While giving a marvelous account of building three cattle guards in southwestern Texas in the mid teens, William M. Jolly of Clifton, Texas, said: "There is one thing for sure. You will never find out who built the first one." In studying folklore, one is conditioned to expect obscurity of origins. Yet that does not mean that an inquiry into origins will necessarily prove fruitless. On the contrary, the search for the first cattle guard has unearthed some fascinating information about its history and about life and times in range country in the early twentieth century, information that might otherwise have been lost.

Printed references to early-day automotive cattle guards are rare; I have found only a half-dozen that predate 1920. Patent records suggest that only four highway cattle guards (three automotive, one for horse traffic) were patented before 1920. Because of the paucity of documentary evidence, most of the information about cattle guards from this period has come from oral history and thus ultimately is dependent upon the frailties—and strengths—of human memory and recollection. As a consequence I have had to be very careful in sifting evidence from the stories and accounts that I have collected. I do not think that anyone has deliberately tried to mislead me, but more than once I have been reminded of the fragility of human memory when informants have placed automotive cattle guards on roads a dozen years before automobiles existed on those same roads. For the most part, though, the recollections that have been passed on to me seem to be reasonable and of honest intent, and many have been corroborated by other evidence as well.
The dates most often given for the introduction of the first cattle guards into any given locale range from 1912 to 1915, or, as most respondents put it, just after automobiles began to be used with some frequency in their areas. In some places this date would be later—well after 1920—while in others it would have been earlier. The earliest cattle guard that I know about was in place at least by 1907, perhaps as much as two years earlier; but accounts of pre-1912 cattle guards are rare. I believe that 1905 is the likeliest date for the first automotive cattle guard.

Another valid conclusion from this study is that the Great Plains is the home of the automotive cattle guard. The special conditions on the plains—the mix of small and large ranches and farms, of oil, of wheat, of cattle—and the advent of barbed wire and cars served as a catalyst to produce the cattle guard. Conditions in other rural regions of the country failed to result in the production—or reproduction—of cattle guards until some years later. Of the forty-odd references to and accounts of pre-1920 cattle guards in my collection, only four lie beyond the boundaries of the plains—two to the west, one to the southeast, one to the east. Even if it were to be proven that the first automotive cattle guard had been invented outside the boundaries of the Great Plains (as were, for example, barbed wire, the sod house, and the six-shooter), still its major initial development is so clearly and firmly associated with the plains and its special technological properties are so appropriate and adaptable to conditions on the plains that the cattle guard must be considered an aspect of Great Plains folk life, an essential part of the Great Plains cultural milieu.

The urge to avoid gates began early on the Great Plains. During the late nineteenth century at least three attempts were made to design highway cattle guards for horse-drawn traffic. The least successful of these cattle guards, which was made entirely of earth, has been described by C. W. Wimberley of San Marcos, Texas, based upon an account given him by his father, Rufus Wimberley:

The first attempt to devise a cattle-guard in this area took place at a site some two miles from San Marcos on the Old Wimberley Road during the late, late 1890's. As is often the case, the name of this creative genius has been lost to time and it is just as well.

From logic that only he could fathom, he figured that a steep barrier in the middle of the road would serve to stop and turn livestock. So, he set about to fill one side of the road with a long slope gradually rising from ground level to the height of three or four feet, then dropping back to ground level within a distance of about four feet. Parallel to and at opposite hand, he filled the other side of the road with another slope.
Needless to say, cattle paid no heed to this cattle-guard, but a short-fused teamster did. One run through this cattle-guard and on his return trip, he skirted it, and cut a hole in the fence to create a new bend in the Wimberley road that remained intact long after the reason for its existence had been forgotten.

The logic behind this early attempt to turn cattle without using gates is valid, for livestock will try to avoid a pit or a sharp-walled ravine. Moreover, it is similar to the open-pit cattle guard used by the early railroad builders. Unfortunately, a man-made pit that would be effective against cattle would also be a barrier to either motorized or animal-drawn vehicles.

A more successful type of highway cattle guard was used in the Gypsum Hills between Medicine Lodge and Coldwater, Kansas, in the 1890s and early 1900s. Three of these guards were on the ranch where W. C. Mills has lived since his birth in 1897, and others have been found on the stagecoach road that connected Coldwater, Deerhead, Sun City, Lake City, and Medicine Lodge. According to Mills, these guards were made by sawing three two-by-twelve-inch-by-six-foot boards into a gentle curve, placing them on edge straight side down, and nailing two-by-sixes onto them in order to make a kind of bridge. These cross boards were then placed on the frame so that there was a space of about one and one-half or two inches between them. This guard would turn cattle and range horses, but it could be driven over with a horse and buggy or ridden over on horseback. A loaded wagon was too heavy for the structure and had to be driven through a gate at the side where cattle could also pass through the fence. According to Mills, much of the old stagecoach road had been fenced in with barbed wire by the time the wooden guards had rotted out; thus there had been no need to replace them. The places that did require gates were fitted out with automotive cattle guards during the teens. Most of the older guards were gone by the time the first cars were introduced into the Gypsum Hills, but at least one of these stagecoach cattle guards had been adapted to automotive traffic and was being used as late as 1918, according to Thomas W. Winkler.

The earliest known of the preautomotive highway cattle guards was one built in 1881 in Archer County, Texas. The Henrietta and Archer City Stagecoach Line was established in that year, and in its run from Henrietta to Archer City it encountered, on the Ikards’ 75,000-acre O Circle Ranch, the first barbed-wire fence built in the county. Instead of by gate, the stagecoaches crossed the fence by a wooden-plank bridge that arched over the fence. Because of the height, this guard would have been even more forbidding to cattle than were the ones on the stage route from Medicine Lodge to Coldwater, and probably the teams crossing the guard found it equally forbidding. As Jack Loftin noted in his book *Trails through Archer*, “This must
have been quite a chore to get horses and mules to travel up and over this cattle-guard-bridge." The stage line and the cattle guard were abandoned in 1908 when the Henrietta and Southwest Railroad was completed.

A wooden bridge, especially if it is arched, is a structure that range livestock seem to avoid instinctively, a circumstance that observant stock handlers have been quick to notice. Green D. Wyrick, for instance, who was reared in southwestern Missouri, has said that wooden bridges over Ozark ravines that were built for either foot or automotive traffic had the extra advantage of keeping cattle at home, although they were not intended for that purpose. In western Texas this principle was also used in some of the earliest crossover highway cattle guards, some of which were modeled after a bridge near Knickerbocker. William Jolly has told this story about the prominent pioneer Texas sheepman Joseph Tweedy:

In about 1908 there was a man [who] bought a bunch of land about 30 miles southwest of San Angelo on a draw called Dove Creek. He put up a store there and as the talk went at that time, gave Mexicans all they could make or raise on a piece of that creek land, provided they did all of their trading at his store. He got a post office there and called it Knickerbocker.

There was a road ran right by the store, and big herds of cattle came right through there in the fall going to San Angelo for shipping. So Mr. Tweedy (I believe that was his name) had to lane the road through his part of that road to protect his farmers.

Then he had a lot of land left above the road with no water on it. So he built a bridge over and across these two little side draws high enough for cattle to cross under and go to the creek for water. He pulled his lane fences in at the ends of the bridge and tied them to the bridge. That forced all cattle herds to cross this little wooden bridge just wide enough for two wagons to pass each other. Now you drive about seven to nine hundred range cattle up to a bridge like that and all you do is after the cattle tear the fence down on both sides of the lane is to get them back together on the other end of the bridge.

