

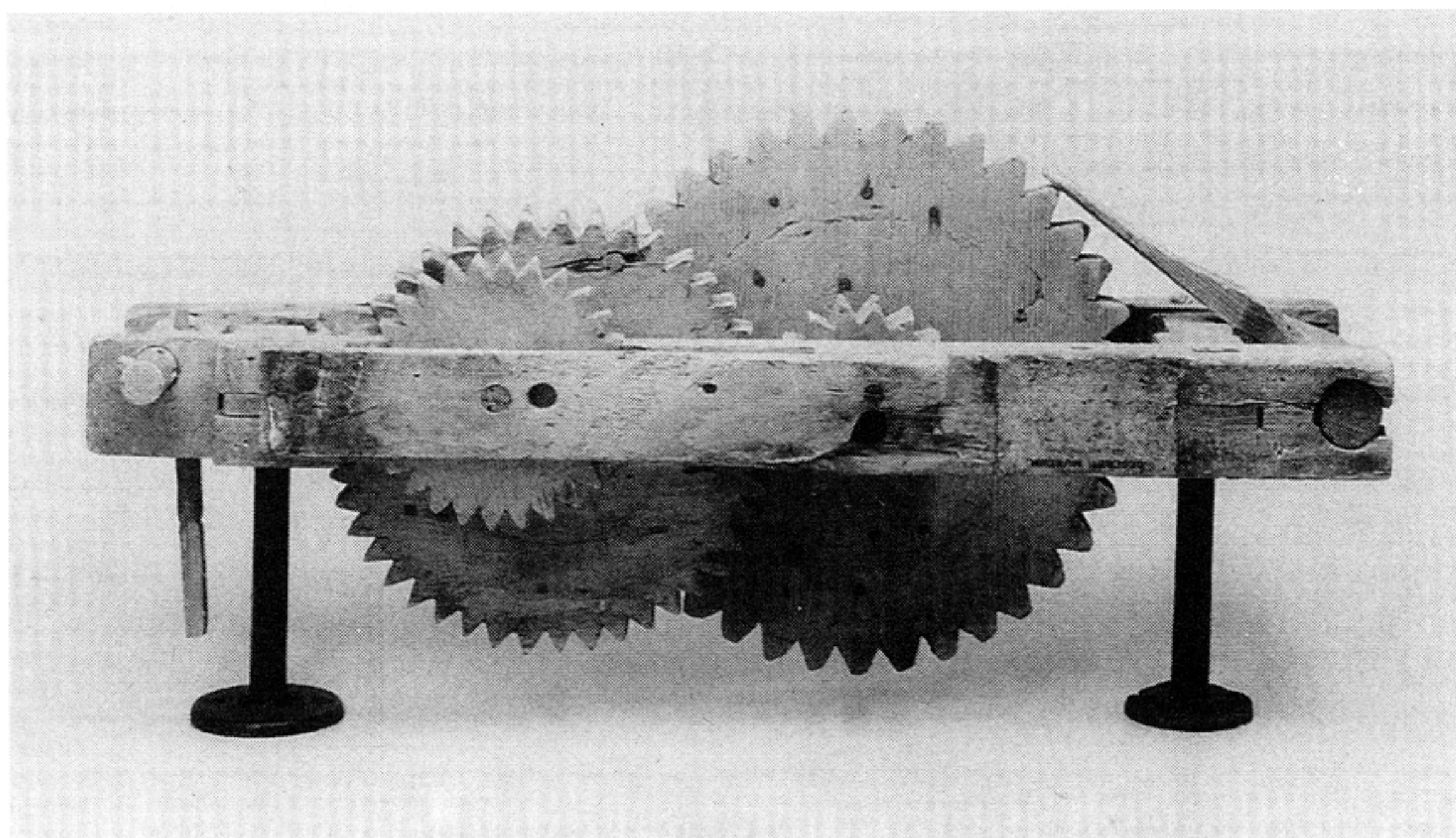


Fig. 1. Thomas Lowe's odometer. For over fifty years, many people believed that this odometer was the first ever invented and that it was designed by Orson Pratt for use by the first company of Mormon pioneers.

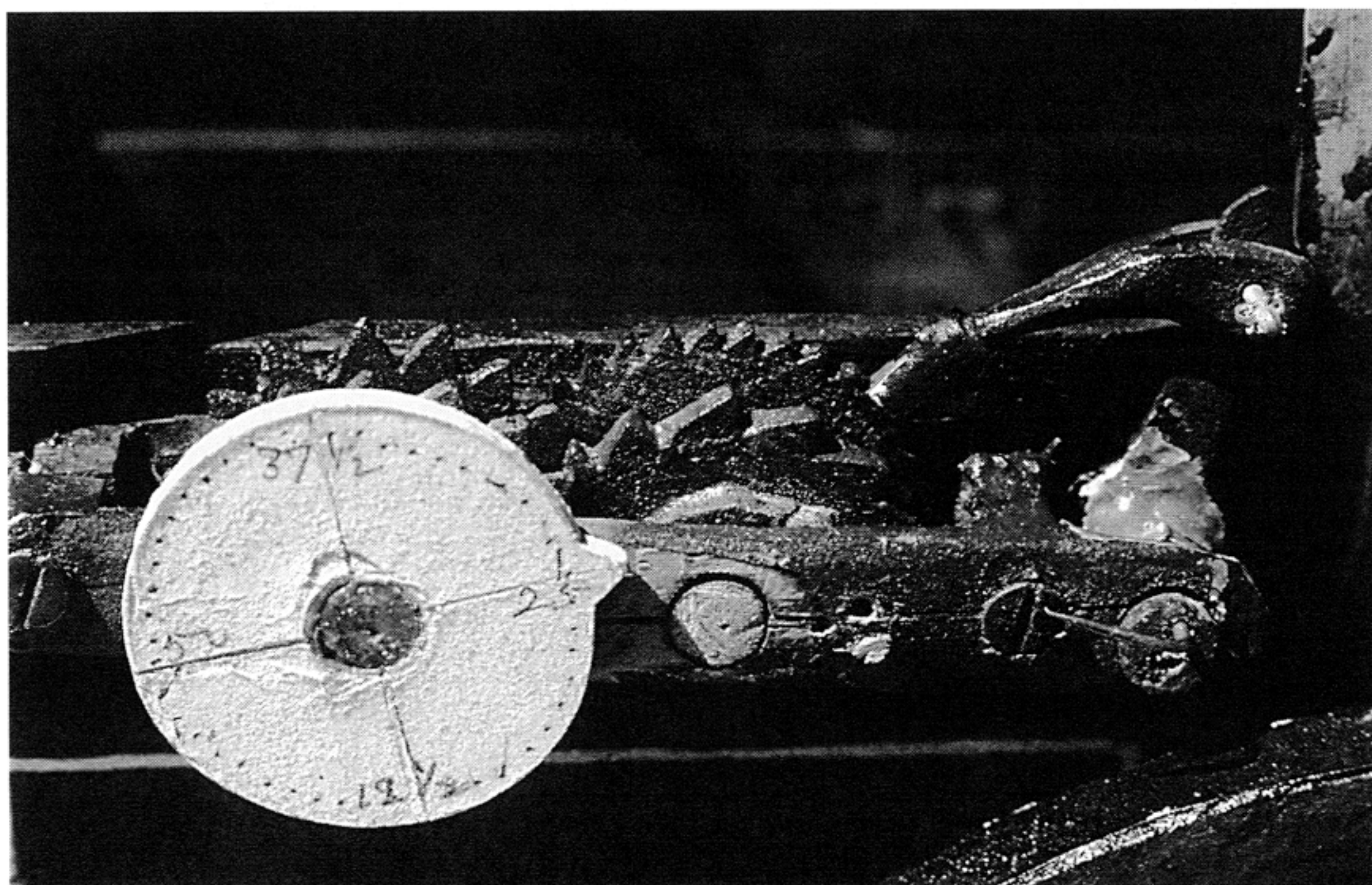


Fig. 2. Lowe's miniature odometer. This miniature replica is part of the evidence confirming the fact that Thomas G. Lowe built the odometer shown above for use during his missionary travels.

The Mormon Pioneer Odometers

This full account of the wooden machines that measured distances along the Mormon Trail documents interesting details and corrects old misconceptions.

Norman Edward Wright

The wooden odometers built and used by the first Mormon pioneer company of 1847 have fascinated students of Western history for one hundred and fifty years. Two odometers were constructed. The first, built by Appleton M. Harmon during the westward journey, was used from a point near present-day North Platte, Nebraska, to the Great Salt Lake Valley—May 12 to July 24, 1847. The second, built by William A. King during the three-week hiatus in the valley, was used during the return trip to the Missouri River—August 17 to October 21, 1847. The well-publicized accounts of the creation and use of these machines are found primarily in the journals of William Clayton and Orson Pratt.

Not so well known, however, is the history of another wooden odometer (figs. 1, 2) built by Idaho pioneer Thomas G. Lowe in 1876, while he was serving as a missionary to the Oriba Indians in northern Arizona. This instrument was, in 1911, mistakenly identified as the original 1847 machine. Ten years later, the misidentification of Lowe's odometer was associated with another error—the claim that it was the first such measuring device ever invented.

Historical research on the subject of odometers in general and on the Mormon pioneer odometers in particular, has provided a more complete and accurate account of these wooden, distance measuring instruments.

