users, in other words, were big-time farmers.¹²

The conservative inclination of many farmers to want both headers and binders available for use, depending on how the grain ripened and if the weather cooperated, was the rationale for the push binder, an implement offered by manufacturers during the 1910s. This was a binder of wide platform (ten to twelve feet), giving it the same economy of scale as the header but also requiring it (as with the header) to be pushed from behind by horses. Richard Goering of McPherson County, Kansas (in the central-Kansas transitional zone between binders and headers), recalled the International
The push binder is used for either binding or heading. This one is on the George Eslinger farm, central Kansas, June 29, 1912. (Halbe Collection, Kansas State Historical Society, Topeka)

The push binder is used for either binding or heading. This one is on the George Eslinger farm, central Kansas, June 29, 1912. (Halbe Collection, Kansas State Historical Society, Topeka)

push binder his father bought in 1914. Hitching six horses (three on each side of the main beam extending back from the platform) with a six-horse evener, the farmer piloted the push binder into the field when the grain was still green but full. As the grain ripened, the farmer would notice the packer arms of the binder shelling out grain and would decide when it was time to cease binding and begin heading. To do this, he removed the binder apparatus—this required only the pulling of four pins—and attached a grain elevator in its place to dump the loose heads into a barge.\(^1\)

The push binder was a response to the needs of farmers in certain transitional areas or times. Other mechanical adaptations, however, were peculiar to areas whose needs were those of extremity, not transition. In the spring wheat areas of the northern plains, there were many big farmers who wanted mechanization to eliminate much of the hand labor associated with binder harvesting but who still considered the header unsuitable. Their grain ripened too unevenly for header harvesting, and, moreover, during a fall harvest it was important to get the grain cut before the snow flew. Many, therefore, embraced the sheaf, or stook, loader to use in conjunction with the binder. Like push binders, sheaf loaders appeared during the 1910s; the
best-known model was manufactured by the Stewart Sheaf Loader Company of Winnipeg. The Stewart brothers shipped their first loader to a farmer at Belcarres, Saskatchewan, in 1910 and subsequently marketed the machine on both sides of the Forty-ninth Parallel. “The Hired Help Takes the Cream Off the Harvest,” mourned advertisements for sheaf loaders, but with loaders there was “No Army of Men and Teams to Board.” Advertisements continually emphasized that manufacturers recognized the special “need” of big spring-wheat farmers and had designed this contraption especially for them. Most sheaf loaders were drawn by four horses and consisted of a platform, or pickup, that scooped stooks up from the ground and an elevator that dropped them into a barge pulled by another team alongside. Some sheaf loaders were combination loader-carriers that scooped and elevated the stooks directly back into their own carrier beds.¹⁴

If the companies producing sheaf loaders got their ideas from ordinary farmers, they never admitted it, but farmers were themselves tinkering with machines along similar lines at the same time. Around 1915 a man named Paulson, near Emerson, North Dakota, devised a shock bucker to carry several shocks at a time to a stationary separator. The Paulson shock bucker was essentially a heavy-duty hay buck, or buck rake, fitted with a frame along the sides to hold the bundles after the protruding buck teeth swept them up. Researchers in North Dakota said that the Paulson machine was “a decided ad-
vance over the Stewart bundle loader, as it supplies the threshing operator with the shocked grain much more economically."  

About three years later, another North Dakotan named Fisher, near Grand Forks, motorized the sheaf loader. He mounted an ordinary hay loader, a pickup device commonly used to elevate loose hay into a rack, onto the front of a motor truck and engaged it to run off the truck engine. On the back of the truck he mounted metal-frame and chicken-wire sideboards to hold a good-sized pile of bundles. He then ran the bundle truck through the grain field, scooping up shocks and carrying them to the separator.

While these men tinkered with devices to complement the binder, others sought to improve the header. The improved models would eventually be known as header stack-barges, or, in the Canadian plains, simply as header barges. At first, however, they went by various names. All were creations of folk technology.

In 1915 a farmer named Winifred Jacobs, near Dodge City, Kansas, built a prototype header stack-barge that he called a stacker wagon. His original idea was to construct a wagon that could be drawn alongside a header in operation and that would accumulate and carry a full-sized grain stack, all without the pitching of harvest hands. Stacks so built could be threshed later in the field.

The Jacobs stacker wagon was about twenty feet long, nine feet wide, and eleven feet high; its bottom sloped eighteen inches to the center in a gentle V shape. Its sides, of wooden studs, ran vertically for about six feet and then angled up and in so that the wheat piled highest in the center. Men
riding the wagon forked the wheat around and tramped it. When the wagon was full, they opened a rear gate and dropped four skids from the rear of the wagon to the ground. Next they drove a stake into the ground behind the wagon, and to that stake they tied a rope that ran under and around the wheat in the wagon. They then shouted for the driver to pull ahead. The result was a well-formed stack on the ground. The outfit was mechanized, with the header and wagon pulled in tandem by a tractor. The stacks, piled high in the center, shed water and kept well until threshing. By 1920 stacker wagons not only were common in Jacobs’s neighborhood but also were used in Rice County, Thomas County, and probably elsewhere in Kansas.

Jacobs’s idea must have been a good one, suited to the region, because not only did neighbors copy it but also other folk inventors came up with roughly the same device independently. Invented in 1913 by two men named Graham and Roach, and used contemporaneously with Jacobs’s model, was a smaller stacker used near Carrington, North Dakota. This region was binder country; thus the implement used to pile grain into the Graham-Roach stacker was a binder with the knotter removed and an extension elevator attached. The stacker was ten to fifteen feet long. A man on top formed the high-centered stack. When the stacker was full, a rear gate opened and the wagon bottom, composed of rods running parallel to the direction of travel, dropped to the ground so that the stack slid off. The stacker was drawn by a team of horses or pulled in tandem with the converted binder by a tractor. Hands followed to tie down the stacks with binder twine run through with a long needle. 19

A folk invention closer in design to the Kansas model than the Graham-Roach stacker was the header barge built by C. W. Hart, near Hedgesville, Montana, around 1918. Used with a header and pulled in tandem by a tractor, the Hart header barge was eighteen feet long, twelve feet wide, and twelve feet high. Its sides were similar to those of the Jacobs stacker, as was its unloading process, which could be completed in fewer than five minutes. 20

In Walworth County, South Dakota, a farmer named Jake Rabenberg in 1926 built a header stack-barge similar to those of Jacobs and Hart. Rabenberg’s model differed from the others, however, in that its rear gates hinged from the sides, which were completely vertical. It was twenty by twelve by twelve feet in size, but his neighbors, who had smaller tractors, decided to build smaller barges as well. 21

Undoubtedly the most fertile, if not the first, field for early header stack-barge invention was the plains of western Canada. Henry Schwindt of Perry, Saskatchewan, said that he began using a stack-barge in 1919. Albertans traced the origin of the device in their province to farmers, particularly a Mr. Hel-lam, near Acadia Valley. As the header stack-barge (called the header barge by Canadians) proliferated in western
Canada, however, its use, surprisingly enough, was to be associated more with the combined harvester than with the header or the binder.²²

Despite the efforts of these farmer-inventors, most grain farmers on the plains accepted the harvesting devices presented to them by implement manufacturers and used them with harvest labor in a generally conventional fashion. Even when they did so, however, it was still up to them to supply, through their own construction, certain additional, necessary devices—that is, bundle wagons or header barges to transport their grain to the thresher or stack.