In the early trials of cattle guard designs there were a few people who put up a kind of cross-over much like the cross-over at Knickerbocker. They would simply bridge over the fence and stock just didn’t like to walk up and over.

The first patent for a highway cattle guard was filed by William W. Brian of Woodsboro, Texas, on 21 December 1915. This guard, which was intended for horse-drawn traffic, was modeled after the wooden-plank bridge, but was flat rather than arched. Instead of crossing over a fence, it was designed to double as an actual bridge, spanning a stream or a ditch. It was made of six movable planks (about two-by-six inches in size) that stood on
edge in order to turn aside cattle. The planks were hinged to the base of the bridge and were all connected to rods that extended several feet down the road in each direction. These rods were connected to handles that could be pulled by the approaching traveler in order to lay the planks flat, thus forming a solid surface. Once the traveler had crossed, he could pull the rod on the other side, and the planks would return to their vertical position.

Well before this patent for a horse-traffic cattle guard was filed, however, the first automotive cattle guards were being used throughout the Great Plains. Information about them is sparse before 1912, the year when reports become relatively common. Bill King, now of Kim, Colorado, was a member of the well-known family of rodeo producers and contestants who helped start Garden City’s Cattlemen’s Carnival, one of the nation’s largest professional rodeos, in 1912. In 1909, when he was five years old, his family moved from Plains to Garden City, Kansas. One thing that impressed young King at the time of the move was a homemade trough-type cattle guard, which he reports having seen near Garden City: “They were just two wooden troughs spaced the width of a car with a hole in the middle. Then they would put an old dried cow hide in the center, and the cattle wouldn’t jump it.” King now estimates that there were probably no more than a dozen cars in Finney County at the time, two of them owned by their neighbor, a real-estate man named Charley Zirkly. “He had two two-cylinder Buicks that cranked on the side, and he had a full time mechanic by the name of Case Vanscoit hired to keep those things running.”

King has also told me another story about a grid-type cattle guard on the Sugar Company cattle ranch just outside of Garden City. This cattle guard was about six by eight feet in size and was made of two-by-sixes turned on edge. In 1916 King and a neighbor boy “used to run our horses and make them jump it, which sends a chill down my spine to think about it now. It was lots of fun but we could have got killed.”

The trough guards seen by Bill King in 1909 or 1910 were contemporary with some pit-and-pole guards built by Robert Crane in Barber County, Kansas, in 1909. In 1908 Crane had been elected clerk of the district court, so the next spring he built six cattle guards on the pasture roads from his ranch to the highway in order to be able to travel more easily to his job in Medicine Lodge. Crane poured a concrete foundation, which formed a pit roughly six by eight feet by three feet deep and had a center wall running with the road for extra support. Into the wet concrete he placed a number of bars made of two-inch lumber. Crane used these guards for two or three years before he moved to Medicine Lodge and leased out his ranch.

The earliest printed reference to cattle guards, a brief notice about a type of cattle guard that may be termed an arched crossover, appeared in “Bridging a Fence for an Automobile,” in the May 1909 issue of Popular Mechanics:
An Indiana farmer solved the problem of passing in and out of his yard with his automobile without using a gate. The illustration shows how he goes over the fence instead of through a gate. The main channels for the wheels of the automobile are 6 in. wide at the top and broaden out at the foot on each side of the fence. The wide part of the channels resting on the ground guides the wheels as the approach is made. The channels are supported by timbers of sufficient size to carry the weight of the automobile.

A drawing of the troughs arching over the fence, with an automobile halfway across, accompanies the article. Its caption, "Roadway over a Fence," shows that the device was thought of, not as a gate or as a cattle guard, but as part of the road.

From interviews with old-timers the earliest firm date I have been able to establish for an automotive cattle guard is 1907. E. S. Sutton of Benkelman, Nebraska, believes that this particular guard was in use at least as early as 1905. The builder, a German bachelor who was farming on the high plains near Barr Lake, Colorado (where Sutton's father was a station agent for the Burlington Railroad), employed Sutton to work in his hayfields during the summer of 1908. Sutton is positive that the guard was in place by then, because he left home to travel during the summer of 1909. The Sutton family had moved to Barr Lake in 1905 when Sutton was twelve years old, and he is fairly certain that he saw this guard while he was chopping weeds on a neighboring beet farm that year. He is even more certain that he rode across the cattle guard on his bicycle during the summer of 1907.

Sutton has furnished some background on the German bachelor, who seems to have been quite inventive:

Neitchez [Sutton's spelling of the man's name] was the Dutchman who built the cattle guard. He spiked lodgepole pine about three inches thick over a drain ditch, three or four feet wide, spanned by three or four railroad ties, about six to eight feet wide. He had been in the Russian army. He made a model steam engine for pumping purposes. When I knew him he had rigged a motor to a buggy—rather it was what we called a "Democrat" and was unpredictable in operation. Coming to a wire gate, if shut down, it was very apt to refuse to restart. It just chugged and died while closing a gate. The country road coming to town crossed the railroad and there were railroad guards on both sides, so that is probably where he got his idea. He had an Old Brush auto, rounded up dashboard, motor under the seat, when I was peddling out to work at odd times for him. He was good at blacksmithing, and blacksmiths were the first garagemen. He soon left for Denver and left that farm.

The automotive cattle guard made by this German-Russian immigrant may
not have been the first one ever built, but it is the earliest one for which I have been able to collect an account.

As stated earlier, 1912 seems to be the watershed year for accounts of automotive cattle guards. Cattle guards have been reported in 1912 on the oil leases between Independence, Kansas, and Copan, Oklahoma. Jim McEndree had traveled with his family in a covered wagon from Osborne, Kansas, to Buffalo, Oklahoma, in 1910, and he remembers that cars and cattle guards both appeared near Buffalo two years later. In 1915 he moved to Springfield, Colorado, where he also saw cattle guards. Richard Robbins, Jr., of Pratt, Kansas, remembers having seen an old cattle guard on a pasture trail between camps on the Anchor D Ranch in Texas County, Oklahoma. This guard was made of railroad rails set in concrete, and the date 1912 had been marked into the wet concrete when the guard was made. An oil company replaced this old guard in the middle 1950s. Cattle guards were also being used on the Goodnight Ranch (owned by my great-uncle Frank Goodnight) near Englewood, Kansas, in 1912 or 1913.

There were cattle guards in Texas in 1913, according to the late John R. Shaw, who has recounted an episode that also illustrates the hazards of automotive travel in western Texas in 1913:

With the advent of the automobile another type of guard appeared [in addition to the railroad cattle guard]. It was made of slats of steel turned on edge in a steel or wood frame. This was set in the opening in the fence over a shallow pit. The first of these I saw were in 1913 on a trip from Colorado City to Odessa. The road went through Big Spring and Midland. At times it just took off across the ranches as two ruts. I imagine they were old wagon trails. You followed the most travelled and hoped that you were on the right road. Highway signs were local projects then. Sometimes a prairie dog would dig his hole in one of the paths. They were quite a hazard to the tires and springs of autos in those days.

I made this trip with my aunt, uncle, and cousin. My uncle, Judge Charlie Earnest, had to be in court at Odessa by 4:00 P.M. His car was a six-cylinder Chandler touring car. The tires were smooth tread. You could not let your wheels get out of the ruts or you might encounter some cactus which could easily damage a tire.