Instruments and Estimates

On April 8, 1847, the vanguard company of Mormon pioneers was camped seven miles west of Winter Quarters, a large

staging area north of present-day Omaha, Nebraska. On that day, Parley P. Pratt arrived with news that "John Taylor was on his way up the [Missouri] river with about five hundred dollars worth of astronomical and other [scientific] instruments" purchased in England.¹ They included

one circle of reflection, two sextants, one quadrant, two artificial horizons, one large refracting telescope, several smaller ones, two barometers, several thermometers, besides nautical almanacks, books, maps, &c.²

This list of instruments purchased for the journey did not include a device for measuring the miles traveled each day, despite the fact that one was readily available. Such an instrument, known in England as a viometer (fig. 3), could have been purchased from any instrument maker in London for a reasonable price.³ Since one was not acquired, the implication is that distance measurement was not an anticipated need.⁴ For the first

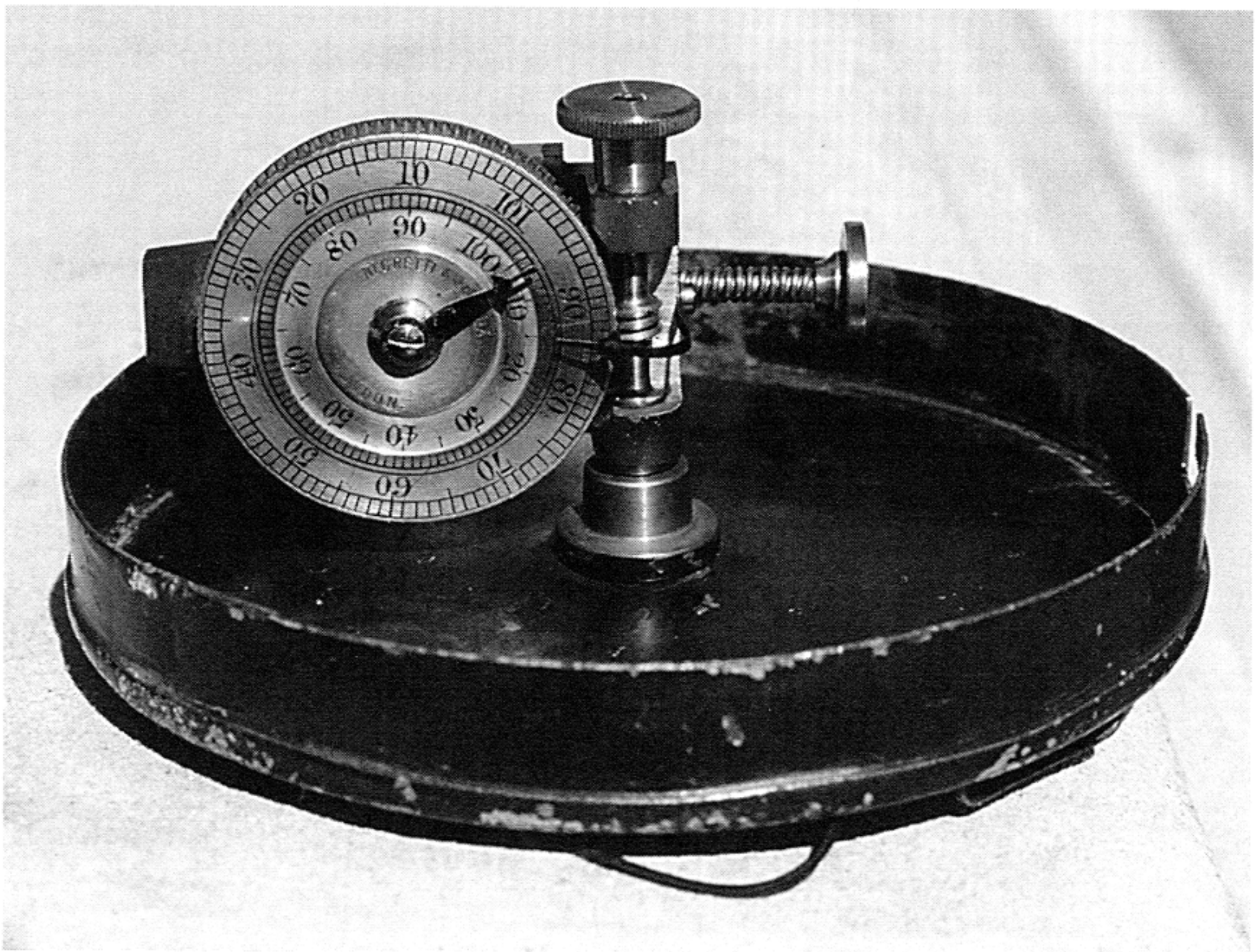


Fig. 3. English viometer, c. 1850. Distance-measuring devices such as this were available at the time the pioneers crossed the plains.

three hundred miles of the westward journey, individuals in the company simply estimated the distances traveled each day. Such estimates were imprecise, as they depended entirely on the observational skills of the estimator.

William Clayton saw the need for an instrument that would provide a more accurate mileage measurement. Others—Orson Pratt, Appleton M. Harmon, and William A. King—played essential roles in developing the instrument, but it was Clayton's love of precision that prompted the whole odometer episode.

Developing the "Roadometer"

William Clayton was one of the last volunteers to sign on as a member of the original Mormon pioneer company. The lead groups had already moved out of Winter Quarters onto the western trail when Clayton made his commitment to go. Heber C. Kimball's journal entry for April 13, 1847, records:

This day Brother Young, and Bishop Whitney and myself were in the store [at Winter Quarters] in company with Brother William Clayton. We then and there beset him to go with us to the mountains. He most cheerfully volunteered to go . . . [if] his family could have some assistance. . . . He remarked that he was destitute of means to fit himself out for the journey. I replied I would see that he had a proper fit out to go on.⁵

Two days later, Clayton joined the main pioneer company, which was then camped about twelve miles west of the Elk Horn River in eastern Nebraska. His recognized talents as a writer, observer, and record keeper were qualities that had prompted the Church leaders to extend their invitation to him to go West with the lead company of pioneers. He now began employing those talents to compensate for the benefits of transportation, food, and clothing that he was receiving. One of his primary tasks was writing the journal of Heber C. Kimball, the Church leader who provided the wagon in which he was riding. Clayton performed this compensatory service by copying an edited version of his own personal writings onto the pages of Kimball's journal.⁶ He also rendered secretarial service for his benefactor.⁷ In addition, Clayton was asked to draw a map of the pioneer company's route superimposed on Frémont's map of 1845, using Orson Pratt's ongoing

observations of elevation, latitude, and longitude.⁸ In addition to these tasks, Clayton kept his own personal journal, which he evidently planned to publish for the benefit of his family:

I shall not write my thoughts here, inasmuch as I expect this journal will have to pass through other thands [*sic*] besides my own or that of my family but if I can carry my plans into operation, they will be written in a manner that my family will each get their portion, whether before my death or after, it matters not.⁹

The Mormons' western route coincided with a large segment of the Oregon Trail, which, even at that time, was a major thoroughfare over which thousands were traveling. Although, initially, Clayton had no plans for publishing an overland trail guide per se, he did know that a trail guide would benefit later emigrants and that it would have the potential for a significant monetary return. Observing and recording the data for such a publication—describing the road, the locations of water, wood, and grass, and the distances involved—fit naturally into Clayton's daily tasks. Moreover, his training as a clerk made it natural to record such details.¹⁰

As the journey west began, however, Clayton's estimates of the number of miles traveled each day were always significantly lower than those given by others. It was a source of irritation to him that his values were always considered to be too conservative.¹¹

Just four days after beginning the journey, Clayton was thinking about this problem and its solution:

MONDAY [APRIL] 19TH. . . . I walked some this afternoon in company with Orson Pratt and suggested to him the idea of fixing a set of wooden cog wheels to the hub of a wagon wheel, in such order as to tell the exact number of miles we travel each day. He seemed to agree with me that it could be easily done at a trifling expense.¹²

Orson Pratt's verbal endorsement of his idea was undoubtedly encouraging. The idea of using "cog wheels" (gears to count wheel rotations) was not new or inventive. In all likelihood, Clayton was acquainted with the gear-driven viometers of his native England. He undoubtedly would have built an odometer himself had he possessed the necessary mechanical skills. But lacking these, he needed the approval and support of the company's leaders, who could commit both men and resources to the project.

Over the next four days, Clayton discussed his idea with members of the company. He also outlined the design of a machine that could perform the task:

THURSDAY [APRIL] 22ND. . . .

I again introduced the subject of fixing machinery to a wagon wheel to tell the distance we travel, describing the machinery and time it would take to make it, etc., several caught the idea and feel confident of its success.¹³

No longer a general idea, he now had developed a specific design for the odometer and a time estimate for its construction. Clayton had done his homework. In doing so, he perhaps demonstrated more technical skill than is generally ascribed to him.

Within three weeks after Clayton's initial conversation with Orson Pratt, the pioneer company had moved three hundred miles west of Winter Quarters, near present-day North Platte, Nebraska. Nothing had been done about the proposed odometer. Distances traveled each day were still being estimated. His patience spent, Clayton decided the time for action had arrived.

SATURDAY, [MAY] 8TH. . . . I have counted the revolutions of a wagon wheel to tell the exact distance we have traveled. The reason why I have taken this method which is somewhat tedious, is because there is generally a difference of two and sometimes four miles in a day's travel between my estimation and that of some others, and they have all thought I underrated it. This morning I determined to take pains to know for a certainty how far we travel today. Accordingly I measured the circumferenc[e] of the nigh [left] hind wheel of one of Brother Kimball's wagons being the one I sleep in, in charge of Philo Johnson. I found the wheel 14 feet 8 inches in circumference, not varying one eighth of an inch. I then calculated how many revolutions it would require for one mile and found it precisely 360 not varying one fraction which somewhat astonished me. I have counted the whole revolutions during the day's travel and I find it to be a little over eleven and a quarter miles,—twenty revolutions over. The over-plus I shall add to the next day's travel. . . . Some have past the days travel at thirteen and some fourteen miles, which serves to convince more strongly that the distances are overrated. I have repeatedly suggested a plan of fixing machinery to a wagon wheel to tell the exact distance we travel in a day, and many begin to be sanguine for carrying it into effect, and I hope it will be done.¹⁴

In early Western history, Clayton is well known for this simple yet tedious solution to his problem. During that first day, he tallied

4,070 wheel rotations, a measurement that would perhaps have been enough to prove his point, but he wanted to make sure. For three additional days, he collected similar data and obtained similar results. With accurate numbers in hand to support his claim that the estimated distances were incorrect, Clayton's proposal to build a mechanical odometer was at last advanced to the top of the priority list. Regarding this matter, Orson Pratt recorded the following entry in his journal:

May 10, 1847 . . .

. . . For several days past, Mr. Clayton, and several others, have been thinking upon the best method of attaching some machinery to a wagon, to indicate the number of miles daily travelled. I was requested this forenoon, by Mr. B. Young, to give this subject some attention; accordingly, this afternoon, I proposed the following method:—Let a wagon wheel be of such a circumference, that 360 revolutions make one mile. (It happens that one of the requisite dimensions is now in camp.) Let this wheel act upon a screw, in such a manner, that six revolutions of the wagon wheel shall give the screw one revolution. Let the threads of this screw act upon a wheel of sixty cogs, which will evidently perform one revolution per mile. Let this wheel of sixty cogs, be the head of another screw, acting upon another wheel of thirty cogs; it is evident that in the movements of this second wheel, each cog will represent one mile [see fig. 1]. Now, if the cogs were numbered from 0 to 30, the number of miles traveled will be indicated during every part of the day. Let every sixth cog of the first wheel, be numbered from 0 to 10, and this division will indicate the fractional parts of a mile, or tenths; while if any one should be desirous to ascertain still smaller divisional fractions, each cog between this division, will give five and one-third rods. This machinery (which may be called the double endless screw) will be simple in its construction, and of very small bulk, requiring scarcely any sensible additional power, and the knowledge obtained respecting distances in travelling, will certainly be very satisfactory to every traveller, especially in a country, but little known. The weight of this machinery need not exceed three pounds (appendix A).¹⁵

Because Clayton left no record of his own odometer design, we do not know what influence it may have had on Orson Pratt's specifications, as given above. Pratt certainly had the technical skill to design his own machine independently. However, since his design begins with the same 360-rotations-per-mile wheel Clayton used in his earlier empirical solution, it appears that he may have

followed Clayton's lead quite closely. One thing is certain; Pratt wrote the initial design specifications in his journal whereas Clayton did not. As historical credit typically goes to the one who writes, Orson Pratt is generally recognized as the designer of the first Mormon pioneer odometer.