Seldom were bundle racks intended for bundle hauling only; most were general farm racks, but because bundle hauling was the most intensive use for them, that function heavily influenced folk design. Certainly such was the case with A. P. Murphy of North Dakota, a farmer-thresherman who in 1928 described his bundle racks for American Thresherman. "It seems queer that so many so-called farm racks are made on no particular plan," he remarked. "They are usually heavier than is necessary, far too clumsy, and nearly all require too much labor to load and unload."²³

Murphy then described how his racks were built. They were eight feet by sixteen feet, although other farmers commonly used smaller, seven by fourteen racks. Murphy’s plans were de-
tailed, precise, and aided by drawings—a testimonial to the potential expertise of folk technology. The backbone of the rack, Murphy said, was its sturdy, lengthwise sills of three-by-eight-inch lumber (which projected a little in the rear to hold a feedbox). The sills, spaced with two-by-sixes, were the base for the two-by-six cross-sills. Onto the cross-sills went a floor of "common rough boards not laid tight or matched," showing daylight between. A rim of flat two-by-fours outlined the floor and was bolted through to the cross-sills. From each corner rose four-foot corner posts, which were also bolted to the cross-sills. The front and back walls of the rack consisted of one-by-sixes spaced a few inches apart and nailed horizontally to the corner posts; the walls were then braced by diagonals. Also in the front, bolted to the front cross-sill, was a vertical two-by-six standard piece by which the driver was to stand. A V-shaped cut in its top end served as a holder for lines or as a handhold for the driver climbing aboard. Side boards consisting of one-by-sixes and two-by-fours ran diagonally down from the tops of the corner posts to the midpoint of the floor length. Murphy estimated the cost of one of his bundle racks, eight of which he had used for years, at twenty-five to thirty dollars. An account such as his provided impressive testimony to the folk engineering necessary to complement manufactured machinery.

Fellow North Dakotan William Lies described a shorter, eight-by-twelve-foot bundle wagon. "A rack was always a home made job," he confirmed, with the two rear wheels always a little larger than the two in front. The height "varied depending on what other uses it may be put to," but it was generally four to five feet. The sides, as drawn by Lies, were similar to Murphy's. Down in the binder area of eastern Kansas, F. M. Redpath recalled an outfit of twelve slightly different, slant-sided bundle racks, "eight by sixteen feet at the bottom, and about ten by sixteen at the top." Although most bundle wagons captured in photographs appear unpainted, these twelve were painted—six red and six yellow.

The variation among bundle racks was largely of scale and detail, not of concept, as is evident from the many that have been photographed. This was generally true among header barges, too, although these more specialized devices also differed in material and appurtenances. Typical header boxes were, as a bulletin put it, "built especially for use in heading wheat," not for general farm use. They also were "inexpensive, since they usually [were] made on the farm from cheap lumber; $8 per box probably [was] a fair average cost." Most boxes, the same study observed, were cheap to maintain because they could be fixed with scrap lumber, were unpainted, rested on running gear that could be taken off and used for other things as well, and lasted for about ten years in the dry climate of the plains.

Operators in the header country of Montana refined the header box further for their large-scale operations.
The standard box there, a bulletin said in 1924, was seven and a half by sixteen feet, with slightly spreading sides and a partition in the center that separated the front of the box from the back. At the bottom of each of the two compartments lay a sling, either store-bought or homemade, that was used to unload the spikes (grain heads) onto the stack. The sides of a header box, unlike those of a bundle rack, had to hold loose spikes. Most, therefore, as shown in photographs, were of solid board construction. A few employed wire mesh or netting on the sides, thereby easing the work of the teams pulling them.

The folk artistry exhibited in bundle wagons and header barges emphasized how important it was for agriculturalists to work methodically and well at all tasks associated with binding and heading. Like dignitaries, the binder and the header occupied prominent places in the host of customs and technologies that accomplished the harvesting of small grains on the Great Plains. They were the central elements, the key items of capital that characterized the harvest in their respective technological domains. Upon them, however, there developed networks of tools, tasks, and organizations that completed the harvest. These constituted the culture of small-grain harvesting on the Great Plains prior to the advent of the combine.

The operation and support of a binder in a wheat field required a certain organization of people and tasks.
The vertical staves on the sides of this header barge were a fairly common alternative to horizontal planks. This one is on the Estan Allen farm in central Kansas, July 8, 1912. (Halbe Collection, Kansas State Historical Society, Topeka)

It was essential that the binder be kept running steadily for a long workday, from first light until dead dark; indeed, in the more expansive wheat farming regions it was not uncommon for the binder to operate after dark, a lantern, tied to the whiffletree of the horse nearest the standing grain, providing adequate light for the driver to continue his work. The binder driver had to be skilled and reliable, and working such long days he had to have relief, either through a regular shift change or through someone just occasionally taking the reins to let him rest.

Likewise the horses on the binder in intensive operation needed rotation, although in more relaxed operations one team might work the full day. Ordinarily three horses were enough to pull a six-foot binder at an appropriate speed. Where the ground was soft or hilly, some operators would hitch four horses. A seven-foot binder required four horses for best operation, and an eight-foot binder put four horses to their most efficient use. During the era of pioneer settlement, farmers sometimes used a variety of animals to draw the binder, occasionally even oxen, but once farming operations were better established it proved more efficient to put quality horses or mules on the binder.
Working with the driver and his animals was the infantry of binder harvesting, the stookers or shockers, who picked up and set up the sheaves or bundles. Economists studying harvesting operations during the binder era confused rather than clarified the relation between binding and shocking. The main reason for this was that the economists habitually calculated the labor of both the binder driver and the shocker at the rate of ten hours per day, whereas no such standard days existed, and the expected length of the workday for the two types of labor was different. The binder started at first light, whereas the shockers came to the field later in the morning. The shockers quit sometime around dark, whereas the binder often worked longer. Nevertheless, the studies were adequate to show that the harvest required more shockers than binders; the number varied according to the size of the binder and the work habits of the crew. Usually from two to four shockers supported the binder. The only agency ever to report the combination of horses and men required to accomplish binding and shocking, according to how operations were conducted in the field by farmers, was the Kansas State Board of Agriculture in 1920. Its report of “standard outfits” showed that typically the driver of a binder handled four horses and covered from ten to fifteen acres per day—fewer in the eastern part of the state and more in the western part. The typical shocking arrangement was for two shockers to complement the binder, and their capacity was about equal to that of the binder.27

The product that these men were handling and the tasks in which they were engaged were called by different names in different parts of the plains. The straw and grain knotted together by a binder was most often called a bundle; it was also called a sheave. “Bundle” prevailed throughout the plains of the United States and was common through much of the plains of Canada, which was to be expected, given the preponderance of American settlement in much of western Canada. However, the British “sheave” rivaled “bundle” in usage and probably predominated except in areas where Americans were numerous. The prevalence of “shock” (or “shocking”) and “stook” (or “stooking”) was also determined by settlement patterns. Throughout most of the wheat-growing region, harvest hands engaged in shocking and built shocks. These terms were unfamiliar in the Canadian plains, however, where harvest hands engaged in stooking and built stooks. That “stook” was of Norse and Scottish origin explained why it was current in the Canadian plains and also, considering patterns of ethnic settlement, why it rivaled usage of “shock” in the spring-wheat growing areas of the Dakotas.28

Farmers and agricultural scientists agreed that inasmuch as the binder was a central implement in harvesting, it had to be kept in running order. Farmers and scientists disagreed among themselves, however, about how this
could best be done. The basic disagree-
ment was whether farmers were ca-
pable of repairing and refurbishing a
binder worn by heavy use. Some
agreed with the authors of a Montana
bulletin who said, “Where the farmer
has a large acreage to cut he must have
binders that are dependable. He will
find it more profitable to discard bind-
ers as soon as they grow old enough to
become undependable.”29 Others con-
tended that careful maintenance and
routine repair were within the ken of
farmers, who should be able to use
their binders for years. “The binder is
a more complicated piece of apparatus
than even the mower or reaper,” wrote
an authority in 1918. “Yet by a little
systematic study of the various parts
and the relation to each other, an intel-
ligent mastery of this machine is ac-
quired readily.”30