Between Midland and Odessa the road crossed a small buffalo wallow, really a shallow lake. We slipped and skidded through it and arrived at the court house at 3:45. (He won his case.) On the return trip we were not so lucky crossing the wallow. The smooth tires would just spin. Trying to push the car was to no avail. Out of nowhere appeared a cowboy. He tied one end of his lariat to the front axle of the car and wrapped the other end around the saddle horn. With the wheels spinning he worked his horse and pulled the car free.
Shaw next saw cattle guards during the summer of 1924, when he made a trip around Texas in a 1923 Ford roadster.

Shaw was not the only person to report that he had seen cattle guards in Texas in 1913. L. P. Wakefield of Stephenville was sixteen years old that year, when his uncle Hugh Hurley and T. E. Riggs built three cattle guards on Hurley’s place and on the W. W. Jarvis Ranch. Riggs was a machinist, a farmer, and a technological innovator, who, along with his brothers, built a jump gate described in chapter 2. Hurley, a blacksmith and a jack-of-all-trades, was also a progressive-minded innovator. His grandfather, Henry Hurley, was a Texas Ranger who had come to Erath County for a six-month tour of duty in 1834, then had been recalled to Hunt County. Immediately after the Civil War, Texas granted Hurley a quarter section of land (measured in the old Spanish varas), a portion of which is now owned by the fifth generation of the Hurley family. Henry Hurley was also a Baptist minister, and he built the first Trinity Baptist Church in Erath County shortly after moving onto his land in 1865. He also built the first house in the county to be
made of boards, not of logs. Much of this house, its timbers hewn from native oak, is still standing, and the notches, pegs, and square nails are plainly visible.

It would seem, then that Hugh Hurley came by his progressiveness naturally. He had the first horse-powered cotton gin in the area, then the first horse-powered thresher. He operated the first steam thresher and hired a crew to do custom threshing. In 1925 he bought the first gasoline-powered tractor in the area, an Aultman-Taylor that now rests on Elvis Riggs's farm. In the winter, when he was not using the tractor for farming, Hurley would move houses with it. Wakefield has said that although his Uncle Hugh may not have been a millionaire, since few millionaires existed then, he was well off and always had lots of projects under way.

When I went to Stephenville in the fall of 1979 to visit the site of the cattle guards built by Riggs and Hurley, Wakefield took me to the Jarvis Ranch, which is now abandoned but has a nice-looking set of native stone buildings still standing. At the southwestern corner of the corrals was an unused pipe cattle guard next to a barbed-wire gate across a little-used lane that was once a public road but had long since been closed. Along the north edge of the pipe grid was a piece of very old oak planking, originally a three-by-twelve cut from native wood, Wakefield said, that had been used as a sill or base for the 1913 cattle guard.

When I asked Wakefield if he was sure that the guards had been built in 1913, he replied: “Let’s go talk to Elvis Riggs. He was with his grandfather when they put them in.” On the way to the Riggs place, Wakefield pointed out the sites of the other two guards built in 1913. Elvis Riggs still remembers that in the fall of 1913, when he was six years old, he went with his grandfather and his Great-Uncle Hugh when they built three cattle guards, all within three-quarters of a mile of one another. He told me how each guard had been built. Two of them were made entirely of native oak. For each of these, two stringers (or sills) approximately three inches by twelve inches were hewn out to form a base that ran about twelve feet across the roadway. (Wakefield had shown me the remains of one of these stringers earlier.) About four more of these stringers, each around five or six feet long, were run with the road between the two longer pieces, thus forming a framework on which the pole grid could be placed. This grid was made of seven or eight round oak poles, each placed in notches that had been cut into the shorter sills. Because these poles, naturally enough, were larger around at one end than at the other, the notches varied in size so that the poles would lie level and smooth. The poles were then wired into place. No pit was dug for these two cattle guards. Instead, dirt was used to build the road up to the top of the twelve-inch sills.

The third cattle guard built by Riggs and Hurley also used native oak for
the sills that crossed the road, but the shorter frame pieces that went with the road were made by nailing a pair of two-by-sixes together, then notching out half circles to hold the twelve to fifteen crossbars. These crossbars were made from metal flues taken from a steam threshing machine. Wakefield remembers that the cattle guards were built in the fall, because the flues had not been removed from the steam separator until after the August threshing season had ended. These pipes were about two inches in diameter, and they were spaced about four inches apart, as had been the oak poles on the wooden cattle guards. They were wired down to the notches in the frame, and they were also held in place by strips of thin strap iron, hammered around the flues and nailed to the two-by-sixes. A pit two and one-half feet deep was dug for this cattle guard.

As far as Wakefield and Elvis Riggs know, the idea for building these cattle guards was original with the builders. Given their inventiveness and their technological aptitude, they may well have conceived the idea on their own. If they had not seen other automotive cattle guards, then they probably derived the idea from railroad cattle guards.

A pile of rocks was all that remained of one of the wooden guards, which a prairie fire had burned many years ago. Most of the other wooden cattle guard had gone to pieces quite some time back, and a pipe grid had been installed on top of what was left. A rather sizable chunk of the three-by-twelve-inch oak base was still lying alongside the edge of the pipe grid. I asked, “Is this part of the original 1913 framework?” Wakefield nodded in affirmation, then reached down and broke off a two-foot chunk and handed it to me: “You might want to have this. It’s not doing any good here.” I did want to have it, for this piece of oak was part of one of the earliest automotive cattle guards and perhaps the oldest extant cattle guard.

Evidence of a roadway and pit still mark the spot where the metal cattle guard stood, even though the gate and the road were moved several yards farther up the hill some years back. The flues had been nearly worn through before they were used to form the grid of the cattle guard. Had they not already been worn thin, they would never have been replaced to begin with, and thus they would not have been available to Riggs and Hurley, who would then undoubtedly have made three wooden cattle guards. Because of their weakened condition, the flues rusted out rather more quickly than the pipes in a modern cattle guard would, and the cattle guard that they formed was scrapped some forty years ago.

Of all the people who were independently installing cattle guards during the first two decades of the century, only one of them fully realized the significance of what he had done. The late Andrew Johnston of Watford City, North Dakota, is the only person ever to have claimed that he had invented the automotive cattle guard. By doing so, which he did in all good faith, he
acknowledged in effect that he understood what an important labor- and time-saving device he had built, one that would become a hallmark of range country, a symbol of ranching. His story deserves extensive treatment, for Johnston, an extraordinary man, can at the same time be considered typical of many of the people who built the early cattle guards.

Andrew Johnston, son of Peter and Brita Paul Johnston, was born in Dakota Territory near what is now Taylor, North Dakota, on 25 March 1885. At the age of ten he was herding, by himself, some four hundred of his father's cattle; two years later he was burning the VVV brand on his own stock. In his late teens he moved to Watford City, where, in 1907, he formed a partnership with August Jens and began operations on Wild Cow Creek about fifteen miles north of Watford City. At its peak, this partnership ran thirteen hundred Herefords and five hundred horses (four hundred draft and one hundred saddle). In the drouth years, Johnston sold out, formed a new partnership with Nels Langdon, and moved to Alpha, where he ran his VVV Ranch from 1937 to 1943. From there he went to Red Rock, Arizona, for six years and served as foreman on the Kenny Ranch until he returned to North Dakota in 1949 and bought the Western Trading Post in Dickinson. He made saddles and sold western goods until a fire destroyed the building in 1966. From then until his death he spent summers with friends in North Dakota and winters in Tucson. He died in a Dickinson hospital on 3 March 1970, just three weeks before his eighty-fifth birthday. Johnston never married, but his nephew Ben and his great-nephew Carroll today own and operate the Watford City ranch where he built his cattle guard in 1914.