More likely, the instrument's final design was a team effort because Pratt's original specifications, as given above, proved to be impractical and had to be modified significantly to simplify construction. In the completed odometer, the second gear wheel had forty teeth instead of the thirty that Pratt had specified. It overlaid the first gear and was turned by four teeth on the axle of that gear (fig. 4 and appendixes B, C). One rotation of the second gear therefore represented ten miles, each tooth being one-quarter of a mile.

Appleton Harmon, a skilled carpenter in the company, was assigned the task of building the wooden odometer. Undoubtedly,

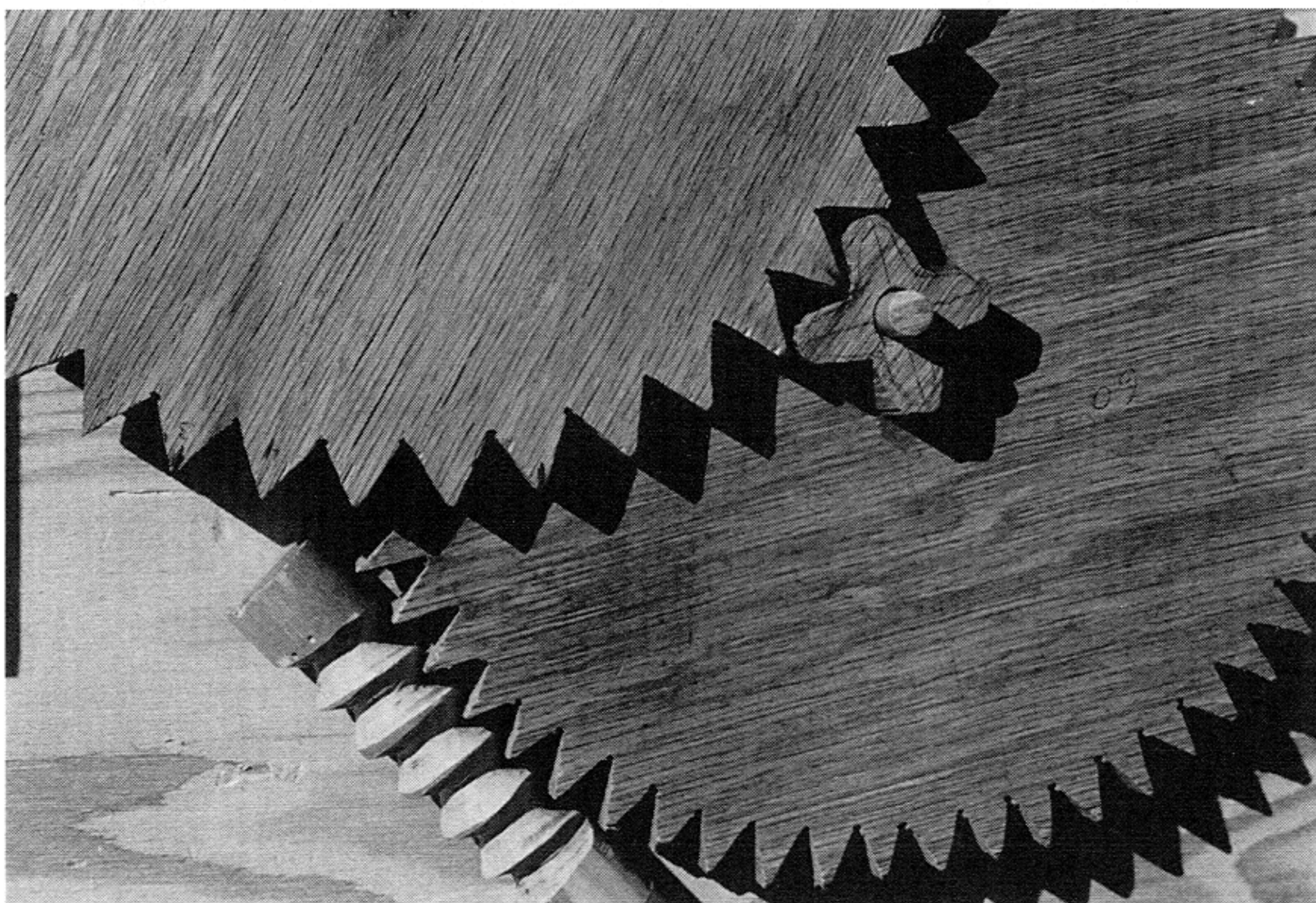


Fig. 4. Replica of gear arrangement of pioneer odometer. The large gear revolved once every mile. Via a second gear, it turned the third gear, which had forty teeth, one-quarter of a mile at a time. Thus the third gear completed a full revolution every ten miles. William Clayton based his mileage observations on this gear.

he also made suggestions for its final elegant design, which would account for Clayton's report that Harmon considered himself to be the odometer's inventor.¹⁶

The project was completed in two distinct phases over a period of seven days. First, the sixty-tooth gear wheel, which rotated once every mile, was built and installed on the wagon box, along with the threaded, eighteen-inch-long drive rod. Clayton records:

WEDNESDAY, [MAY] 12TH. . . . Brother Appleton Harmon has completed the machinery on the wagon so far that I shall only have to count the number of miles instead of the revolutions of the wagon wheel.¹⁷

Next, the smaller forty-tooth gear wheel was built and installed, along with a box to cover and protect the whole mechanism:

SUNDAY, [MAY] 16TH. . . . About noon today Brother Appleton Harmon completed the machinery on the wagon called a "roadometer" by adding a wheel to revolve once in ten miles, showing each mile and also each quarter mile we travel, and then casing the whole over so as to secure it from the weather. We are now prepared to tell accurately, the distance we travel from day to day which will supercede the idea of guessing, and be a satisfaction not only to this camp, but to all who hereafter travel this way.¹⁸

In his journal, Amasa M. Lyman also noted the installation of the ten-mile gear wheel: "May 17, 1848 A.M. Harmon put another wheel to his roadometer, gaged for ten miles."¹⁹ Its two gear wheels and eighteen-inch drive rod could count up to 3,600 rotations of the wagon wheel without recycling, a distance of ten miles. The completed odometer project was a source of satisfaction not only to the principals involved, but also to others in the company who noted the event in their journals.²⁰

William Clayton provides us with the only known description of the completed machine:

SUNDAY, [MAY] 16TH. . . . The whole machinery consists of a shaft about 18 inches long placed on gudgeons [a sleeve in which the rod turns], one in the axle tree of the wagon, near which are six arms placed at equal distances around it, and in which a cog works which is fastened on the hub of the wagon wheel, turning the shaft once around at every six revolutions of the wagon wheel. The upper gudgeon plays in a piece of wood nailed to the wagon box, and near

this gudgeon on the shaft a screw is cut. The shaft lays at an angle of about forty-five degrees. In this screw, a wheel of sixty cogs works on an axle fixed in the side of the wagon, and which makes one revolution each mile. In the shaft on which this wheel runs, four cogs are cut on the fore part which plays in another wheel of forty cogs which shows the miles and quarters to ten miles. The whole is cased over and occupies a space of about 18 inches long, 15 inches high and 3 inches thick.²¹

For the whole mechanism to fit within a protective box with dimensions of 18 x 15 x 3 inches, the two gears would have been about 9 inches in diameter and 1 inch thick.

At long last, Clayton had a fully operational “roadometer”—his name for the odometer. But it was a machine, and, like all machines, it could and did malfunction. Just four days after announcing the machine’s completion, Clayton records a major problem with its operation:

THURSDAY, [MAY] 20TH. . . . At 7:45 we started out again but had not traveled over a quarter of a mile before the roadometer gave way on account of the rain yesterday having caused the wood to swell and stick fast. One of the cogs in the small wheel broke [the 40-tooth, ten-mile wheel]. We stopped about a half an hour and Appleton Harmon took it to pieces and put it up again without the small wheel. I had to count each mile after this.²²

There is no mention of repairing or replacing the broken ten-mile gear wheel until they arrived in the Great Salt Lake Valley. It appears that the one-mile, sixty-tooth gear wheel is the only part of the machine that was operational during the remainder of the journey west. If this is true, Clayton would have had to watch the gear wheel closely and record each rotation as they traveled, that is, every mile:

TUESDAY, [JUNE] 8TH. . . .

. . . The road over was indeed very crooked but mostly bending to the north. . . . we began to descend gradually, and while watching the roadometer I discovered it did not work right which made me pay more attention to it.

WEDNESDAY, [JUNE] 9TH. Arose at 4:20 and at 5:15 a.m. we moved onward. . . . At 5:45 we halted for breakfast. . . . While we halted I got the roadometer fixed again and also put up a guideboard marked “To Fort John [Fort Laramie] 60 miles.”²³

The Upper Platte River Ferry

From Winter Quarters, the Mormon pioneer company traveled along the north side of the Platte River. With the odometer on board, they continued up the river's north fork to Fort Laramie, where they crossed over and continued west on the Oregon Trail. Seventy miles farther on, they again met the Platte River where it flows eastward in a gentle arc from its headwaters in the Colorado Rockies. Due to high spring run-off conditions, one full week was required to ferry the wagons across the river.

In order to expedite the crossing of eight other Mormon emigrant companies farther back on the trail, a decision was made to leave a small contingent of men at the river crossing to continue operating the ferry. The ferry operation would also be financially profitable since large numbers of Oregon and California pioneers on the Oregon Trail would also need to cross the river. One of the men assigned to the ferry crew was Appleton Harmon, the builder of Clayton's "roadometer."

On July 10, 1847, a small company of Oregon-bound pioneers arrived at the Mormon Ferry. They camped that evening and were ferried across the river the next day. Two entries in Harmon's journal refer to them. The first entry is particularly important because it corroborates the fact that Oregon-bound pioneers were also using odometers, thus invalidating a later claim that Clayton's machine was the first odometer ever built:

[Saturday,] July 10. . . . The company altogether bought about \$100 worth of goods of Mr. H. Quelling [*sic*], a Quaker. He had a roadameter on one of his wagons. Captain Bonser's company of twelve wagons ferried.

[Sunday,] July 11. Received for blacksmithing \$16.45, \$1.00 for ferrying. Twelve wagons of Captain Bonser's company, \$10.55 cash. . . . We ferried a nursery of seven hundred fruit trees, which, were apple, peach, plum, pear, currants, grapes, raspberry and cherries all growing nicely in clover. They were owned by H. Lieuelling [*sic*], a Quaker from Salem, Iowa.²⁴

The nurseryman was Henderson Luelling (note different spellings), an early pioneer of Oregon's Willamette Valley. His load of seven hundred fruit trees was indeed unusual, but his use of an odometer was not. Odometers were used by many westward

moving pioneers of that period. Unlike Clayton's wooden one, they were made of brass and were constructed by English or American instrument makers.²⁵

Interestingly, four-hundred of Luelling's fruit trees survived the wagon trip to the Willamette Valley, and with them he initiated the fruit industry of the Pacific Northwest.²⁶ What happened to his odometer is unknown.