Those who believed that farmers
could maintain their binders pointed to
the need for beginning long-term
maintenance as soon as the harvest was
over. The binder should be housed, not
exposed to the elements. Immediately
upon shedding the implement, the
owner should prop up the tongue so
that it would not acquire a sag; clean
the cutter bar and probably detach it to
store in a dry place; remove all accu-
mulations of debris, especially vege-
table matter, from the machine’s parts;
and apply oil and grease where
needed. Then, through slack seasons
of the year, the farmer should system-
atically refurbish the machine in prep-
aration for the next harvest. He should
check the alignment of the cutter bar,
not just by eyeballing it but by stretch-
ing a string along the surface. He
should slide his hand down the bar to
make sure that the guards were prop-
erly aligned and would not interfere
with the cutter bar. He should check
over each sickle section on the cutter
bar and on the extra cutter bar and re-
place the bad ones (by shearing the riv-
ets, not by knocking them out). He
should check, service, and, if necessary,
replace bearings, particularly the pitt-
man bearing. He should clean the en-
closed gears and refill them with grease
and graphite and clean and refill the
oil cups. He should preserve the
wooden pittman with linseed oil and
repaint other exposed wooden parts.
He should take off the canvas, check
the alignment of the canvas rollers by
measuring the diagonals between the
ends of the rollers, and put the canvas
back on. He should check and lubricate
all chains. He should test the reel slats
and replace any that were cracked or
sprung. After these and other tasks, he
would still have the most ticklish job—
working over the knotter. Most knotter
adjustments took place under field con-
ditions, but certain bits of maintenance,
such as sharpening the twine knife and
replacing bad knotter parts, could be
done in the shed. The idea was to have
long-term maintenance done long be-
fore it was time to wheel the binder
into the field again.31

Obviously, the time of harvest varied
in localities of the plains with latitude,
alitude, and other conditions from
early May in the far south to Septem-
ber in the far north. What most con-
cerned the individual farmer was how
to tell when he should begin to bind his
own wheat. A good amount of neigh-
bor watching went on, and thus farm-
ers were influenced by one another's
actions; but the great determinant was
the condition of the wheat in the field.
Generally, the wheat was ready to bind
a week or ten days before it would have
been ready to be cut with a header (or,
later, a combine). Color was the first
and obvious consideration: The wheat
should look yellow-white, with no vis-
ible green except in low spots. The
turning of the wheat brought the
farmer into the field to pluck a few
heads and examine the seed. Kernels
of wheat ready for binding would be
starting to harden; they would no
longer be "milky," as farmers put it.
They tested this by pressing a thumb-
nail into the kernels and putting them
into their mouths. One more consid-
eration, particularly with winter wheat,
was the angle of the heads on the
stalks. If the head stood vertical, then it
was not quite ready to bind (or else
there was no grain in the head, which
was worse). When the wheat was ready
to bind, the heads would begin to
bend. Impatient farmers would be in
the field by this time, but others would
wait to make sure that the grain had
full opportunity to fill in the head.
Richard Goering’s uncle used to tell
him when he was impatient to begin
binding that if "you go and look at
your wheat and you think it ought to
be about ready in a day or so, go fish-
ing for three days and then come back,
and your wheat will be ready to go.”

Having decided to bind, the farmer
would road-hitch the binder and haul
it to the field. At the field he would un-
hitch the horses and prepare the ma-
chine for work. This meant he had to
disconnect the road hitching and adjust
it for fieldwork, lower the platform
wheel and bull wheel, make final lubri-
cations and adjustments of mecha-
nisms, and then rehitch the team. He
would then be ready to open the
field.  

Some farmers began with the back-
swath. The back-swath was the swath of
grain that stood closest to the edge of
the field. In some areas, such as most
of the Canadian plains, this posed no
problem because there were few fences
along field edges and few other crops
bordering wheat fields to be trampled;
the binder operator would merely com-
mence cutting the field in the usual
clockwise, round and round proce-
dure, starting from the outside edge,
with the horses walking outside the
field of standing grain. In many other
areas, by contrast, the binder operator
might begin with a counterclockwise
round, with the horses walking
through the standing grain and the
platform extending to the edge of the
field. After this back-swath the driver
would turn around and cut the rest of
the field clockwise. More commonly,
however, the driver would begin by cut-
ting a clockwise round and leaving a
small swath of grain, perhaps six feet
L. G. Brown has just opened a field on his farm in central Kansas, June 29, 1912. (Halbe Collection, Kansas State Historical Society, Topeka)

The binder operator has laid the bundles down properly for efficient shocking on the John Erickson farm in central Kansas, June 29, 1912. (Halbe Collection, Kansas State Historical Society, Topeka)
wide, standing along the edge of the field. He would then turn counterclockwise and cut the back-swath before turning again and cutting the remainder of the field clockwise. While he cut the back-swath, someone, probably a boy, would walk into the standing wheat to the right of the first clockwise swath and toss the bundles that the binder had dropped into the stubble, clearing the way for the driver’s return to the clockwise round. If the driver did not cut the back-swath before proceeding with the rest of the field, the boy would have to hurry to stay ahead of the binder.34

The binder operator tried to lay the bundles on the stubble in a pattern that would make it easy for the shockers to do their work. Early binders dropped single bundles, which were scattered evenly throughout the field; but from the mid-1890s on, most binders were equipped with bundle carriers. The bundle carrier held four or more bundles and released them only when tripped by the driver. The driver intended to leave the piles of bundles on the stubble close enough to one another so that they might be combined into shocks without excessive walking by the shockers. Thus as much as he could, the driver would trip the bundle carrier at about the same points in each round of the field. If he succeeded, the piles of bundles, after he completed the field, not only would be in lines following the progress of the binder around the field but also would be in perpendicular lines stretching from the center of the field to the edges (except that the shockers were probably working in the same field and thus had shocked up the pattern as it was laid down).35

Obviously, as one harvest laborer observed, “no man has a right to point to himself with pride as a binder-operator if all he knows about the job is to hold the lines over four horses.”36 Besides watching where the dumped bundles landed, the driver had to see that he took a “full cut” but did not move over too far to the right so that he left heads standing on the left. He had to regulate simultaneously the height of the sickle and the position of the straw as it entered the binding mechanism. Regulating the height of the sickle ensured that enough straw was attached to each head so that the binder could tie good bundles; regulating the position of the straw as it was bound ensured that the twine would wrap around the middle of its length, not around the end, where it could slip off. This was particularly tricky when the height of the grain varied within a field. Every time the driver adjusted the height of the sickle, he also had to check the position of the twine on the bundles. Beginning binder operators, such as Richard Goering, received little maxims from their fathers: “Regulate your binder according to the length of your straw”; or, one should adjust the reel “so that the reel would hit your full head.” The reel should be low enough to strike each head but not below the head. The binder operator continually checked to make sure that he was tying good bundles. He watched to see that he did
not run out of twine; he watched for wear on the knotter; he watched to make sure that each bundle was tied. He noted the supply of twine coming through the tension rollers: If it was too loose, the twine would snarl; if it was too tight, it would break. 37