Johnston, an active rancher most of his life, was instrumental in developing and initiating many reforms and aids to ranching. One of the earliest manifestations of his industry-wide concern culminated in the Packers and Stockyards Act of 1921, for which he had organized rancher support. Further, until 1940, North Dakota had not had any statewide livestock organization. Johnston himself had joined the South Dakota Stock Growers in 1907 and had been made a director of that group in 1914, a post he held for thirty years. His work there reinforced his belief that North Dakota needed an organization of livestock producers of its own, so in 1928 he proposed to a group of eighteen ranchers who pastured cattle on the Fort Berthold Reservation that they institute a reward fund to discourage rustlers. From this action the Western North Dakota Stockmen's Association emerged in 1930, with John Leakey as president and Johnston as secretary-treasurer, a position he filled for the next six years. He served as president from 1939 to 1941, the period during which the organization became the North Dakota Stockmen's Association. Among his accomplishments was having this organization authorized in 1949 as the official brand-inspecting agency of the state. This authorization completed an effort that had had its first concrete results some twelve years
earlier when Johnston had compiled and published the first complete North Dakota brand registry. He was a member of the American National Cattlemen's Association for fifty-five years, attended fifty-two of its conventions, and was made an honorary vice-president of the organization. In 1955 he was honored with the G. F. Swift Centennial Founders Award for his outstanding contributions to the beef industry.

Johnston's interest in history and in the cultural heritage of the West is illustrated by two major actions. First, Johnston was a founding member of the National Cowboy Hall of Fame and Western Heritage Center in Oklahoma City; his $200 contribution was among the first to fund its establishment. Second, he was a cofounder of the Fifty Years in the Saddle club, formed in Sanish, North Dakota, in the 1940s. Besides giving old-time ranchers and cowboys a reason to get together, this group also published two volumes of reminiscences: *Looking Back down the Trail* (1963) and *Another Look at the Trail* (1966). Johnston had a prominent hand in this venture: he not only compiled and edited the volumes; he also did much of the writing and supplied many of the stories.

From the foregoing brief biographical sketch, one can see that Andrew Johnston had the intelligence, the initiative, and the perceptivity required by an innovator. He seems to have been capable of conceiving unusual but practical ideas, then of putting his plans into action. One of his close friends, C. J. Goddard of Watford City, remembers that Johnston was "quite ingenious and something of an engineer as well as a cowman." Indeed, by his own testimony, Johnston did "serve as McKenzie County surveyor... in addition to studying a great deal at the college and university level." Evidence of his innovativeness is seen in his work in organizing livestock associations, but his inventiveness also showed itself in physical, about-the-ranch improvements such as the gravity-action grain elevator he built on a hillside on the Watford City ranch. This large building is now many decades old but is still functioning. At harvest time, loads of grain are dumped into the upper level; when the grain is to be removed, a truck or wagon is driven under the spouts at the bottom, a lever is pulled, and the grain is loaded, all without a shovel being lifted. Thus, Johnston's assertion that he invented the labor-saving cattle guard gains plausibility.

This assertion appears in print twice: once in Johnston's own published account and once in a newspaper interview. In addition, his fame as the builder of the first cattle guard lives on among the people of western North Dakota; several residents of the area told me about Johnston's cattle guard. This is Johnston's own printed version from *Looking Back down the Trail*:

> In the spring of 1914 I bought this beautiful automobile, a Model T Ford.
Plaque marking the site of Andrew Johnston's original cattle guard

Arched crossover cattle guard built in the teens by John Applegate, Wood Lake, Nebraska. (Courtesy of Albert Lawlis)

The first patent on an automotive cattle guard. (Photo from U.S. Patent Gazette)
In going to town from the VVV Ranch that was in one of the ranch pastures, the gate was on a level place so the Ford would stay, while opening and shutting the gate. But the gate going out the other way to the ranches of Grantiers, Keoghs, Goodalls and others as well as to the reservation was on a steep side hill and we soon found the Ford brakes would not hold it if you weren't there stepping on them. So it took two men to go out this way.

I got the idea of a quite deep hole and troughs across it for the wheel to travel in. I made two troughs fourteen feet long, eight inches wide with a two by four on each side. We planned to have this trough lower than the level of the ground so it would be handy for the driver to get the wheels in the troughs to cross.

We went on one side of the gate and dug two holes one on each side of the fence lengthways of the fence about thirteen feet long, three feet deep and three feet wide. There was about three feet of ground between them in the center for about seven feet (little more than road width). We put two logs across the hole, car wheel width, burying them below the ground enough so the troughs on top of them would still be below the level.

When we got to deciding how many poles to put under those troughs to carry the cars and also to keep the stock from stepping in the hole and crossing, we discovered by using a few more we could cross the car without troughs—on the poles and not near enough together so stock could walk across.

We hauled the troughs back to the ranch and got more poles and nailed them on. Thus the cattle pass or guard was invented.

The two holes on each side of the fence made it look quite bad and we never had any stock attempt to cross it.

Many cattle guards have been put in too careless so they will not fill the place but when put in more careful will in most cases do the job.

Johnston's second account of the invention of the cattle guard appeared in an interview in the Bismarck Tribune in 1967:

Flood, Drought of '36 Didn't Faze Johnston

"I invented the first cattle pass," Johnston said, "and if anyone doubts it, I can prove it."

The events leading up to the cattle pass, now manufactured out of metal and so constructed that cattle will refuse to cross, involved a Model T Ford with faulty brakes and the creek into which it rolled.

"The hired man and I," he said, "decided to prevent the car from rolling into the creek again. We dug a ditch and while in the process of putting in small logs, the idea came to me that if we'd use smaller saplings that not only would it serve to hold the Model T
back when it was parked there, but it'd keep cattle from leaving the pasture."

Plans are now underway, said Johnston, to erect a plaque at the site of the first cattle pass, now located on the Ben Johnston ranch 10 miles north of Watford City. "It'll be there for anyone who doubts my claim to see," he said, "as well as to mark the spot of this inspiration which has done so much to serve my fellow cattlemen in all of the years since 1914."

There are differences other than length between these two accounts. Johnston's, for instance, is more complex; the newspaper version mentions a hired man whose presence is only implicit in the "we" of the first; in the second account the installation of logs seems to be only to prevent the car from rolling; and the creek of the second version is absent from the first. My own judgment, having visited the site of Johnston's original cattle guard in the summer of 1978, is that the newspaper account is somewhat oversimplified and sensationalized. For example, the creek mentioned in it is far below the site of the pits dug by Johnston. If by chance the car had rolled even once from the gate down the steep hill to the stream, it is most unlikely that it would have stayed on the curving road, and it is most likely that it would have suffered serious damage by the time it had come to rest on the rocks and the stream banks below. Thus, Johnston's own version is, I believe, the more accurate.

His version, however, is admittedly difficult to envision. As I decipher his plan, he and the hired man dug a rectangular pit, leaving in the middle an island of dirt as wide as the road. The troughs for the car wheels were to be placed across this pit, resting on poles, and the idea of adding more poles while dispensing with the troughs resulted in the pit-and-pole design of the cattle guard, the design most commonly favored today.