The Salt Lake Valley

The broken ten-mile gear wheel of Clayton's roadometer had not been repaired or replaced when the pioneers arrived in the Great Salt Lake Valley on July 24, 1847. Three weeks of intense activity followed their arrival—plowing, planting, watering fields, hauling logs, making adobe houses, building cabins, laying out a new city, and exploring the valley with its towering mountains to the east and the Great Salt Lake to the west. The need to measure distance was no longer a priority. During this time, Clayton continued to write, compile distance tables, draw maps, and help Orson Pratt determine the elevations of significant points of geography. Within two weeks, however, Clayton again became involved with the design and testing of a second wooden odometer.

Roadometer: Model II

The pioneers had just completed an overland journey of more than one thousand miles. Nevertheless, their plan called for more than half of the men to return immediately to Winter Quarters on the Missouri River and prepare their families to move west the following spring. The families had been left behind because of the difficulties anticipated by the advance party. William Clayton was one of those designated to make the return trip:

MONDAY, [AUGUST] 2ND. . . .

. . . After dark President Young sent for me to come to his wagon and told his calculations about our starting back. He wants me to start with the ox teams next Monday so as to have a better privilege of taking the distances, etc. . . . He wants the roadometer fixed this week and Elder Kimball has selected William King to do the work.²⁷

TUESDAY, [AUGUST] 10TH. . . . I am expected to keep a table of distances of the whole route returning from here to Winter Quarters and make a map when I get through, and this for public benefit.²⁸

Brigham Young, recognizing the value of Clayton's distance measurements over the last two-thirds of their outbound journey, now wanted him to expand the data to encompass the entire route. In published form, this information would be useful to future emigrant companies traveling west. Earlier, as noted above, Clayton had not planned to publish a trail guide. Now he had specific instructions to do so.

Instead of repairing the first odometer, as President Young had suggested, William A. King²⁹ began building a new machine two days later. The decision to make a new odometer instead of repairing the old one was undoubtedly prompted by a desire for increased measuring capacity. The new instrument was designed to measure one thousand miles instead of ten. The exact design specifications of the second roadometer are not known, but the basic features of the first machine, in modified form, probably carried over into the second. Three facts support this idea: (1) fractional distances of $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ miles were recorded by both machines;³⁰ (2) the first machine's threaded drive rod had its counterpart in the "shaft or screw" of the second;³¹ and (3) the second machine was installed on "Clayton's wagon."³² Since Clayton had no wagon of his own, the implication is that the new machine was installed on the same wagon and wheel as its predecessor—the wheel that was exactly 360 rotations per mile.

It took William A. King just four days of uninterrupted work to build the new odometer. Clayton's journal entry, "again at the roadometer,"³³ tells us that he, too, was involved in the project. His journal also notes its completion:

SATURDAY, [AUGUST] 7TH. Today William A. King has finished the roadometer which will now tell the distance for one thousand miles without keeping any account.³⁴

You can almost hear a sigh of relief in the words "without keeping any account." The improved instrument would make Clayton's task much easier.

Before leaving the valley, the new odometer was tested on two occasions: first on a twenty-two-mile excursion to the Great

Salt Lake³⁵ and then on a one-and-one-half-mile jaunt to the warm spring north of their camp.³⁶ In the first instance, the shaft screw broke and had to be replaced,³⁷ but in the second, the new odometer proved to be operational and ready for the return journey to Winter Quarters, which began on August 17, 1847.

The Return to Winter Quarters

Apparently, Clayton encountered only one problem with the new odometer on the return trip to Winter Quarters. With the brief note on September 13, 1847, "We fixed the roadometer this morning," he records the only known difficulty he had with the machine.³⁸ "We" in that note credits the assistance of others in making the necessary repairs. Exactly what was done and who helped is not known.

We do know that Clayton's traveling companions took little interest in the mile-measuring project. This activity had no relationship to daily necessities—moving teams and wagons over rough terrain, protecting themselves from Indians, hunting for food, and so forth. Nevertheless, Clayton persisted in his appointed task and, in the end, produced a legacy of lasting value.

On October 21, 1847, Clayton's company arrived at Winter Quarters. With characteristic thoroughness, he wrote,

We have been prosperous on our journey home and have arrived in nine weeks and three days, including a week's delay waiting for the twelve and killing buffalo. . . . I have succeeded in measuring the whole distance from the City of the Great Salt Lake to this place, except a few miles between Horse Creek and the A La Bonte River which was taken from the measurement going up. I find the whole distance to be 1032 miles and am now prepared to make a complete traveler's guide from here to the Great Salt Lake, having been careful in taking the distance from creek to creek, over bluffs, mountains, etc. It has required much time and care and I have continually labored under disadvantages in consequence of the companies feeling no interest in it.³⁹

Mistaken Identity

By February 1848, Clayton had prepared his trail-generated data for publication. With a letter of introduction from Brigham Young in hand, he proceeded to St. Louis, Missouri, where he

arranged for the publication of the first five thousand copies of *The Latter-Day Saints' Emigrants' Guide*. Its later use by many western pioneers is well documented.⁴⁰

What happened to the two gear-driven counting machines that provided the data is not known. It is important to recognize that Clayton's first roadometer (and undoubtedly the second) was a series of individual parts mounted on the side of a wagon box. Those parts—wooden gear wheels, threaded drive rods—may be found someday in a museum or in a private collection. At present, they are artifacts lost to history.

To say that the original odometers are lost, however, immediately raises a question about the identity of a wooden odometer displayed for many years in the old Latter-day Saint Museum on Temple Square and identified as the original 1847 pioneer instrument. Sometime in the early 1900s, the odometer on display had been mislabeled as Clayton's machine, even though it did not match his journal description. This case of mistaken identity persisted for many years, primarily because there was no hard evidence to support a different conclusion. The machine on display had a number of missing components, raising questions that could not be resolved. Many assumptions were made which attempted to explain the differences between the odometer and Clayton's description, but none of these were conclusive.⁴¹ Eventually, new evidence confirmed that the machine on display was built in 1876 by a man named Thomas G. Lowe.⁴²

In 1921, the Lowe machine, under its misnomer, was associated with the creation of a myth that the Mormon pioneer odometer of 1847 was the first such instrument ever made. The story of how this myth came into existence constitutes a continuation of the odometer episode and involves not only Lowe and his machine, but also a man named Harry B. Parrish.

The Thomas G. Lowe Odometer

In the year 1875, Thomas G. Lowe was living in the small pioneer community of Franklin, Idaho, twenty miles north of Logan, Utah. That fall, Brigham Young called Lowe to serve a mission to the Oriba Indians on the Little Colorado River of Northern Arizona.

While engaged in this service, this twenty-five-year-old craftsman and engineer provided the Indians with water-powered machinery that greatly improved their ability to produce Indian blankets.⁴³

His labors required him to move from village to village and to sleep in his wagon at night. One evening, after retiring, he gave some thought to the design of a wooden machine that would count the rotations of the wagon wheel as he traveled, thereby enabling him to calculate the distances between villages. He subsequently built the machine he had designed and successfully used it on his own wagon.

In the midst of his missionary labors, Lowe returned to his home in Idaho. On the way, he stopped briefly in Salt Lake City, where he was interviewed by a *Deseret Evening News* reporter who wrote an article that appeared in the newspaper on August 10, 1876.

Arizona Matters

Yesterday we received a call from Elder Thomas Lowe, of the Moan Coppy mission, in Arizona, having just arrived in the city . . . expecting to return to the South in the Fall.

Brother Lowe . . . has a decided mechanical and inventive turn. He exhibited to us a roadometer, which he invented and manufactured himself, from wood. It is a small machine, very simple in construction, consisting of a frame and four solid wheels, cogged or notched at the edges. One turn of the wagon wheel to which it is attached passes one notch on the largest wheel on the machine, and so on till it gets to the fourth wheel, which moves one round every six miles. This machine was thoroughly tested and found to operate with exactness. Brother Low [*sic*] never knew that there were such things in existence as road-meters, and there is probably not another one that operates on the same principle. . . .

By means of his machine he was enabled to make calculations of the distances between different points in the south and the first settlement on the Little Colorado.⁴⁴

The First Odometer Myth

Before leaving Salt Lake City, Lowe gave his odometer to the Deseret Museum,⁴⁵ an institution established in 1869. The odometer was on display from 1876 until 1903, when the museum closed and its holdings were placed in storage for a period of eight years. When the museum reopened to the public in July 1911, Lowe's

odometer was prominently displayed, but in the interim, its identification had been changed. How this occurred is not clear, but a label that was attached to the machine read as follows:

Deseret Museum

"ROADOMETER"

Used by the Pioneers of 1847 to measure the distance across the plains. Made by Appleton M. Harmon. —William Clayton.⁴⁶

As a result, Lowe's machine became known as the original 1847 instrument of William Clayton, Orson Pratt, and Appleton Harmon. This switch in identity has mystified historians because Clayton's and Lowe's machines are distinctly different. A list of the individual machine components makes this abundantly clear:

Clayton, Pratt, and Harmon Odometer (per Clayton's description)

- 1 60-tooth gear wheel, approx. 9" diameter
- 1 40-tooth gear wheel, approx. 9" diameter
- 1 18-inch, threaded drive rod
- 1 Enclosing box, 3" x 15" x 18"

Each part was mounted separately on the wagon box (fig. 5).

Lowe Odometer (per actual measurement)

- 1 42-tooth gear wheel, 13" diameter
- 1 38-tooth gear wheel, 10³/₈" diameter
- 1 28-tooth gear wheel, 6" diameter
- 1 18-tooth gear wheel, 4⁵/₈" diameter
- 1 Ratchet-activated drive mechanism

Each part was set in a fixed, 8" x 30" wooden frame that was mounted on the wagon box (fig. 6).