Meanwhile, was the canvas running evenly on the rollers? Were there any strange sounds that might indicate lack of lubrication or bad alignment? Even if all appeared to be running smoothly, the binder operator could not get too comfortable on his seat. He had an oil can ready to squirt troublesome parts. There were thirty or more zerks to grease on many binders, and some of them, such as the pittman, had to be greased many times during the day, depending on how dry and dusty it was in the field. 38

The best driver had trouble turning out good bundles if his twine was of poor quality. “Take the matter of twine now,” one laborer complained. “Some folks seem to believe that all they need is a string that will not pull in two every so often. ‘I ain’t buying for style,’ the farmer says.” 39 Harvesters needed good twine of even gauge, and they needed it in quantity; it took two pounds of twine to bind an acre of twenty-bushel wheat, and barley or oats required even more per acre. Most farmers bought their twine from their implement dealers, but they complained chronically about both the quality and the price of the product supplied by these “trusts,” as they called them. Several state governments therefore manufactured their own binder twine, using penitentiary labor. In Kansas in 1914, with estimates saying farmers would need 8.2 million pounds of twine that year and with a private dealer cost of eleven cents per pound, authorities at the state penitentiary in Lansing had ninety men working thirteen hours a day making twine. Still, the prison authorities refused all orders received after March 20 of that year. “Generally,” reflected one North Dakotan, “twine manufactured by the state penitentiary usually ran uniform, more so than twine that was made by commercial companies.” Consequently, farmers would pool their orders early and buy their twine in carload lots from state prisons. 40

A chronic problem with binder operation was the extra power required from the bull wheel to run the knotting mechanism to tie bundles. In most areas where the ground was muddy or sandy, the bull wheel would slip when the binder tried to tie a knot, and an untied bundle would be kicked out. A common folk remedy was to mount a beer barrel on a frame atop the binder. The barrel could be left empty when there were no slippage problems but filled when needed, thereby providing extra weight and preventing the bull wheel from slipping. Another solution, more expensive but also more dependable, came during the 1910s with the advent of Cushman and similar small engines. Farmers in the Red River Valley of North Dakota and Minnesota at least as early as 1904 obviated bull wheel power by mounting small gasoline engines on their binders; in most
places, however, this practice was adopted several years later. During the early 1910s Canadian Thresherman carried many advertisements for Cushman engines to mount on binders. “I sold three of your engines here for binders and attached same,” testified one dealer in Alberta. “They are doing splendid work. The land is so soft that they can’t get their grain any other way.” Goering recalled buying a Cushman engine and disconnecting the bull wheel in 1919 or 1920.41

“The shocking of wheat that has been cut with a binder is universal,” asserted the Kansas State Board of Agriculture in 1920. That was true insofar as Kansas went, but for the Great Plains at large, as a federal bulletin pointed out, the practice of shocking bound wheat was merely “almost universal.”42 Occasionally, the grain being bound was already in the dead ripe stage, and a threshing outfit was on the scene ready to thresh; in such cases, the bundles would be loaded directly onto wagons from the piles on the stubble and threshed immediately. In other circumstances, such as were noted in Montana in 1924, labor shortages could cause farmers to leave bundles lying on the stubble for an extended time without shocking, but this exposed them to serious damage from weather and increased the amount of labor required at threshing time. Occasionally, too, dry bundles might be hauled directly to a stack instead of being set up in shocks. Most bound wheat could not be so handled, however. “An opportunity must be given for the grain to completely ripen and for the straw to dry out before the bundles are stacked, to avoid heating, or ‘burning,’ in the stack,” explained the Kansas State Board of Agriculture. “For a time, while the wheat is in the shock, the sap continues to flow from the straw into the head, resulting in greater plumpness and better quality in the berry. Wheat should stand in the shock not less than forty-eight hours, and would be better for standing as long as ten days before it is stacked or threshed.”43

In the techniques of shocking there developed an accommodation between tradition and environment. One example was the way in which farmers decided the number of bundles to put into a shock. From previous experience outside the plains, farmers had an idea how big a shock should be—usually eight or ten bundles. But when the Kansas State Board of Agriculture surveyed practices across the state in 1920, it found 106 farmers who advocated eight to ten bundles per shock; 97 who favored ten to twelve; 233 who said twelve to sixteen; and a few who believed a shock should contain twenty-five, thirty, or more bundles. The reason for the much larger shocks was the south wind, which dried large shocks effectively and blew small ones around. The farther west a location was on the windy plains, the larger were the shocks. Milo Mathews observed this bit of agricultural geography in the course of his working life. As a boy in Iowa, he made small shocks, eight to ten bundles; however, later, as a custom
thresher in the Dakotas, he saw much larger shocks.\footnote{Another eastern practice called into question by plains farmers was the use of capsheaves atop shocks to turn the rain. To make a capsheave, the shocker held a bundle between his knees or over his leg and spread both ends in a fan shape. Mathews recalled that although some old farmers in northern Kansas wanted capsheaves, they were of little use because the wind blew them off. Guy Bretz said of practices in western Kansas, “We never used a cap sheaf. Didn’t think it was necessary in dry western Kansas.” Richard Goering said only a few of his acquaintances used capsheaves, and many said that instead of turning water, capsheaves held it in the shock. “It wasn’t customary around here at all,” agreed Ernest Claassen. “One year my father was out, and we had started to shock, and he suggested that we try capsheaves. We went to doing that on each shock. And he would sort of break each bundle over his knee so the straw wasn’t stiff and straight there, and turn it over so that both ends hung down. But, especially if it had been dry when we were shocking, the bundles were bushy, and the Kansas wind was working on them day and night, and we only tried that once.” If it did rain on capless shocks—as happened in 1914, Goering recalled—some farmers would just turn them so that they dried.\footnote{To the casual observer shocks of grain were just amber piles, but in each shocker’s mind was a pattern of how a shock should be constructed. The patterns varied with circumstances, of}
Figure 2.3 Sheaf Arrangement in Shock Formation.

course: Thin or thick wheat affected the distance between the piles left by the binder, and the time of tripping the bundle carrier affected the number of bundles in a pile. Despite these constraints, the patterns were clear and persistent enough to be recorded or recalled. The shocker possessed a sense of order, and his product gave him a sense of accomplishment.

This craftsmanship was so taken for granted by farmers, however, that the only agency to document it with any care was the Kansas State Board of Agriculture. The board identified and sketched four patterns for shocks (see...
Figure 2.3). Pattern 1, a “somewhat common but inferior method,” was simply to stand pairs of inward-leaning bundles in a line. Although this position allowed good aeration of green wheat, it also blew down easily. Pattern 2 used capsheaves. The shoker first leaned a pair of bundles against one another. He then leaned another pair into the slot of the first two, and finally four more into the slots (“corners,” shockers would say) between the first four. Two capsheaves made this a ten-bundle shock that stood up well and shed rain.

Pattern 3, a more common type, began, as did the others, with one pair set up. The shocker would then set two more pairs on either side of the first to make a row of three pairs. Last, he would put a bundle in each corner of the row. Two capsheaves made this a twelve-bundle shock. Pattern 4, “perhaps the best” form of shock, was unusual in that it placed the first two pairs of bundles in a four-bundle row. Six more bundles were then laid in the corners; with two capsheaves, this became a twelve-bundle shock, usually set up with its long axis parallel to the binder’s direction of travel. This shock stood wind better than most as well as provided good curing of the grain.

There was more to it than this, however, as old shockers recalled the process. First, there was the question of how to pick up and hold a bundle. Men usually lifted bundles by the twine and carried them in each hand. When setting the starters, however, it was important to plant them firmly on the ground and not leave them tipsy on the standing stubble. The shocker therefore would wrap his wrists and arms around them and even hold them tightly against his body, with the heads up and the butts down, before he plumped them down hard with his body weight.