As we have already seen, however, Johnston's was not the first cattle guard, despite his claim. Even his close friend C. J. Goddard concedes that "as cars came into use, someone else someplace must have had the same idea," while Robert Cory of the Minot Daily News, who wrote several articles about Johnston, states:

Frankly I never had time to investigate his claim that he "invented" the cattle guard, and was somewhat disbelieving that there were not cattle guards anywhere on the Great Plains until he made one. It seemed to me that inventing a cattle guard would be like inventing a pasture gate made of boards. But I never doubted Andrew's sincerity in making that claim, and he had traveled more in the plains country than I, by far.

It is hard to doubt Johnston's truthfulness, since both Goddard ("However, Andrew's was the first cattle guard in our area that I saw or knew
about”) and Cory ("Johnston was highly respected by the ranchers of western North Dakota”) attest to his reputation. I am convinced that Andrew Johnston did invent the cattle guard at Watford City, North Dakota, in 1914. On the other hand, as Goddard and Cory suspected, he was not the only one at this time who was inventing cattle guards. Johnston must have been influenced by the railroad cattle guard, for if he had not been aware of these devices and their name, then he surely would have gone into greater detail concerning how he came to call his invention a cattle guard.

Yet Andrew Johnston is unique in that he was the only inventor of the cattle guard with the foresight to recognize the importance of what he had done. Thus, his is the name on the only plaque that commemorates the invention of the cattle guard.

In the years following Johnston’s innovation, cattle guards were being installed all over the plains. In Kansas, for instance, when Vern Kysar, who grew up in Goodland, drove his new Model T across Greeley County from north to south in 1915, he had to cross several wooden-plank cattle guards in the process. In 1917 a cattle guard was built on the Bert Lovett Ranch on Homer Creek in Greenwood County. The guard still stands, although it has been almost totally rebuilt over the years. In 1917 cattle guards were also being used on the Shumway Oil Lease near El Dorado in central Butler County. In 1918 Earl E. Perkins of Howard built a pipe-grid cattle guard as a bridge across a drainage ditch into his feedlot when he replaced his team-driven feed wagon with a truck. Also in 1918 Peter Meier of Quinter placed some wooden planks on edge over a pit to make a cattle guard on a newly opened road into his ranch. This was two years before Albert Tuttle installed one on his family’s ranch near Quinter.

At the same time that Andrew Johnston was inventing his cattle guard, another guard was beginning to make its appearance on roads in the Nebraska Sandhills. This guard, an arched crossover similar to the Indiana guard of 1909, was widely used in Nebraska and parts of Texas during the teens and even into the twenties, despite some inherent disadvantages. Albert Lawlis of Broken Bow, Nebraska, sent me a photograph that shows an arched crossover built by John Applegate on his brother Lee Applegate’s ranch a few miles south of Wood Lake, Nebraska. Mabel Hickman Pearson of Valentine, a niece of the Applegate brothers, wrote in a letter: “I think that was the one and only guard of that type ever made. Uncle John was given to the unusual.” In 1918 Applegate sold the ranch to Elmer Reddick, whose widow, Ella, reported that the crossover worked very well and that driving over it was no problem if one approached it slowly. This particular guard remained in use until 1921, when Reddick replaced it with one of standard design, using two-by-fours placed edgewise as bars. This guard lasted until it was replaced by a pipe guard in 1941.
Illustrations from the 29 June 1916 Breeder's Gazette, showing plans for a cattle guard used in New Mexico as early as 1915.

The first patent on a highway cattle guard. This guard was intended for horse-drawn traffic. (Photo from U.S. Patent Gazette)

Mrs. Pearson was wrong in thinking that Applegate's guard was unique, for arched crossovers were fairly common. Another Nebraskan, Albert Durbin of North Platte, took out what seems to have been the first patent on an automotive cattle guard in February 1916. Undoubtedly he had built arched crossovers several months before that date, although I do not know if there is a connection between Durbin and the Applegates (none of my correspondents was aware of any link between them). Durbin's guard may even be older than that of the Applegates. It is also possible that neither party was aware of the other's efforts.

The first lengthy published reference to an automotive cattle guard was in an article by Will C. Barnes, "Crossings in Fences for Autos," on pages 1549–50 of the Breeder's Gazette for 29 June 1916. A regular service of that trade journal was to print replies to readers' queries. As the first known full-scale description of a cattle guard, it is important enough to quote in full:

Replying to D.S., Middlewater, Tex., who asks for plans, specifications and the cost of cattle guards in a fence which will permit autos to go over and still turn the cattle, one of the simplest and most satisfactory plans for auto crossings through wire or other fences is used in New Mexico, where there are many fences across public roads, and some sort of opening that will save getting out to open gates and at the same time keep stock from escaping from pastures, is an absolute necessity. I regret my failure to take pictures of some of them, when there last summer, but they can be described, so that any one can understand their construction. The design is of course similar to the ordinary cattle guards used on railroads, but
without any pit. Take two heavy timbers 8 by 8 inches square and 9 or 10 feet long for mudsills or foundations. A common railroad tie answers the purpose admirably. Lay these on the ground through the cut in the fence, so as to rest on each side equally. Space them on the ground to lie parallel and 56 inches apart, measured from center to center. Slope each end with an axe from a point about 12 inches back from the ends. Have enough 2 by 4-inch scantlings 6 feet long to lay across these mudsills not more than 3 or 4 inches apart; these are crossties. Take a hatchet and bevel off the tops of the crossties, trimming them to an edge on top of about \( \frac{1}{2} \) of an inch. Cut a mortise in each end of the crossties 10 inches wide and 1 inch deep, measured so that the center of the mortise will space exactly 56 inches from center to center. Spike the crossties to the mudsills, getting the center of the mortise exactly over the center of the mudsills. Spike a light strip of 1-inch stuff along the ends of the crossties, to steady them and keep them from warping. Into the tops of the crossties drive 20-penny spikes deep enough so that they will stand up about 2 inches. Space them about 2 inches apart. Make two wheel troughs 8 inches wide in the clear, of either inch or 1 1/2-inch stuff for the bottom, and the sides of inch stuff. These should be the same length as the mudsills, less the sloping ends, which should be built up with boards level with the floor of the wheel trough on top and short sections of trough run down to the ground. Flare the troughs at the ground end, so that wheels will readily enter. Place these troughs in the mortises at each end of the ties and spike them firmly down, being careful that they space the necessary 56 inches from center to center.

The cut in the fence should be 10 feet in the clear, and the crossties 6 feet, so that one will have a space of 2 feet on each side between the ends of the crossties and the fence post. Spike a piece of 2 by 4 stuff on the fence post about level with the crossties and long enough to almost touch them; then run another piece from the top of the post to the outer end of this lower piece which will close the gap between the posts and the guard, and the natural slope will furnish plenty of clearance at the height where it is needed to allow for the overhanging sides of the cars. Stock will never get through such guards, unless under unusual conditions; the cost is small, and the benefit to the autoist great. If the builder has the necessary timber on his place, the stuff for the mudsills can easily be hewn from the tree, which reduces the cost. Such a guard should be furnished at the side of every gate where autos use the road. I have seen special auto roads in several parts of the west, where, by the use of such crossings at the fences, and trough bridges across the arroyos and washes, autos could have a road to themselves, ordinary traffic being unable to use it on account of lack of bridges, culverts and fence crossings. An auto stage company in the Pecos country in southeast-
ern New Mexico has such a road for more than 100 miles across the prairies, and through pastures, and by using these appliances teams are unable to trespass upon it, and it is always in good shape, and not cut up by wagon wheels.