B. H. Roberts, in his *Comprehensive History of the Church*, noted these differences but was unable to explain them:

According to the Deseret Museum Curator's report upon the machine in that institution and . . . [Clayton's description of his machine] . . . there are material differences, both as to the size of the machine over all, and the number of cogs in wheels and in the levers for transmitting motion, etc. Which differences may be accounted for either by defectiveness in the description, or by the absence of parts of the machine, perhaps by both of these circumstances.⁴⁷

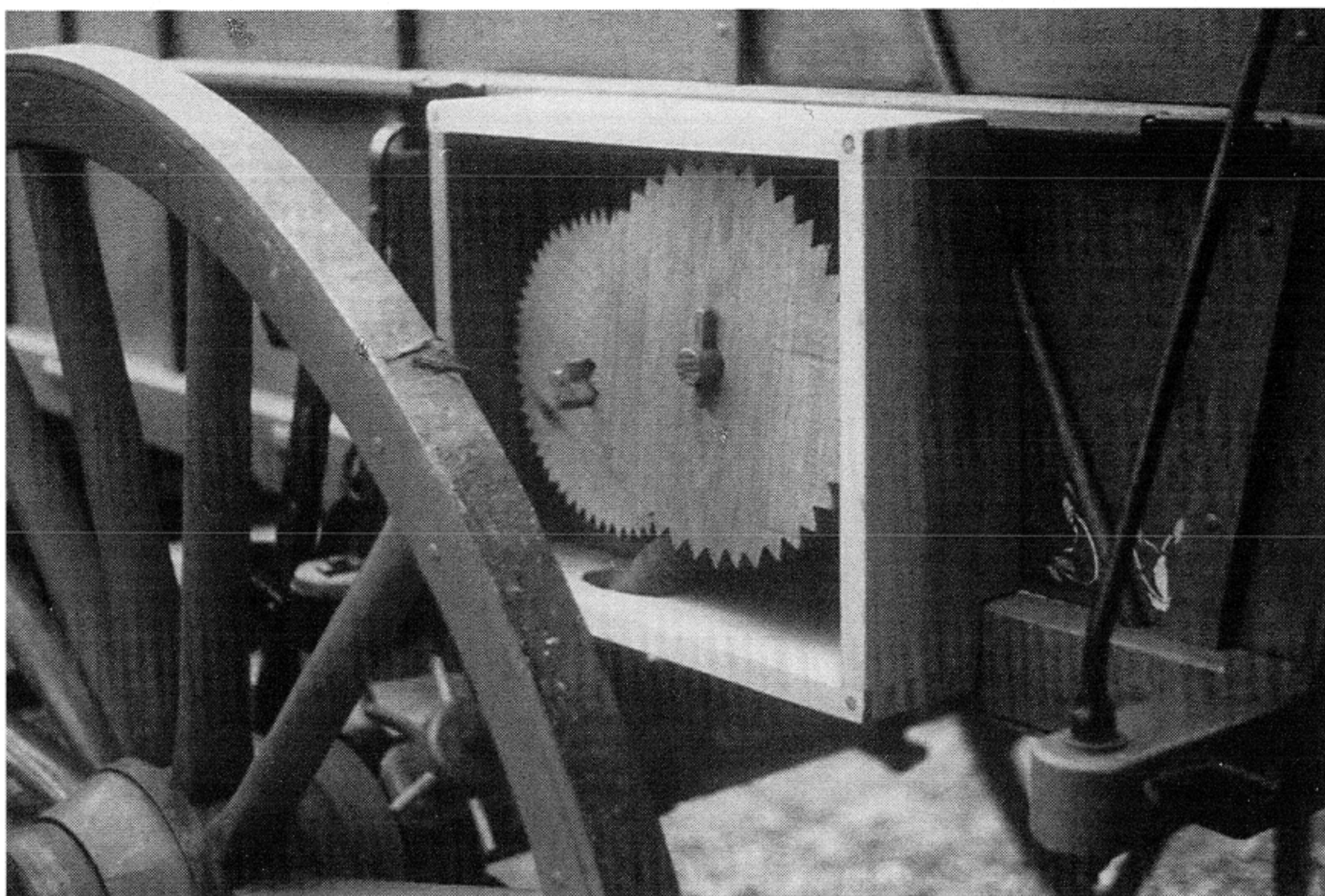


Fig. 5. Mounted replica of pioneer odometer. Following Clayton's specifications, Steven Pratt re-created the pioneer odometer. This version is mounted on a wagon at the Museum of Church History and Art.

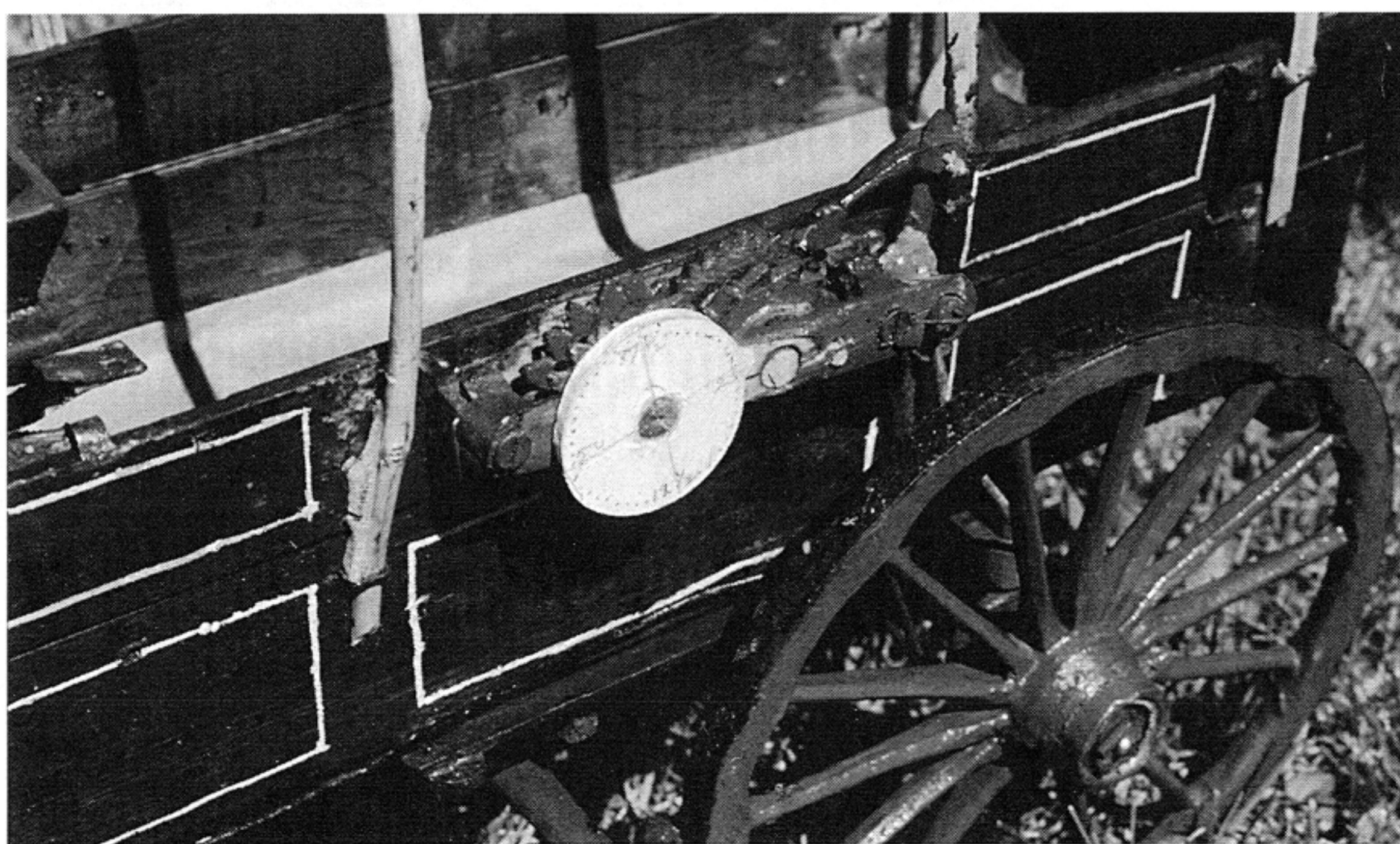


Fig. 6. Mounted miniature of Lowe odometer. The differences in components and method of mounting between the two odometers on this page are readily apparent. This replica of the Lowe odometer was made by Lowe himself. For a close-up view, see fig. 2.

Misidentification of Lowe's odometer as the 1847 pioneer machine continued for many years.

Coupled with this identification error was the inaccurate story that the Mormon pioneer odometer was the first such device ever invented. This latter error was initiated by an interesting series of circumstances involving a salesman named Harry B. Parrish, a cloth-measuring machine, and Lowe's odometer in the Church museum.

The Second Odometer Myth

In the spring of 1921, Parrish, a businessman from Grand Rapids, Michigan, came to Salt Lake City as a representative of the Simplex Computing Machine Company, manufacturers of a newly invented device for measuring yardage goods. The machine was of primary interest to department stores and mercantile institutions engaged in retail sales.

While in the city, Parrish visited the Church Museum on Temple Square and saw Lowe's odometer displayed as the original 1847 Mormon pioneer artifact. He was fascinated with the machine, its early origin, its ingenious design, and its pragmatic use. His interest was the basis of an article that appeared in the *Deseret News* on May 19, 1921. That newspaper report initiated a myth that persists to this day:

Pioneer Measuring Device May Prove to Be First Speedometer⁴⁸ Ever Made

The old roadometer [Lowe's] in the L.D.S. Church museum, used by the Utah pioneers crossing the plains is likely to become famous in the near future. It is believed it may be proved that the machine was the first of its kind ever made and that it may be proven to be the forerunner of the modern speedometer. It is possible that authorities in the research department of the Smithsonian Institute, which has to do with pioneer inventions may be appealed to in order that the exact status of the pioneer instrument may be determined. . . .

Mr. Parrish's interest in the machine has attracted the attention of local citizens and because of the visitor's connection with measuring machines, he has been consulted as to the place the relic may hold among such devices. Mr. Parrish believes it to be the first of its kind.⁴⁹

To the understandable error about the odometer's origin, this *Deseret News* article added a new inaccuracy, that the instrument on exhibit [Lowe's] was "the first of its kind ever made."

Because Parrish represented a company that manufactured a linear measuring device, his word was accepted as authoritative. What Parrish did not know, however, was that gear-driven odometers were in use at the time of the pioneers (figs. 7, 8). This fact was explained two weeks later by Albert A. Gentry, a Salt Lake City engineer, whose letter to the *Deseret News* was published on June 4, 1921:

I read with interest the description of the old Clayton (Lowe's) "roadometer" contained in the *Deseret News* of recent date and note also the existing supposition on the part of some that this mechanical device may possibly be the "first of its kind."

It may be of interest to those concerned to learn that Marcus Vitruvius, architect and engineer to Emperor Augustus, fully described a somewhat similar odometer 13 years B.C. in his great work "De architectura" Book X, 9. This work covers Vitruvius's observations on civil and mechanical engineering founded on Roman and Grecian experience. The odometer he describes is similar to Clayton's [Lowe's] in principle only and is perhaps more elaborate.⁵⁰

The article goes on to describe the gear-driven odometer of Vitruvius which dropped one pebble into a "counting box" every Roman mile.