Ernest Claassen said, “Someone who was really going to shock picked them up under his arms, and then he would come down solidly in that stubble so that it was setting on the ground, not teetering on the stubble.” Then came two more bundles in the slots; then four more in the corners of the first four; then, “if the bundles were fairly handy, you’d set one at each side so they totaled twelve. Shocking the grain that had just been cut and was still a little on the green side would work very nice, the bundles would fit smoothly together. But if it had lain there twenty-four hours in a dry wind, that was stiff and bushy and you really had to push it hard to get that solidly together.”

“I would pick up two sheaves—one under each arm—and place them on the stubble, joining them at the top,” explained Michael Ewanchuk. “Then I would add two more sheaves, two on each side, and complete the operation by placing a sheaf at each end.” If the wheat was green and flexible, he would put on a capsheave. Guy Bretz thought that shocking was “very easy,” but in western Kansas the stubble was thinner and less liable to tip the bundles. He set his starters, laid another pair into the slots, and commenced setting into
the corners until it was too far to fetch more bundles. “The size of the shock depends a lot on how thick the bundles are on the ground,” he noted. “Put them in a straight line [for later convenience in loading] and judge how many you put in a shock so it will be the least number of steps.” This approach was much like that of Texan Ned McKinney, who described his
shock as similar to an “Indian wig-wam.”

Grains other than wheat required special consideration—especially barley, mainly because it was so scratchy but also because its short sheaves tended to slip in the twine. Shockers preferred to handle it with a fork and generally put more bundles into a shock than they did with wheat. Ewan-chuk described the typical method in his area as setting up a first sheave (not a starter pair) and then just ringing this first one with others leaning in. Rye was a different problem, Milo Mathews recalled. With its long bundles, seldom tied at center, the shocker had to carry one at a time, putting one hand around the bundle and one in the twine. For oats, the shocker grabbed the bundle near the head, not by the twine. As Claassen described it, he would then set up a simple line of pairs, as depicted in Kansas State Board of Agriculture wheat shock pattern 1.48

What particularly annoyed serious shockers was to find the loose grain of an untied bundle. They were supposed to gather the loose grain, twist some of the straw together into a band, and use this band to retie the bundle before setting it into the shock. This was just a revival of a skill from the days of the reaper, but the hands considered it good cause to cuss the binder operator. Some farmers, too, were picky about loose grain. “My father had a rule, there should be a string for that loose bundle,” recalled Ernest Claassen. “It may have gotten pushed off the knot-ter, but it should be there, and see whether you can find that. And if you can’t find that, then you would bind it with straw and he showed us how. He could do that very swiftly, he’d seen it done in Germany, so we learned to make straw bands.”

If shocking bundles was full of subtleties, stacking bundled grain was even more so—people commonly referred to it as an art. “Good stacking is an art,” wrote a correspondent of American Thresherman, “and few there be who know it.” When possible, farmers preferred to leave their grain in the shock until threshing time; but sometimes the interval between harvesting and threshing was so long that they thought it necessary to get the grain out of the shock and into the relative security of stacks. Just how long the bundles might remain in the shock without stacking was a matter of discretion influenced by circumstance. Good stackers were scarce, and even if skilled labor was available, the extra step of stacking added to the total cost of harvesting. In Kansas by 1920, therefore, the State Board of Agriculture reported “that a very small percentage of the bundled wheat is put into the stack.” At about the same time, however, the United States Department of Agriculture reported that the stacking of bundled grain was “very common” in parts of North Dakota. Even within particular localities, such as McPherson County, Kansas, another bulletin reported, neighbors differed as to whether they usually stacked their
Stacking of bundles on the Great Plains, when and where it was done, proceeded somewhat more hastily than in the eastern states. In the East, when loading bundles onto wagons from the shock in the field, one man would pitch bundles into the wagon while another in the wagon would arrange them. In the West, by contrast, both men remained on the ground and pitched bundles into the wagon, which was generally somewhat larger than the one used in the East. After the wagon was loaded, both men would ride to the site of the stack, where one man would pitch the bundles from the wagon to the other man on the stack, who would then arrange the pile. A shortage of skilled stackers, however, might alter this ideal pairing.

The first step in stacking bundled grain was to select an appropriate site. This selection entailed a number of considerations, foremost of which was drainage. Many farmers chose high ground in a field for a stack, whereas others put the stacks on sloping ground. The point in either case was to avoid damp ground and standing water. Sandy ground was a better base than black dirt or clay. A second consideration was that some farmers used straw for feeding; thus they located their grain stacks so that the straw stacks threshed from them would be near the feedlot. Finally, other things being equal, the farmer located his...
METHOD NUMBER ONE

METHOD NUMBER TWO

METHOD NUMBER THREE

METHOD NUMBER FOUR

STACKS

THRESHING ENGINE

Figure 2.4 Stackyard Arrangements. Source: Data from Kansas State Board of Agriculture, Thirty-seventh Biennial Report (Topeka: State Printer, 1949–1950), p. 519.

stacks in a place convenient for the threshing run to minimize travel for the threshing outfit.⁵¹

Again for the sake of efficient threshing, it was customary to locate stacks in groups of two, four, or even six. Such a group was called a stack yard, or, to the thresherman, a set (see Figure 2.4). If just two stacks were set together, they would be long, oval ricks extending north and south and spaced so that the separator could just be pulled between them at the north ends, but with more room at the south ends.
If four round stacks were in the stack yard, they could be placed according to one of two plans. The first was to set up two closely spaced stacks east and west, as if they were to be the only two in the stack yard. Next, two additional stacks would be added to the south of the first pair; the second pair would be lined up east and west but farther from each other than the first pair. This second pair would, however, be quite close to the first. This trapezoid pattern was designed to give the engineer room to manipulate the angle of his belt on the separator. The second way to position a group of four stacks was to set them as the corners of a square, all of them far enough apart to admit the separator between them. Then the separator could be pulled up to any two of the stacks on either an east-west or a north-south alignment. If six stacks were to be in the stack yard, they would usually be set as the corners of a square, all of them far enough apart to admit the separator between them. Then the separator could be pulled up to any two of the stacks on either an east-west or a north-south alignment. If six stacks were to be in the stack yard, they would usually be set as the corners of two triangles. The adjacent, parallel sides of the two triangles would run north and south, and between the two stack-triangles there would be enough space to pull the separator on a north-south alignment and to manipulate the angle of the belt a bit. (The six-stack yard was unpopular with threshers, however, because the distance between the outside stacks made pitching bundles to the separator difficult.)

A stack of bound wheat viewed from above was usually round because that shape afforded the greatest storage space in the stack for the amount of surface exposed. Viewed from the ground, the stack was shaped like a mushroom, bulging out a few feet off the ground and tapering to a point at the top. The taper and the bulge were designed to shed water off the stack and away from its base.

The achievement of such a design, although commonplace throughout binder country, was such an intricate process that it taxed the powers of description. Farmers and laborers could build such things, and they could teach others to build them by example, but they could hardly explain in the abstract how to do it. Adequate description was almost beyond even the best writers of agricultural bulletins and periodicals. Professor S. E. Salmon of Kansas State Agricultural College was among those who tried. “One of the best ways to start a round stack is to begin with a shock in the center,” Salmon began. “Then keep adding to the shock by placing bundles in rows leaning against the shock, each succeeding row becoming flatter than the one preceding, until the outer row lies almost flat, but still overlapping, so that none of the heads touch the ground.” At this point the outward-pointing butts of the bundles formed a circle of twelve to fourteen feet in diameter on the ground.