Barnes makes several comments that are particularly interesting and one that is disappointing—I regret far more than did Barnes his failure to take photographs. First, these guards were in service at least as early as the summer of 1915, maybe much earlier. Second, this cattle guard had troughs, as does the arched crossover guard, but it was built at ground level in a gap in the fence, not over it, and it had no pit. In order to provide the grid of a modern cattle guard, one would only have to double the number of two-by-four spike-studded "crossties," which are spaced about ten inches apart and placed over a pit, and to remove the spikes. (Andrew Johnston's account seems to indicate that his original intention was to build a trough-type guard and that his innovation was to recognize that the support poles themselves would turn cattle and allow cars to pass.) Third, Barnes's observation about the similarity between railroad and automotive cattle guards reinforces the theory that the highway cattle guard was suggested, consciously or otherwise, by that of the railroad. Fourth, Barnes notes the necessity for, and describes how to construct, rudimentary wings to connect the edge of the cattle guard with the fence, and thus allow plenty of clearance along each side. Wing fences had been used for years with railroad cattle guards, but this is the first documented occurrence with highway cattle guards. Finally, the comments about the competition for roads between horses and automobiles provides a brief but interesting historical perspective on a major sociological change in our culture. It is intriguing that as late as 1916 Barnes can refer to horse-drawn traffic as ordinary traffic.

The building of a trough cattle guard has been described by Everett Anderson of Torrington, Wyoming, who grew up in Henry, Nebraska, on the Wyoming border. In 1919 the foreman of the PF Ranch bought a Ford roadster to use around the ranch. He then built a box on the back of it so that he could use it as a pickup. This industrious man soon felt the need for a cattle guard, so he set two heavy posts in the fence, about twelve feet apart, then dug a trench, about four feet wide and equally deep, from one post to the other. Next he took two two-by-twelve planks, ten feet long, and nailed two-by-sixes on the sides of each plank in order to form troughs. These troughs, which extended three feet beyond the pit on both sides, were laid out precisely to accommodate the wheels of his Ford. Anderson watched this cattle guard take shape as he drove the family's milk cow back and forth to pasture that summer.

The cattle guards seen by Will Barnes may have been of the trough type, but pit-and-pole cattle guards were also in use in New Mexico around 1915.
Sometime between 1914 and 1916 a photograph was taken of a grid-style cattle guard on a New Mexico state highway in Guadalupe County (Santa Rosa). This photograph was published in the Second Biennial Report (1914–16) of the New Mexico state engineer, a copy of which is in the New Mexico State Archives in Santa Fe. Dr. Myra Ellen Jenkins, head of the Historical Services Division, has sent me a copy of the photograph. Unfortunately, the photographer stood some distance from the cattle guard when he took the picture; nevertheless, one can discern that the guard is at ground level and apparently does not have troughs. Wooden wings, slanting at about a 45° angle, are also plainly visible, as is a gate at the side for livestock to use. This seems to be the earliest surviving photograph of an automotive cattle guard.

The third report of the state highway engineer, published in 1917, shows that the New Mexico Highway Department built fifteen cattle guards that year, all of them in Chaves County (Roswell). Grant County (Silver City) also installed, at its own expense, a cattle guard on a state road.

In 1916 Ray Purinton of WaKeeney, Kansas, built a pit-and-pole cattle guard at the entrance to his family’s ranch, located twelve miles south of Collyer. In an interview at his home in 1979, Purinton said that his paternal grandfather, Albert, suggested the design of the cattle guard to him. Albert Purinton had come to Kansas from Vermont in 1878, and he could, according to his grandson, “make anything and everything out of wood or timber.” Albert had settled a ranch and built a store halfway between the Union Pacific and the Missouri Pacific railroads, which went through WaKeeney and Utica respectively. It was here that Purinton, who had just bought a new Dodge, dug a pit and spaced some ash poles over it. Perhaps the elder Purinton had seen a dry moat (a yard gate for foot traffic, made by spacing small logs over a ditch—see chapter 6) in use back in the eastern woodlands; his idea for an automotive cattle guard may have been suggested by that early memory. If this were the case, it would be the only instance that I am aware of when a dry moat has served as a direct model for a cattle guard. Whatever the case may be, Ray Purinton’s cattle guard exhibits the spontaneity of an independent invention. He cannot remember having seen or read about any other cattle guard before he built his own, yet many guards had already been built in other parts of the plains.

Purinton reported that the ash poles lasted about a year and that they worked fine for cloven-hoofed cows but not so well for horses. He replaced this guard with a very solid one: for stringers he used twelve-foot-long U-iron beams from an old set of wagon scales, and for the grid he used eight-foot flues out of a steam thresher, just as Riggs and Hurley had done in Texas a few years earlier. The pit was lined with stone and could be walked through by some of his horses. The pipes had been spaced far enough apart so that his draft horses could not step on two bars at once and just walk out, but some of
The earliest known photograph of a cattle guard, from the New Mexico Highway Engineer's Report published in 1916. (Courtesy of Myra Ellen Jenkins)

Spencer Allen and his cattle guard, invented in 1917 and patented ten years later. (Courtesy of Pollie Allen Fitch)

A ladder-type cattle guard, with open-pit middle, in Llano County, Texas. Concrete wings are common in this region of Texas.
the smaller horses could step between the bars and escape unless the pit was cleaned regularly. One of their ponies once got caught, all four legs down between the bars, but it was extracted without injury. This guard was well constructed and would probably be in place today, Purinton said, if it had not been torn out when the entrance to the ranch was changed several years ago.

A short article in the November 1916 issue of *Popular Mechanics* described an arched crossover in western Texas. The article also contained a photograph of a car, pulling a trailer, in the middle of the crossover. The caption read: “An Incline on a Road in Western Texas Which Enables the Motorist to Dispense with Opening and Closing a Gate.” This is the text:

In many parts of the West and Southwest where automobiles are numerous it is becoming common to drive one’s car over a fence instead of stopping to open a gate, drive through, and then shut it. The new and quicker method is made possible by the construction of inclines which make it an easy matter to mount to the top of the barrier and then descend on the other side. The inclines are usually composed of two tracks, set the proper distance apart for automobile wheels and supported by posts. The tracks are equipped with a guard at one side, which prevents a car from running off, although accidents happen occasionally in spite of this provision. Cattle will not walk up these inclines, since ordinarily no floor is laid between the tracks.

The most detailed account of the building of an early-day cattle guard has come from William M. Jolly, who was born on 7 November 1890 and during his twenties worked on a ranch near Ozona, Texas:

In 1916 or 1917, before I went to the war in 1918, I helped build three cattle guards. This was on a ranch owned by Charles F. Davidson who had two sons, a Mexican, and myself working for him. We built the guards at spare times on the ranch.

Among the things to do on a cattle ranch is to go over to a neighboring ranch and drive three or four cattle that had gotten out of the pasture where two bulls had torn the fence down. Then you check all of your watering places two or three times a week. If a windmill has quit pumping you get someone on the ranch to help you fix it. Someone comes by the ranch and leaves word that they saw a cow of yours over at a certain windmill with a very new calf and the cow’s teats were so large and full the calf couldn’t suck them. On and on like that the year round.

Back in those days not most but all ranchers did all the work that was done. And a ranch owner didn’t turn loose a nickel that he didn’t have to. Now this Mr. Davidson had a law office in Ozona, about seven or eight miles to the north. He and his family lived at the ranch house. The whole ranch force stayed there. Mr. Davidson
at that time still used a buggy and team to go places. I don’t believe I ever saw him on a horse.