Although this newspaper article established the fact that odometers had been built and used anciently, it did little to curtail the spread of the false information generated by Harry Parrish's visit to Salt Lake City. From that time forward, the myth that the Mormon pioneers were the inventors of the first odometer found its way into print in many places.⁵¹

Correcting the Record

In 1921, when the *Deseret News* printed the articles cited above, Thomas G. Lowe was seventy years old. Although he knew that the odometer on display in the L.D.S. Museum was his own, Lowe had been unable to convince museum authorities of that

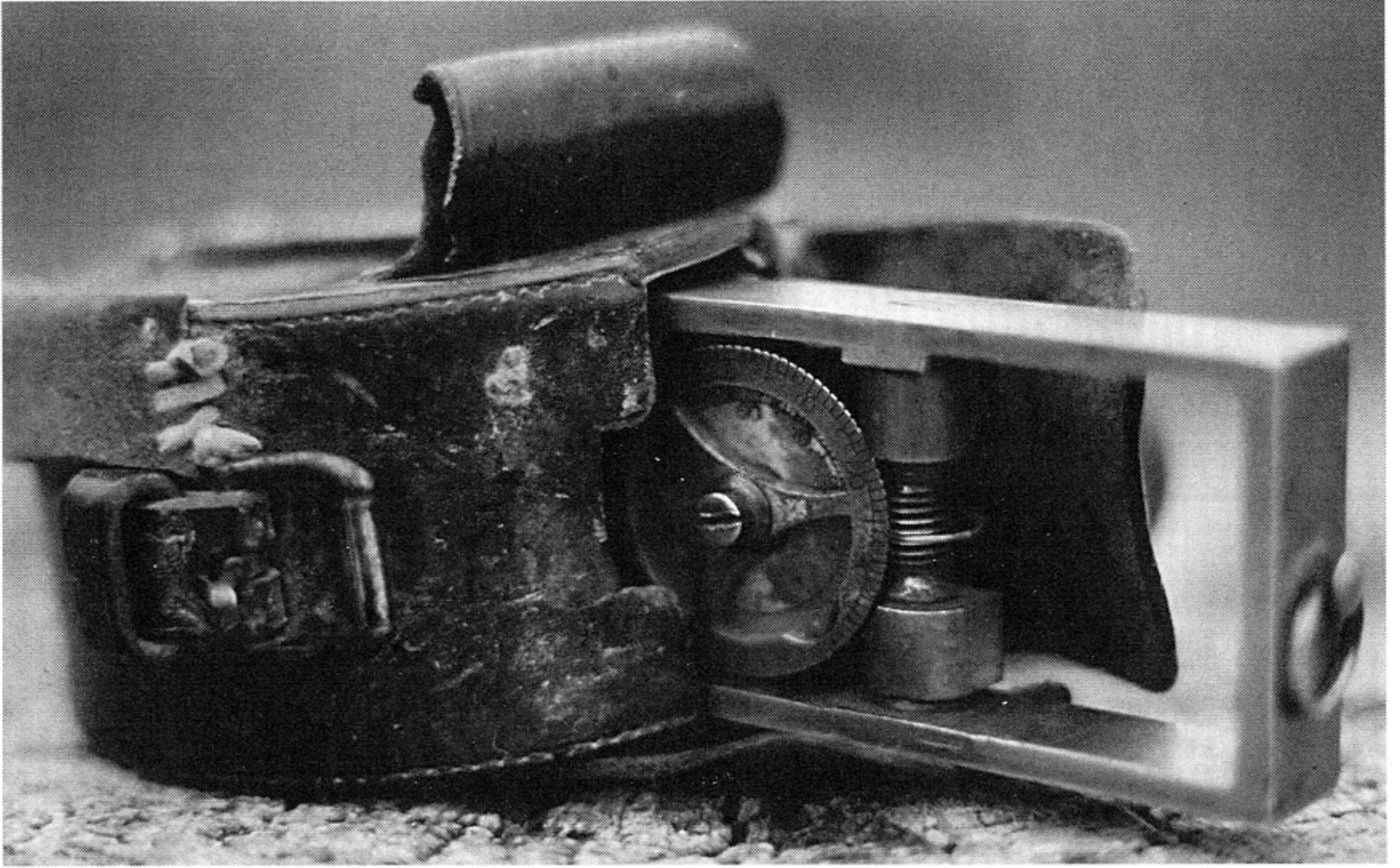


Fig. 7. Odometer from the 1850s. Odometers were commonly used by surveyors and the military during the Utah pioneer period. This odometer was probably employed by John W. Gunnison during his last survey. Shortly after he was massacred by natives in 1853 south of Delta, Utah, the pioneers recovered all of his equipment except his odometer. Some years later, this odometer was found on a trail near the massacre site.

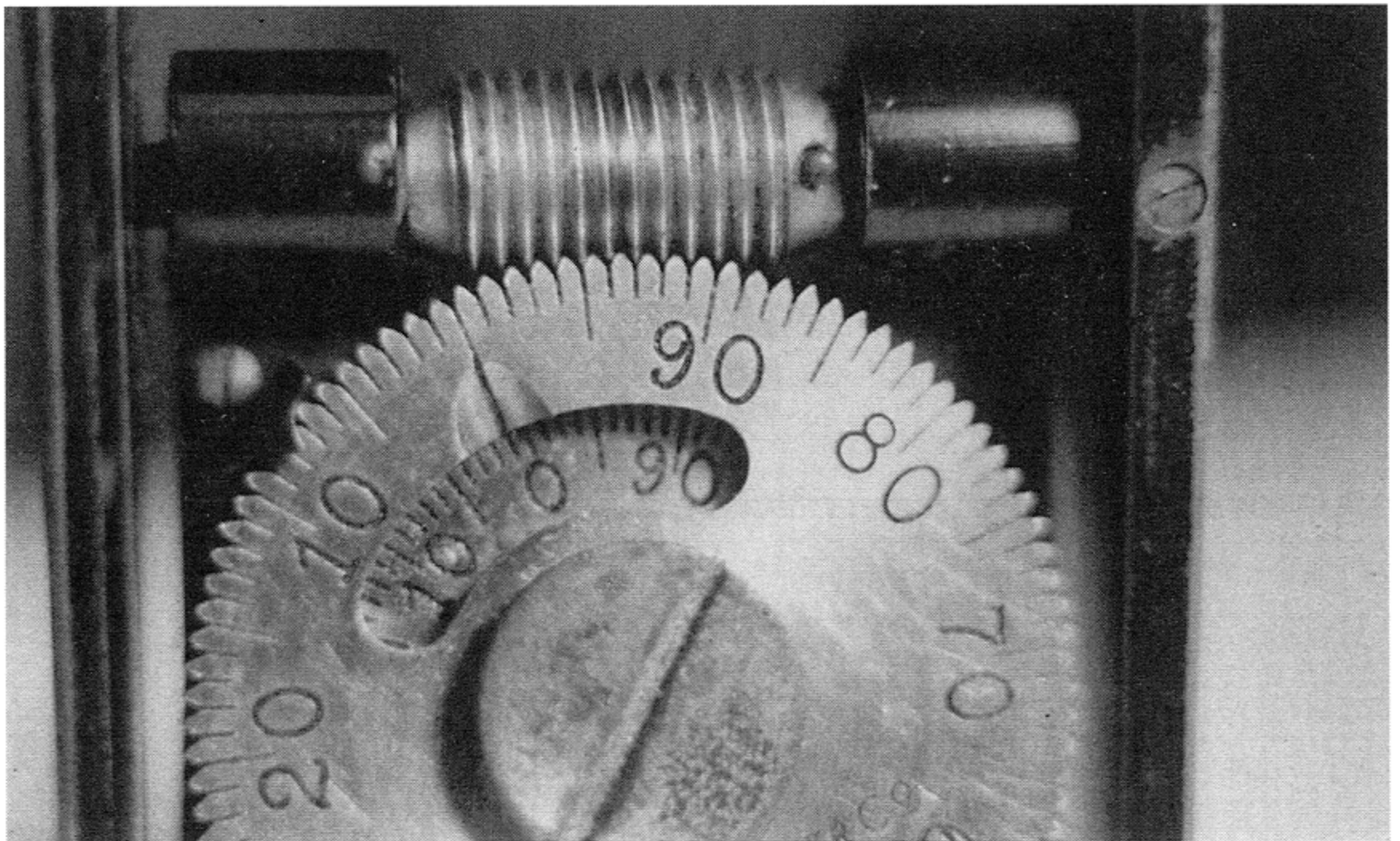


Fig. 8. Military odometer, dating to Civil War times. This style of odometer was used relatively unchanged from the 1850s to WW1.

fact. Now, recalling the 1876 *Deseret Evening News* article about his odometer, he set out to use it as evidence to validate his claim. An account of his endeavors was printed in *The Salt Lake Telegram* on July 13, 1921:

Proves Orson Pratt Was Not Inventor

LOGAN, July 13—Thomas G. Lowe has returned from a trip to Salt Lake City, where he went to attempt the rectification of what he considered an injustice to himself, with every prospect of success. Visiting the Deseret museum sometime since he saw enclosed in a case a form of roadometer in use in early days, the invention of which was attributed to the late Orson Pratt, but which Mr. Lowe at once recognized as his own, invented forty-three years ago for the purpose of measuring the road from Moan-Coppy, Ariz.—which he had been called to help settle—to Salt Lake, the device recording the revolutions of one of the hind wheels of the wagon from which the distance could be readily computed.

Mr. Lowe related the facts to the curator, but having no proof, it looked as if the mistake would go unrectified, and especially as Mr. Pratt was known to have invented a roadometer, although the description, still extant, did not fit the appliance on exhibition. Recently it occurred to Mr. Lowe that upon his arrival from that trip a reporter from a Salt Lake paper saw it, was interested and wrote a description of it. Mr. Lowe then made the trip to Salt Lake, from which he had just returned. The paper's files were overhauled, the description and narrative found and he was given a certified copy which he presented to the authorities with every prospect of having the mistake rectified.⁵²

The *Logan Journal*, Lowe's hometown newspaper, also noted his dilemma in an article that appeared July 12, 1921. Then, in a follow-up article on August 16, 1921, the *Journal* reprinted the full 1876 *Deseret Evening News* report and concluded by saying that it fully established Lowe's claim.⁵³

From these newspaper accounts, it would appear that the odometer in the LDS Museum should have been credited to Thomas G. Lowe from 1921 onward. But such was not the case. For another sixty-two years, his wooden instrument continued to be known as the original 1847 Mormon pioneer "roadometer." Interestingly, Lowe played a posthumous role in correcting the error. The mechanical skill that had produced his original odometer also produced a sure means of identifying it.

In 1931, Lowe, who was then eighty years old, constructed a miniature working model of a pioneer wagon (fig. 9). It was authentic in every detail. He carved, assembled, and installed a tiny odometer on the wagon box of this model, similar to the one he had built some fifty-five years earlier. This diminutive device incorporates the same gear design as his original instrument. Its ratchet-like drive mechanism, activated by the rotation of the rear wheel, provided the missing information required to fully understand the machine's drive mechanism. Lowe placed the model in a glass case and gave it to the Pioneer Museum in his hometown of Franklin, Idaho, where it can be seen today.

It was not until 1977, after I inspected the model of Lowe's odometer in the Franklin museum, that I could offer convincing proof of its identity to the authorities of the Museum of Church History and Art in Salt Lake City. Finally, in 1983, the museum curators changed the label on the odometer, correctly identifying it as Thomas Lowe's. This action resolved one of the fascinating puzzles in Mormon pioneer history.