Salmon continued: “In stacking the second layer begin at the outer edge, laying the first row of bundles on top of the outside row of the preceding layer, butts out, at the same time laying a row inside the butts overlapping the outside row. The stacker walks on the second row, laying bundles ahead of him until he has gone around the
stack. When he completes this round he lays a third row, with butts overlapping the second row as before. From this point until he reaches the center of the stack he lays only one row at a time." Stepping on every bundle except those on the outside perimeter was not just a matter of convenience. The bundles had to be packed down solidly at the middle of the stack; otherwise the stack would settle in the middle and the taper at the top would be lost.

"The third layer is much the same as the second except at this point the stacker may begin to push the bundles out a little to get the bulge in the stack," the professor continued. "The stacker may find at this point that he will have to add extra bundles to the center of the stack in order to keep it full. The center must always be full enough so that the bundles lying against it are always sloping downward." Tramping in the center of the stack lowered it, necessitating those extra bundles to keep it high. The desired downward slope of every bundle in each layer was to help direct water out that might penetrate the stack as it went down.

Salmon was not adept at explaining how the stacker "pushed out" the bundles to make the bulge in the stack, or how he "drew in" the bundles to make the taper; instead he skipped to the end of the process: "When the stack is finished the top bundles must be fastened on. This is often done by taking two or three pointed sticks about 6 feet long and running them through the top bundles into the stack. These sticks are notched at the top and the top bundles are tied to them." Salmon then figuratively backed away from the stack to check its contour: "A stack which slopes uniformly on all sides of course looks better than one that does not, but of greater importance is the fact that if one side slopes more than the other, or is drawn in more quickly, the stack settles unevenly and the bundles on one side may collect water instead of shedding it." 

Salmon described the ideal stack well, but, of course, local and individual practice varied. Round stacks ranged in diameter at the ground from ten to thirty feet, although the most common sizes were twelve, fourteen, and sixteen feet. Stacks of standard size contained from one hundred to one hundred fifty bushels of grain. It took anywhere from six to twelve bundle-wagon loads to make such a stack. Most stackers did not use the number of sticks Salmon had mentioned for anchoring the top bundles; they used only one stick per stack. A minority, instead of topping the stack with bundles of wheat, used bundles of grass.

An eastern Kansas farmer named M. H. Heberling also tried to describe the stacking process in writing. He began largely as had Salmon but then varied somewhat after positioning the ground layer. "The next step is to lay a single course around the outside, keeping the butts just off the ground, thus making the bundles lie nearly flat," Heberling specified. "In this operation the stacker works on the stack and uses his
fork to place the bundle, and steps only
on the heads of the bundles he is lay-
ing.” The second layer continued with
the stacker putting down a “double
course” of bundles. “In laying a double
course the stacker should lay the
bundles side by side and then break
joints with a third, and keep this up
until he gets around the stack. The
stacker should step only on the second
or inside course, as this will keep his
weight off the edge of the stack.” If the
straw was slippery, it would not stay in
place well without other bundles on top
of it; in such a case, the stacker should
lay a triple course where possible. “In
laying a triple course the stacker
should step only on the third course, as
this will allow a large bulge without
danger of slipping, even with the driest
and most slippery straw.” The problem
with the slippery straw was that as the
stacker pushed the outer butts farther
out to make the bulge a few feet above
the ground, the bundles, because they
sloped outward, would continually slip
farther out than he intended.

As the stacker positioned his courses
where he wanted them around the out-
side, he could proceed to lay bundles
toward the center, “care being taken to
tramp around thoroughly to locate soft
spots,” for where there was a soft spot,
“it should have as many bundles as nec-
essary tramped into it to make it solid.”
Putting the bulge in the stack was a
ticklish operation. Heberling cautioned
that because the stack would settle with
time, the bulge should be started fairly
high off the ground, about five bundles
up. The sixth course of bundles, then,
should be set out on the edge about six
inches. Another consideration arose at
this point: Each bundle on the butt end
had a long side and a short side; be-
cause of the angle of cut on the binder,
the straw on the butt end was a bit
longer on one side. The long side of
the butt should be laid up while mak-
ing the bulge. “It is a good idea to get
down and look the stack over several
times while putting on the bulge,” ad-
vised Heberling, to get the right pro-
portion and to ensure “a good-looking
stack.”

After creating the bulge, the stacker
commenced “drawing in” the stack.
This part was easier: “Having built the
bulge, the most difficult and important
stage is past, and the rest of the stack
will be harder for the pitcher [than for
the stacker] because of the increasing
height, and easier for the stacker be-
cause he can look down the sides of the
stack and see how much it is coming
in.” As the stacker did the drawing in,
he laid mostly single courses of bundles
long side up. He kept the middle well
tramped and at the same time gradu-
ally built it higher than the outside
courses with extra bundles. Thus the
bundles more and more sloped to the
outside to shed the rain.

Nearing the end of this task, Heber-
ling continued, the stacker had to take
care that the slope on all sides was the
same, or else the stack would settle un-
evenly. If he saw one side developing
differently from the others, he should
take a ladder
When the stack gets too high for the pitcher on the rack to reach, the stackers will top it off and descend the ladder. Peter U. Schmidt stacking on his farm in Marion County, Kans. (Courtesy of Franz Goossen)

on it, and use his hands to push bundles around until they aligned. At last the stacker stood atop the completed stack and thrust in the tapered stick that had been tossed to him by the pitcher. He should absolutely not slide down the stack to the ground. Instead the pitcher should place against the stack a ladder as tall as the stack itself, down which the stacker could climb, being careful not to disturb the top bundles.  

Joe M. Goodwin, a county agent from eastern Kansas, provided instruction that was similar in most respects to that of Salmon and Heberling. He provided two additional admonitions, however. The first concerned topping the stack. Goodwin noted that many farmers, instead of using pointed stakes, threw strings or wires over the top of the stack and hung weights from them. Goodwin said the weights ought to be poles, not rocks, because heavy rocks tended to sink into the sides of the stack and not anchor well. Goodwin also pointed out the key role of the pitcher in making it “either easier or hard for the stacker. He should be able to place his bundles accurately at the side of the stacker and in the position desired by the stacker.”
Ernest Claassen recalled the stacking of bundles as something his father would do when few threshing machines were yet in the neighborhood. He did it himself, too, but only for two years when the threshing machine was particularly late getting to his place. “I had watched my father stack, and the bank here put out a circular giving some instruction on it, and that was an art in itself,” he said. His stacking methods conformed largely to those of contemporary writers, but his recollections gave hints about why stacks assumed the dimensions that they did. The diameter of a stack, he said, was about the length of a bundle wagon; the diameter derived from the convenience of pitching from the bundle wagon. The height of a stack likewise was simply as high as a man could pitch with a fork. Claassen topped his stacks with strings and weights.

When Richard Goering stacked bound grain, he departed from the common round form. He began a stack with a long shock of some sixteen bundles. From this shock he laid out courses, resulting in an oval stack. The bundle wagons came first to one side of the stack and then to the other. Atop a stack, he recalled, some farmers put a few courses of bundles with the heads out because they believed it would shed water better.

The concern over building stacks of bundles highlights the elaborateness and sophistication of the harvesting folk life attached to the binder. The folk life associated with the header was, by contrast, not so elaborate. This was to be expected, inasmuch as the header was by definition a labor-saving device meant to cut down and simplify the job of grain harvesting. Still, header harvesting assumed its own patterns and place in regional culture.