Now to the three cattle guards. There was a public road that came out of Ozona and went south down a big wide draw. The road went through his pasture out west of the house. Mr. Davidson had started up a herd of registered hereford cattle. The pasture he kept them in was west of the ranch. A Mr. Couch owned the ranch between Davidson and Ozona. The pasture below this registered pasture, as it was known, was Mr. Davidson’s also. There was a gate out of Mr. Couch’s pasture on this public road into Mr. Davidson’s registered pasture, also another gate out of the registered pasture. Now if the gate into Mr. Couch’s pasture was left open and one of his bulls got into the registered herd, there was a bad mixup on the registration. Same way on the other gate.

There was getting to be a lot of traffic on that road since quite a few cars were coming into the country. Mr. Davidson had a car but I don’t remember what it was. But he didn’t drive it around on the ranch. For ranch work everything was wagon or his buggy.

Most all ranch people would close the gates behind them, but a lot of just travelling people would say that fellow behind me will close the gate, so Mr. Davidson was almost compelled to either make a cattle guard of some kind or move over and fence off a registered pasture to the east of his house or go out of the registered cow business.

These gates were right on the road so as I was only breaking horses there by the head he would use me a lot of the time as help there on the ranch.

He went over to one of these gates in his buggy. He had a pick and shovel that stayed in that buggy all the time. I came on over horse back. We took a piece of rope and measured off a pit for the cattle guard.

Mr. Davidson had a Mexican there that just helped do any and all things. When this Mexican wasn’t busy with feeding cattle or something else, he dug on this pit. One day he said he had it finished. Now the material. Mr. Davidson had a windmill with a wooden tower. It was getting in bad shape, so he got a man from Ozona that made windmill towers to come out there and put a new one up. So he just let this old tower down and left it lay there.

We took the wagon over there, took the tower apart, then when one of us was loose, maybe two of us would go over to where the cattle guard had been dug out and work on it sometimes three hours, sometimes half a day.

We all knew about what we were going to do, so whoever was there working was the boss.

We took two of these tower legs, cut out 14 feet of the best part of them, lay them across the pit the way the traffic went. We sunk
the ends in about 12 inch trenches so when the two by six cross beams were set on them, it would bring the top of the cattle guard floor up even with the road level. We spaced these up-edged boards about five inches apart, then sawed a block just as wide as the space was and nailed it in to keep the distance even and to prevent them from turning over or to one side.

After we finished this first one we could see how to improve on the next one. After we fixed the fence up to each end to keep the cattle from walking around the ends, we turned the traffic loose on it. Mr. Davidson drove his car across it back and forth several times and everything worked just fine.

As well as I can remember we dug the next hole for the guard, but we got busy at other ranch work and it was a month or more before we got back to it. During that time we had run out of feed for some young registered bulls we were feeding there. A freighter was to bring the feed out to the ranch, but didn’t show up. Mr. Davidson had gone into Ozona on some office work. Someone phoned in and asked him to bring out enough feed for that night for the bulls. So he put about eight sacks of feed in the back seat of his car and when he got the hind wheels out to about the center of the cattle guard, one of those 6 by 6 supports broke in two, let that side of his car down, and he was stuck. He had to walk about two miles to the ranch.

The work horse team was out in a pasture but they wanted the feed for those bulls that night, so we got the horses in, hitched the team of work horses up to the wagon and pulled the car out of this place. We just pulled it on over to the ranch and fed the bulls and got to bed. We went to improving that cattle guard in our minds.

The easiest way to make the next one hold up with the least amount of work using what we had there on the ranch to work with, for that was all we had and we all knew there would not be any new material from town, was to jack the broken beam up and nail some boards on each side to hold it straight, then put a big flat rock under it to hold up the weight. Then we also put a big flat rock under the other beam (which we should have done the first thing.) That is where you learn by doing.

I refer here as we. That meant that any one or all 5 of us. Charley, the youngest boy, was going to school, but he worked on the ranch every morning and evening, Saturday, and Sunday just like he was drawing wages.

A lot of this information may seem useless to you, but I put it in here so you can understand how ranchers worked and also why there were so many kinds of cattle guards built. There simply was no one pattern.

After we got the car unloaded there was a man that worked on cars some came down to the ranch and he and Charley after school
straightened up some brake rods, hammered out a pan dent, and the car was back good as new.

Now I believe that takes care of the first cattle guard I ever helped to build. On the second guard we built it the same way, but at the ends of these 2 by 6 cross boards we put another 6 by 6 under each end of them. That made four beams under that one. We also put a big rock in the center of each support beam. That cattle guard would hold up just about anything. I guess we had been two or two and ½ months on those two guards.

Then we got a slack spell on the ranch work, and from 2 to 4 of us worked on the third guard. It was about five miles south of the ranch house, where the road went into another man's ranch, a Mr. Bagget. Mr. Bagget said as we had built two guards, he would furnish the material if we would build the guard between the two ranches. He said he had the material there at his ranch house.

This material turned out just like ours had been. It was an old windmill tower and some one by six corral lumber. We only found enough of this old tower posts to make three beams underneath. Then we had to nail two of these corral planks together to make our 2 by 6s for the top. But we put a big rock in the middle of each beam.

Now you can see the way we made our three cattle guards, and the rest of the ranches in the country all made their own cattle guards the same way—out of whatever old scrap material they could find.

This account provides not only a thorough description of the building of early cattle guards but also a fascinating glimpse of day-to-day ranch life in the early years of the century.

Arched crossover guards were widely used in southern Texas in 1917, according to C. G. Wood of Floresville, who, when he was sixteen years old, saw them on a road along the Nueces River that ran southeast from Cotulla through LaSalle and Duval counties. Each guard consisted of a wooden trough for each wheel, flared at each end to facilitate the entry of car wheels. Livestock and horse-drawn traffic could pass through gates at each crossing. According to Wood, "Cars could cross from either side of the fence, and cross over the top of the fence, but of course very slowly and cautiously. Brahma cattle from India had just been introduced into Texas at that time, and it was quite a relief to be able to cross over the fences where the strange cattle roamed, without having to get out and open the gates."

Wood, whose working career was spent with the Texas State Highway Department, also remembers having seen at about the same time (1917) pit-and-pole cattle guards on the farm-to-market roads in the hill country near Kerrville, where many sheep and goats were raised. Wood assumed that these grid-type cattle guards would work better with goats, which soon learned to walk over the troughs of an arched crossover.
Trough cattle guards were still being used in Texas in 1920 when Jim Roberts built one on his ranch near Wimberley. Ten years later he replaced it with one of a conventional grid design. Also in 1920 near Wimberley, Jim Dobie had installed a bar-grid guard using cedar poles for bars. C. W. Wimberley has said that the cedar-pole guards would have been much more durable if the builders had used bolts instead of nails in putting them together. They worked well under moderate or light traffic, but as cars got heavier and faster, the guards "began to award the speedsters with busted tires and loose mufflers for their driving manners."

An interesting analogue to the development of cattle guards on the Great Plains was taking place in California in 1914. There, according to an article in Popular Mechanics ("Grooved Tracks Are Used as Automobile Bridge," September 1914, p. 398), an automobile club had constructed troughs of structural iron and wood and had mounted them on concrete piers in order to form bridges across small streams on roads where traffic was too light to warrant a regular bridge. The open middle between the two troughs, as noted in the article, made it impossible for these bridges to be used by horse-drawn vehicles. Only a small step was necessary in order to adapt this type of bridge to use as a cattle guard.