The Sesquicentennial Reenactment

On May 16, 1997, a new chapter was added to the saga of the Mormon pioneer odometers. As the westward-moving sesquicentennial Mormon Trail wagon train approached North Platte, Nebraska, Virginia Starling, a member of the company, volunteered to count the rotations of a wagon wheel for one day, duplicating William Clayton's heralded task of 150 years earlier. She attached bandannas to the spoke of a wheel and succeeded in counting 7,360 wheel rotations during the day—a distance of 19.2 miles. She was honored that evening at an odometer installation ceremony attended by Church and civic leaders. Descendants of the Clayton, Pratt, and Harmon families were also honored as a replica of the original, ten-mile odometer was installed on one of the wagons (fig. 10).

This historical reenactment makes it clear that the Mormon pioneer odometers constitute an ongoing legacy that is as alive today as it was 150 years ago.

Norman Edward Wright is Professor Emeritus of Computer Science at Brigham Young University.

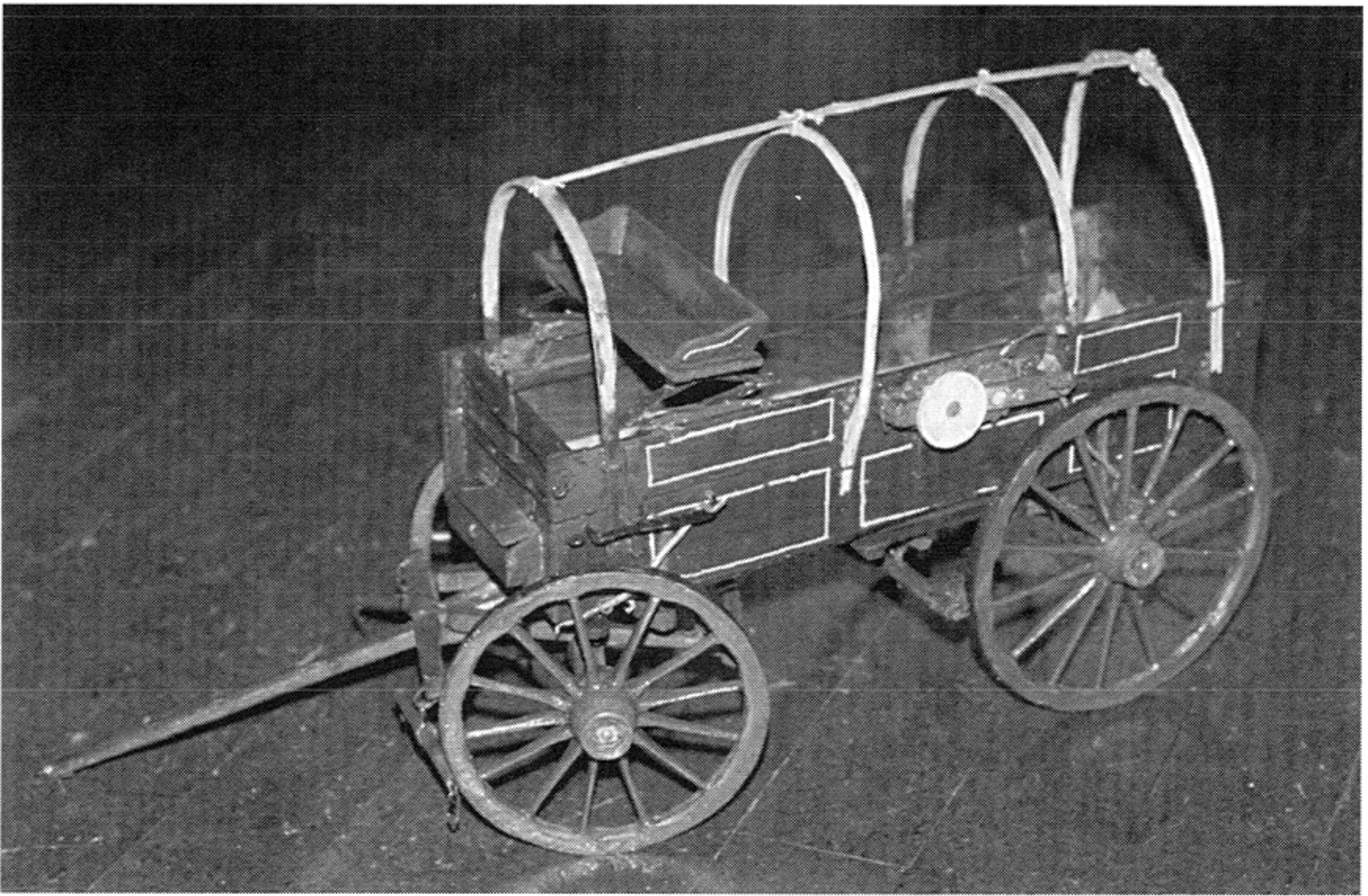


Fig. 9. Lowe's Miniature Pioneer Wagon. Late in life, Thomas G. Lowe built this working model of a pioneer wagon and included a tiny replica of his 1875 odometer. This model helped convince museum authorities that the odometer attributed to Pratt and Harmon was actually built by Lowe.

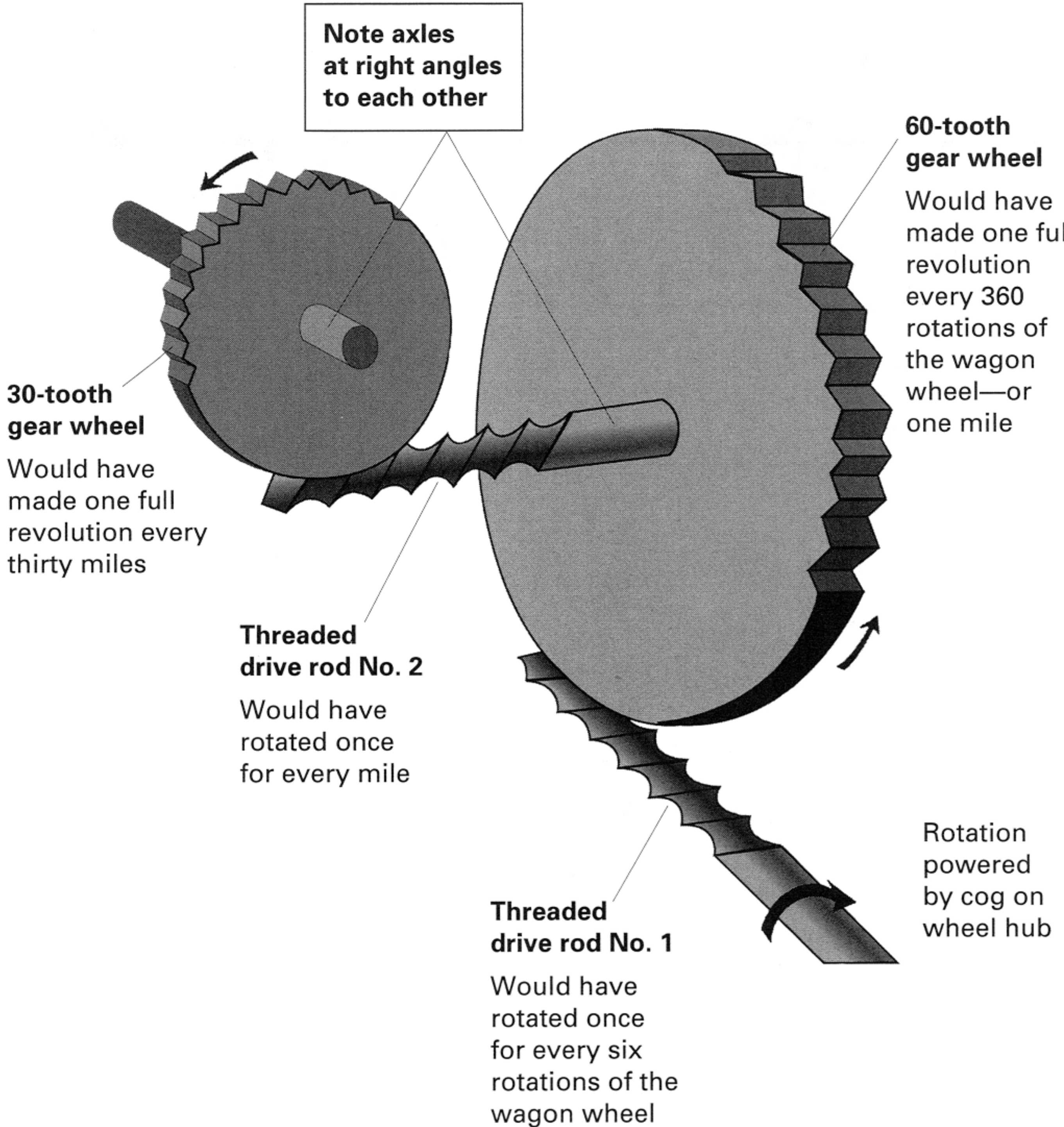


Courtesy James F. Tierney and Jane Tierney, North Platte, Nebraska.

Fig. 10. Sesquicentennial installation of Steven Pratt's replica of the odometer used by the first pioneer company. *Left to right:* Robert Killpack, relative of Appleton Harmon; Vernon Combs, President of the Lincoln County Nebraska Mormon Trails Association; Gary Clayton, descendant of William Clayton; Theron Roundy, descendant of Shadrach Roundy, member of Brigham Young's 1847 company.