A header outfit was a big operation. One man drove the header, which commonly was either a twelve-foot or fourteen-foot machine. The twelve-foot was usually pushed by six horses, sometimes eight, standing in traces alongside a fourteen-foot beam that extended back from the platform. Fourteen-foot headers generally required eight horses. One man drove the header barge while another stood in the back, arranging the grain as it fell from the header elevator. Each header barge was drawn by two horses. There would also be at least one other man—more often two—doing the stacking. So a header outfit entailed at least six men and ten horses and frequently more of each. Operations that employed more than one header obviously were considerable matters of organization. A variation in the scheme of labor for multiheader outfits was to have the man who rode the header barge also arrange grain, switching from one barge to the next as they pulled under the header elevator; the man who stayed at the stack would serve as a spike pitcher for every load that came. In 1920 the Kansas State Board of Agriculture reported that the average header outfit in the central part of the state harvested seventeen acres in a ten-hour day, whereas the average in the western part of the state...
was twenty-two acres. A Montana bulletin in 1924 said that a typical header outfit in that state could handle about thirty acres a day. The differences in the figures stemmed from the heaviness of the grain.57

Like binding, heading had specialized terminology. It was common to refer to loose, headed grain as “spikes” and to a man who pitched it as a “spike pitcher.” A stack of headed grain might be called a “stack,” but because such stacks often were elongate rather than round, many people called them “ricks.” The differences in terminology for heading were not as pronounced, however, as were those for binding.

Some concerns about the header were quite similar to those about the binder, including general maintenance (except that the header, of course, used no knotter). A difference at the outset of harvest, however, was at what point the grain was considered ready to harvest—it was later with the header than with the binder. Guy Bretz said, “Break a head off and rub it in the palm of your hand. If it’s ripe, it will thresh out easily and the grains will be hard.” The Kansas State Board of Agriculture in a survey found 375 farmers who agreed that they began heading when “the grain was fully ripe, mature and hard”; 122 said they began heading when the grain was “dry enough to stack without heating”; 55 began when they thought that “the majority of the heads were ripe”; 23 began with the grain “in the
tough dough stage”; 9 were willing to start “when the heads turned yellow but the straw was still somewhat green.”

Inasmuch as headers operated largely in open country, header drivers had fewer concerns with transportation and setting up than did binder drivers, but the large scale of the task facing them required a certain amount of geographic organization. The wheat fields of header country often were so large that they had to be subdivided for heading, or else the distance from the heading operation to the stacking site would be too great. The acreage of grain put into one stack yard was called a land. Facilitated, no doubt, by the rectangular parameters of section, quarter, eighty, and forty and unencumbered in many places by natural obstructions, farmers' folk conceptions of lands for heading were at least geometric, if not aerial, in perspective.

The Kansas State Board of Agriculture gathered information on how to "lay out" a land, which "brought out a diversity of opinion." The majority of respondents tried to lay out a land large enough to yield enough wheat to build two stacks. Some wanted larger lands with four stacks in a stack yard, but this was unwieldy if the grain was light, because it would necessitate long trips with the header barges. Some farmers gave ideal dimensions for their lands, such as twenty-by-eighty rods or forty-by-eighty rods, and others stated a range in acreage from ten to thirty. All this depended, too, on the shape of fields and the yield of grain. Unusually, however, the farmers stacked headed wheat in the field where it was cut. Just where in the field was debatable, but the great majority said that they placed their ricks at either end of a larger land; others planned ahead so that one round of the header would make a barge load, thus rendering the exact placement of the yard less relevant; and a few tried to make things easy for threshing by locating all their ricks in the middle of a quarter section. The great majority put two ricks to a stack yard, although four ricks to the yard was fairly common, and six was the practice of a few. Another name for a stack yard of ricks was a lot.

Patterns unrecorded in the statistical efforts of the Kansas State Board of Agriculture emerged clearly from a bulletin by the Montana Extension Service in 1924. It noted two basic patterns of heading, the "circular system" and the "divided strip system" (see Figure 2.5). In either case a rule of thumb was that forty acres of medium grain was about the proper size for a land.

In the circular system the header driver first cut his way to the center of a square land. Then he commenced cutting a circle outward from the center, proceeding counterclockwise until he reached the edge of the land. He never had to stop or slow down for corners; the only stops he made were when changing header barges. When he finished his circle he still had triangular corners standing at each corner of the land, but he left these until later. Most of the corners adjoined similar corners of other lands and therefore
CIRCULAR LAND

Grain cutting begins in the center and continues in an ever widening circle. Corners are cut separately.

DIVIDED STRIP LAND

Fields A and B have greater length than is depicted. Barge exchanges can be either north or south of the stack yard.

formed diamonds or parts of diamonds that might be cut out fairly efficiently later. The stack lot was formed, or "raised," at the center of the land.\textsuperscript{61}

In the divided strip system the header driver first cut his way around a long, rectangular land. After rounding the land he cut a couple of swaths directly across the narrow middle of the strip. These swaths in the middle were the spaces in which the stacks would be built. This done, the driver resumed circling the entire land clockwise. If he had laid out the land properly, a trip around one half of it should produce a barge of grain. Thus a header barge would pull under the elevator of the header and stay with it from the cross-cut strip halfway around the land back to the other end of the cross-strip. Hitting the cross-strip at this point, the header ran empty for a few feet. This gave the opportunity for the full barge to veer off and an empty barge to pull under the elevator without the header stopping or losing grain. The full barge had only a short distance to travel to the stack lot and then, empty again, from the stack lot to the other end of the cross-cut strip, where it resumed its progress under the elevator.\textsuperscript{62}

The little seat of the header driver atop the rear beam was no place for idle contemplation of the geometry of the lands. He had quite a few technical details to take care of. He generally steered the outfit either with his feet on a wheel underneath the beam on which he sat, or sometimes with his hands on a tiller. He had reins on the horses, but they needed little guidance; they knew where they were going. As the bull wheel of the header, some fourteen inches wide, smashed down a strip of stubble, one of the inside horses would find the strip and follow it. "After two or three rounds, the horse got the idea," recalled Guy Bretz, "so the driver wasn’t needed very much except at the ends turning the corners." This
The seat of the header driver, with a tiller to steer by turning the rear wheel, at the Terning Steam and Gas Engine Show, Valley Falls, Kans., 1981. (By the author)
was good because the driver needed to keep an eye also to the left, where the grain was falling from the elevator into the barge. He had to cooperate with the driver of the barge to deliver the grain at the right place. Ideally, by speeding up and slowing down slightly, they worked to deliver the grain in layers front and back without forcing the man in the barge to step on the grain too much.63

The other two main concerns of the header driver were the regulation of the height of the cutter bar and the smooth running of the canvases. He sought to cut just low enough to get all the grain but as little straw as possible. If the grain was lodged, he had to drop down and take more straw than usual. As for the canvases, the header had them not only on the platform but also on the elevator. The driver had to watch for a torn canvas, in which case the header had to be stopped immediately or the loose chains would damage other parts. He checked the canvases in the morning before starting and whenever he stopped. At quitting time in the evening, he took the canvases off and rolled them up to stay dry. Otherwise the dew would dampen them and cause them to shrink; then, after the header had been running a while they would stretch out again and require a halt in operations for tightening.64

Handling the header barge while it was receiving grain from the header was less ticklish than driving the header itself. The barge driver kept eye contact with the header driver and reined in or clucked up his horses to see that the grain was delivered to the right place in the barge. The man in the back of the barge forked the grain around as necessary and tried to avoid stepping on it too much while also trying to avoid bumping his head on the elevator. As the barge filled, he rounded out the top of the load. If the barge was close to the stack yard, the men did not try to load it too full; if it was far, however, they piled on the spikes until they got closer.65

The hard work for these fellows came when the barge was full. The driver quickly piloted the barge along the opposite side of the stack from where the previous barge load had been unloaded. He then joined the man in the barge, and each took up his fork. The man on the stack told them where he wanted the spikes pitched. The men in the barge pitched together, inserting their forks into the spikes from opposite directions and heaving them onto the stack. Again, they were supposed to avoid stepping on the grain.66

As for the man on the stack, he was, Guy Bretz said, "the most important man out there. The ripe wheat is very fluffy and if not handled right will slide out to one side or the other or possibly a corner slide out, especially if bumped by the corner of the barge." Particular farmers took this job for themselves. "We only needed one stacker, my father took care of that job," recalled Bretz. "He was an expert at stacking wheat, and learned how by experience.
Keep it as solid as possible in the middle, by walking back and forth and the sides will take care of themselves, with just a little stomping.” At this point, the spikes required a bit of tramping, but only so much as was necessary to make the stack solid enough to stand.