Although his inspiration came from different sources, Raymond Lauppe of Arbuckle, California, took this step in 1916, his last year in high school. With help from his father, Lauppe built the second cattle guard constructed outside the Great Plains, so far as I have been able to learn. The elder Lauppe had a positive attitude toward agricultural efficiency; as early as 1904 or 1905 he had installed a remote-control gate operated by rope pulls. Raymond Lauppe told me that sometime after 1913 he and his father had seen a picture and description of an arched crossover cattle guard from Texas in a newspaper or a farm or mechanics magazine, but he is not sure of the name or date of the publication. (Nor have I been able to locate this reference. It could possibly be the one from the Breeder's Gazette, discussed earlier in this chapter, although that guard was a trough type without a pit, not an arched crossover. The Popular Mechanics article about the Indiana guard in 1909 seems too early; on the other hand, the November 1916 article about western Texas inclines seems a bit late. Of the three, however, this last-named one seems the most likely for Lauppe to have read.) In any case, Raymond Lauppe did build an arched crossover, but it did not work satisfactorily. The guard was so close to the road that it was rather difficult to line up the car to cross the guard. So, he immediately tore down the arched crossover, dug into the fence line a pit that was three feet deep and just wide enough for a car to pass through, and put the troughs from the crossover down at ground level. The result was a trough cattle guard with an open pit in the middle.

About a year later, Lauppe realized that the railroad cattle guards he had been seeing for years could be adapted to highway use. "I don't know why it took me so long to think about the railroad cattle guard," he told me. Once he did think of it, however, he removed the troughs from the pit, put in some stringers, and placed two-by-sixes on edge, spaced four inches apart, as bars,
This guard worked fine, except that the Lauppes' car rolled over it so fast that the boards soon became worn. In 1918, this time with some help from his father, Raymond Lauppe spaced two-inch pipe bars on some four-by-six inch stringers. The result was a cattle guard that stood on the farm until World War II.

A second cattle guard west of the Rocky Mountains was built by Spencer F. Allen of Ridgedale, Idaho. His daughter, Pollie Allen Fitch of Rexburg, has explained the circumstances that led to his invention:

He had recently bought a Ford car which delighted him until he had to stop at the end of our land to open the gate. He pondered over this; he thought of building an incline over the fence [i.e., an arched crossover]. My mother assured him she would never ride with him ascending into the air. So he devised a cattle guard. According to his diary this was in January 1917 and first used in March 1917. Later he added wooden side sections which were laid down over the guard for horse drawn vehicles. Years later after his friends had told him many times, "You should get a patent on that gate," he applied for a patent.

In 1927, ten years after he had first built his cattle guard, he was granted a patent on it, but he did not try to market it, and he never made much money from it. He did, however, build and install cattle guards at the entrances to cemeteries in Wellsville and Hyrum, Utah, and in Malad City, Idaho. Moreover, he became locally famous, as had Andrew Johnston in North Dakota, for having invented a cattle guard. Several letters from people in the Nevada-Utah-Idaho region testify to the Allen Cattle Guard.

Pollie Fitch did not know where Allen got the idea for the cattle guard, but she thought the idea may have been original with him. "There surely were no cattle guards around our area at the time he devised this solution to the problem." Allen may well have developed a cattle guard independently, as had many others east of the Rockies a few years earlier. I find it especially interesting that his experiments encompassed both the grid cattle guard and the arched crossover.

On 29 March 1919 Edwin H. Underwood of Bainbridge, Georgia, filed a patent on another cattle guard developed outside the Great Plains during this period. This appears to have been a classic pit-and-pole cattle guard, with seven or more metal or wooden bars secured to a metal base, and the whole arrangement placed into a pit in the roadway.

Also in 1919 (on 13 October) two New Mexicans, Emory Hickok of Engle and Albert H. Hollenbeck of Fair View, filed for a patent on an automotive cattle guard. This guard was somewhat complicated to operate, and its design incorporated elements of the trough and the pit-and-pole guards, for the entire surface was supported in the middle by a heavy vertical bolt fixed in such a way that the grid would swing both lengthwise and crosswise. Thus, a cow

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that attempted to cross it would be frightened off by the quivering and shaking of the trough. As illustrated in the *Patent Gazette*, this guard required a substantial framework, which, instead of being placed in a pit, was placed on the road, with dirt being mounded up to it in order to make approach ramps. This guard, like many of the more complicated railroad cattle guards, undoubtedly turned cattle, but it was much too complicated to be either work effective or cost efficient.

So far in this chapter, three major types of cattle guards have been described: the bar-grid (or pit-and-pole) style, the arched crossover, and the ground-level trough guard. There was one other major experiment in cattle-guard design during this decade of experimentation—the ladder cattle guard. This design incorporated elements both of the trough and of the pit-and-pole guards. Victor H. Merrihew of Ashby, Nebraska, has described how one of these guards was built. A pit was first dug, but instead of regular troughs with solid plank floors, a “ladder” was made for each wheel by inserting numerous pieces of two-inch pipe several inches apart into two three-by-eight-inch bridge planks turned on edge. Holes were bored into (but not through) these planks for the pipe to fit into, and long one-half-inch bolts were run through each end of the ladders to clamp them securely together. The tracks were about twenty-two inches wide, with the bridge plank surrounding them thus forming troughs for the wheels. Local blacksmiths sometimes used steel mine rails instead of bridge planks for the edge pieces and old boiler flues for the bars. The chief disadvantage of this type of guard, especially where the edges did not stick up far enough to form a trough, was that cars often ran off the track and into the open pit in the middle.

Some of these old ladder guards were still to be found on back roads near Hulett, Wyoming, when Melvin Storm was growing up there during the 1950s. A modified form of the ladder guard, which incorporates ladders for troughs and also has three or four bars over the pit, is still being used in the Llano County, Texas, area. These guards are used, not on heavily traveled roads, but on ranch roads where they enter onto a highway or county road.

Interestingly enough, a guard nearly identical to the ladder guard, called a Combermere Ladder, was invented in England in the 1920s by Sir Kenneth Crossley of Crossley Motors, who lived at Combermere Abbey, Shropshire. According to Lady Ruth K. Lowther of Lightwood-on-Green, Wales, he had a rather long driveway on his estate. At some of the gates dividing the fields, he dug pits several feet deep and put in metal-runged “ladders,” over which the car wheels could pass, leaving the open pit in the middle to frighten livestock.

Lady Lowther’s father installed a Combermere Ladder at the back of his property, a few miles from Combermere Abbey, sometime before 1931. Keeping the car wheels on the ladder could also be a problem there. Lady Lowther
wrote that for her twenty-first birthday her father gave her an Austin Mini and this advice for driving her new car over the Combermere ladder: “He told me there were two inches inside before I fell in and two inches outside for the lorry and his car had the middle. I never did fall in.” Several years later her father put in a bar-grid guard at the front gate of his estate in order to keep horses from wandering. Steel H-bars were used for the grid, and it was, according to Lady Lowther, “strong enough to hold up the Bertram Mills Circus.”

These English cattle guards are actually from the twenties, the subject of chapter 4, but the similarity to the ladder guards from Nebraska makes it appropriate to include them here. After the experimentation during the first two decades of the twentieth century, when the automotive cattle guard underwent its initial development, the time was now ready for a decade of cattle-guard dispersion.