A typical rick of headed grain was twelve to fourteen feet wide, twenty-eight to thirty-two feet long at the base, and as high as the spike pitchers could throw. If the wheat was not thoroughly hard, many thought it better to cut down the dimensions of the stack one way or another. Milo Mathews recalled building a smaller rick about six feet by fourteen or sixteen feet at the base, then spacing another rick five or six feet away from the first. This was to permit better circulation and drying of the grain. Richard Goering dealt with the same problem by building long stacks some thirty feet long and ten feet high but as narrow as they could be built and still stand. He recalled doing this in an extremely wet year, 1919 or 1920. Any stack or rick was tapered from about eight feet off the ground to the top. Finally, the rick was topped off with wires or cords thrown over it and stones or poles suspended from them.67

A few farmers in Montana used slings and derricks to elevate spikes from the barge to the stack. This required a header box divided in half crosswise with a partition. A rope sling was spread across each of these halves. The sling was constructed with two-by-four slats to keep the ropes or chains of the sling in place. The release of the sling (the trip) was in the center so that the load would drop squarely on the stack. Some farmers made the slings themselves; others purchased them from hardware or implement dealers. Derricks and haystackers mounted on
wheels were then used to drop the
sling loads onto the stack. This method
increased the work of the man on the
stack but reduced the need for spike
pitchers. 68

In connection with the stacking of
wheat, either bundled or headed, there
developed an elaborate myth focused
upon what was called “the sweat.” Ele­
vator operators and millers were great
believers in the sweat, a special process
curing grain that produced consider­
able heat. They knew that threshed
grain stored too green or too wet in the
bin would heat and be “bin-burnt.”
They reasoned that green grain also
went through this process in the stack
but that there the bulk and space of the
straw provided enough circulation to
prevent the heat from doing damage—
unless the crop had been stacked so
wet that it became “stack-burnt.” Wheat
left in the shock and never stacked,
however, was never piled in enough
concentration and bulk to promote the
special curing associated with heat.
Such curing was potentially dangerous
in the bin or in a too-wet stack, but
under proper stacking conditions, it
improved the quality of the grain by
safeguarding and even restoring the
color of the berry, bringing down the
moisture content, and increasing the
test weight.

The phenomenon of the sweat re­
ceived serious treatment in a circular
issued by the Bureau of Plant Industry
in 1910. “Millers, as well as operators
of country and terminal elevators, pre­
fer wheat that has gone through the
‘sweat,’” wrote Leslie A. Fitz. “The millers invariably hold that sweating of the stack improves weathered grain and is much to be desired.” Unfortunately, however, little was known as to exactly what constituted this process of the sweat: “Very little information concerning it can be gleaned from scientific literature,” said Fitz. Perhaps, he speculated, there was present in the straw enough plant food to continue for some time the maturation and growing of the kernels, and thus “a chemical or enzymic action within the plant by means of which this nutriment is transferred to the grain and stored as starch may continue for a considerable period. When wheat has been thrashed before going through the sweat, it is probable that a rearrangement of the chemical constituents of the kernels still takes place, and this will account for the sweating of shock-thrashed grain in the bin.” The chemical action produced heat, and “this may account for the heat usually generated during the sweating process,” which was also related to the percentage of moisture present in the grain. “Wheat cut in the hard-dough, or containing considerable moisture, goes into the sweat much more quickly when stacked; straw becomes very tough and a great deal of heat is involved.”

Despite this shaky prologue, Fitz went on to test samples of wheat threshed from the stack, which, he reasoned, had gone through the sweat in proper fashion, as well as samples threshed from the stook, all the wheat coming from the same place in North Dakota. He concluded that the stacked wheat had better color; tested better for moisture and weight; stood up better under milling and baking tests; and generally was liable to be graded a level higher than stook-threshed wheat. Whether these differences derived from the sweat or simply from the stacked grain’s being better protected from the weather remained unclear.

The Kansas State Board of Agriculture also devoted attention to the phenomenon of the sweat. It asked O. P. B. Jackson, a railroad and warehouse commissioner in Minnesota, whether he agreed with the folk belief that the sweat constituted a “fermentation” in the grain. Jackson replied that it was not fermentation but rather a benefi-
cial process that improved color and lowered the moisture content of grain. His wording was such that it was unclear whether he truly believed in the sweat phenomenon or whether he merely favored stacking on general principles. A chemist from the United States Department of Agriculture, J. A. LeClerc, told the board that sweating “is intimately connected with the life processes of respiration” and was not merely a matter of drying out. He regretted that he was “unable to offer you a conclusion that is warranted by tests and shared in by those who have investigated the phenomenon. I know of no work that has ever been done which will justify definite conclusions.” But he was willing to venture that he did not “think it [sweating] is a fermentation in the usual sense.” A biochemist from the University of Minnesota, C. H. Bailey, characterized the sweat as “after-ripening” and offered the unorthodox opinion that the grain went through more of a sweat in the shock than it did in the stack. Finally, E. F. Ladd, president of North Dakota Agricultural College, characterized the sweat as “a result of enzymic action that is continued in the kernel. When the wheat is placed in the stack conditions are favorable for this sweating to go on, and wheat so treated and allowed to pass through the sweating state produces a superior bread-producing flour.”

The Kansas State Board of Agriculture, determined to discover the truth about the sweat, queried farmers and then announced, “It is customary for farmers to allow wheat to remain in the stack until it has passed through the sweat before threshing.” This practice the board attributed to the “generally accepted belief that sweating improves the quality of the grain”; however, farmers disagreed on how long grain should be left in the stack so that it might sweat. After all its inquiries of authorities and farmers, the board concluded that “this investigation developed no definite information as to just what takes place in the berry while it is going through the sweating process.”

Thus even though the sweat was much talked about and much written about, it remained dubious whether farmers truly believed there was such a thing. William Lies of North Dakota, for instance, was familiar with the term but thought of the so-called sweat as no mysterious process. “That is merely a drying process it goes through,” explained Lies. Ernest Claassen recalled, “There was talk about it, it needed to go through the sweat. I never was sure what the process was supposed to represent or whether it was necessary. At least I didn’t worry about the sweat.” Perhaps, then, the myth of the sweat arose mainly from the wish of elevator men and millers that farmers should practice good stacking.

Regardless of the merits of the sweat, it was obvious that there developed around the main implements of harvesting—the binder and the header—numerous customs, beliefs, terms, and techniques that in their broad com-
monality constituted a culture of harvesting on the Great Plains. There was variation from locality to locality, from individual to individual, from time to time, but such variation merely showed that the culture of harvesting was a folk culture, interacting with the environment and evolving through time. It was based on the high harvesting technology of the time, on existing machinery, but it prospered through tradition and example. As tradition, it was to continue until basic changes occurred in the machinery upon which it centered.