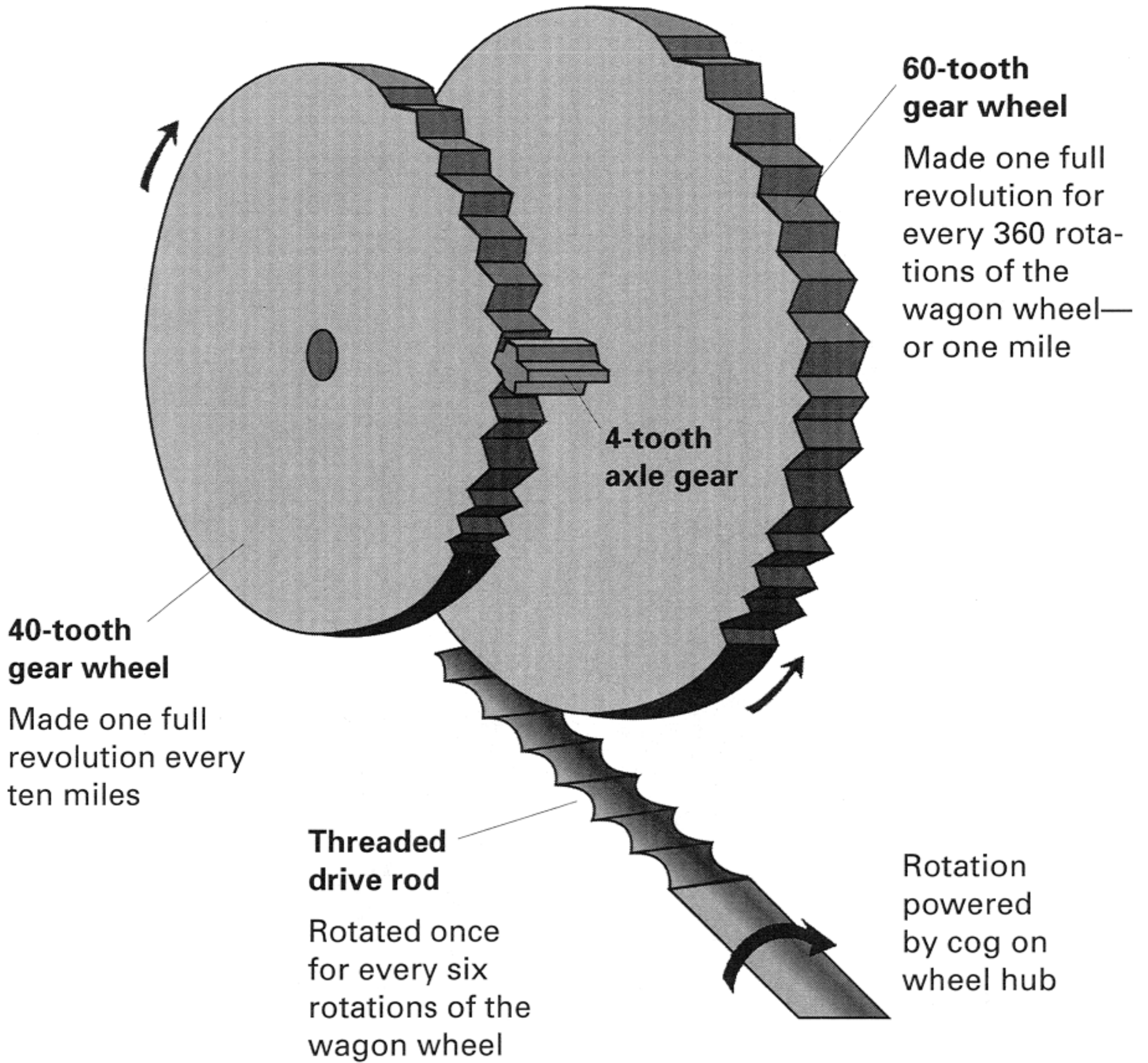
Appendix A

Pratt's Proposed Odometer



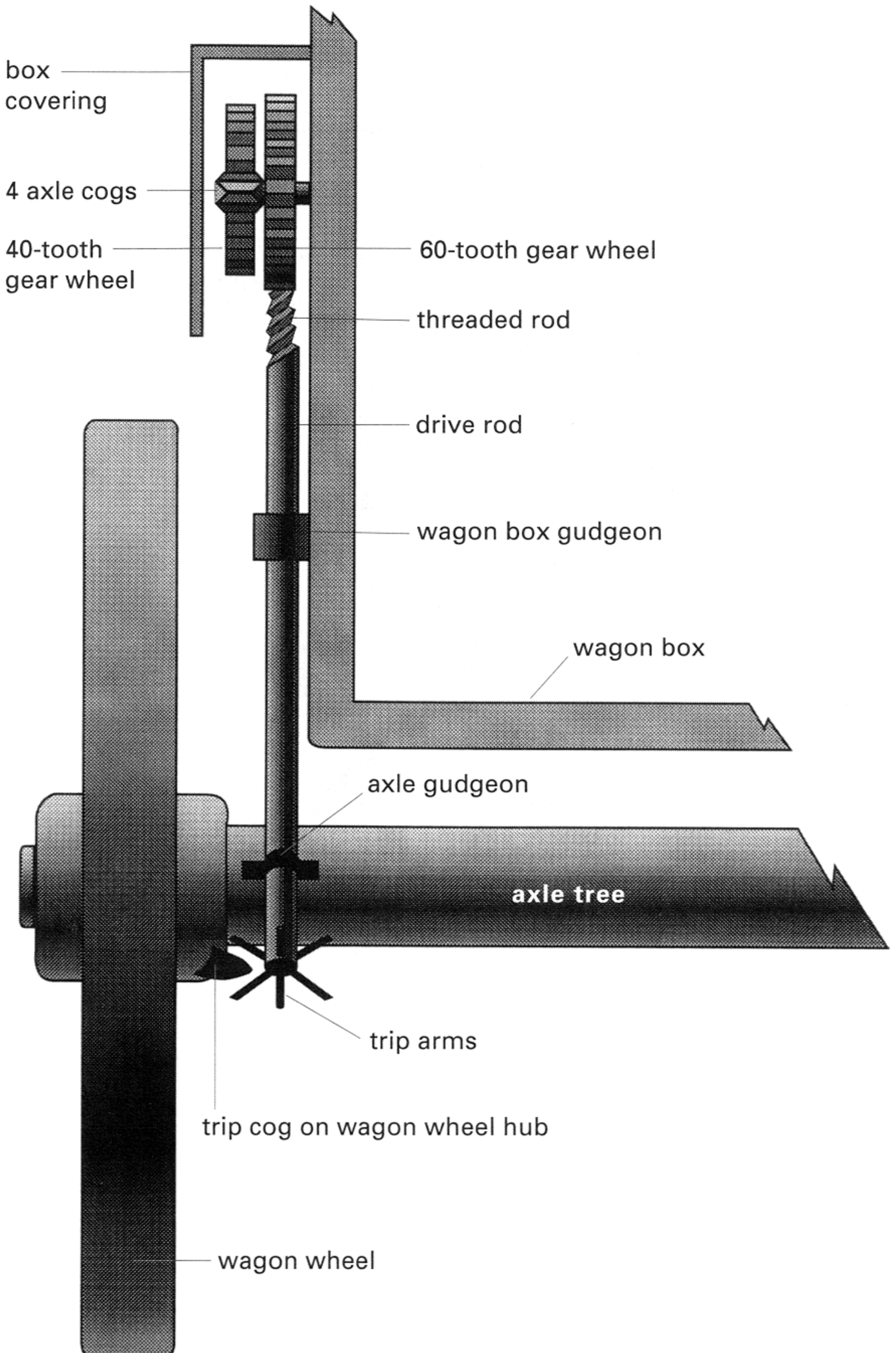
Appendix B

Clayton's Odometer as Built by Harmon



Appendix C

Diagram of Top View of Clayton's Odometer



NOTES

¹Erastus Snow, "From Nauvoo to Salt Lake in the Van of the Pioneers: The Original Diary of Erastus Snow," *Improvement Era* 14 (May 1911): 634. Orson Pratt tells of ordering these instruments sometime earlier, "During our stay in 'Winter Quarters,' we had sent to England, and procured the following instruments preparatory to our exploring expedition, viz;—two sextants, one circle of reflection, two artificial horizons, two barometers, several thermometers, telescopes &c." Orson Pratt, "Interesting Items concerning the Journeying of the Latter Day Saints from the City of Nauvoo, until Their Location in the Valley of the Great Salt Lake. (Extracted from the Private Journal of Orson Pratt)," *Millennial Star* 12, no. 2 (January 15, 1850): 18.

²Orson Pratt, "Conference Minutes," *Millennial Star* 10, no. 17 (September 1, 1848): 264-65.

³"The Viometer or Travelling Register," *Scientific American* 3 (July 8, 1848): 332. This brief article provides a detailed description of the viometers [odometers] used in London in 1848:

"Viometers are sold in great numbers in London, and the following account of them as sold there, will not be uninteresting to our readers.

The Viometer consists of a brass plate having a fixed axis placed perpendicularly to its surface with an endless screw cut on its middle part. On this is suspended a small brass frame which swings freely below. In this frame are two brass wheels turning freely and independent of the same axis, each cut with teeth on its edges beveling toward each other, one containing 100 and the other 101 teeth. The endless screw on the fixed axis engaged in the teeth of both wheels drives them in the same direction, every revolution of the carriage wheel moving them one tooth. In 100 revolutions the wheel with 100 teeth has returned to its original position, and the other wheel is one tooth behind, and so on successively, so that the number of teeth the second wheel is behind the first will be a register of the number of hundreds of revolutions the carriage wheel has made since it started, or since the machine was set and the number of revolutions the carriage wheel has made beyond the even hundreds."

⁴The list of scientific instruments purchased in England is almost identical in type and number to those used by Captain John C. Frémont, U.S. Army Topographical Engineer, during his 1843-44 western expedition. Frémont's list did not include an odometer. Odometers were not available as a standard item of army issue until 1848. Frémont's report does, however, include a table of distances traveled each day. These values, all whole numbers, were undoubtedly obtained from individual estimates or calculated from astronomical measurements and rounded.

In 1845, the Mormon leaders in Nauvoo obtained a copy of Frémont's report and studied it diligently. His use of scientific instruments undoubtedly

underscored their importance and may account for the fact that the Church leaders ordered a similar list of instruments from England and that they overlooked an odometer.

A comparative list of instruments follows:

Frémont—1843-44	Mormon Pioneers—1847
One refracting telescope	One reflecting telescope
One reflecting circle	One circle of reflection
Two sextants	Two sextants
Two barometers	Two barometers
Six Themometers	Several Themometers
Two Pocket Chronometers	Two Pocket Chronometers
No Odometer	No odometer
—	—
No Artificial Horizon reported	Two Artificial Horizons
No Quadrant reported	One Quadrant
No Small Telescopes reported	Several small telescopes
(J. C. Frémont, <i>Report of the Exploring Expedition to the Rocky Mountains in the Year 1842, and to Oregon and North California in the Years 1843-44</i> [Washington: House of Representatives, 1845], 106)	(Pratt, "Conference Minutes," 264-65)

⁵Heber C. Kimball, "The Pioneer Journal of Heber C. Kimball," *Utah Genealogical and Historical Magazine* 30 (January 1939): 11-12.

⁶"SUNDAY, [APRIL] 18TH. . . . I commenced writing Heber's journal and wrote considerable. He wants me to write his journal all the journey. I also wrote considerable in this book [his own journal]." William Clayton, *William Clayton's Journal* (Salt Lake City: Deseret News Press, 1921), 79-80.

FRIDAY, [MAY] 21ST. . . . Elder Kimball proposed tonight that I should leave a number of pages for so much of his journal as I am behind in copying and start from the present and keep it up daily. He furnished me a candle and I wrote the journal of this day's travel by candle light in his journal, leaving fifty-six pages blank. (Clayton, *Journal*, 166, 169)

To compare the content of the Heber C. Kimball journal to that of William Clayton's for the same days (May 23 and 29, 1847), see Heber C. Kimball, *Journals*, holograph, book 94, Special Collections and Manuscripts, Harold B. Lee Library, Brigham Young University, Provo, Utah (hereafter cited as BYU Archives); and Clayton, *Journal*, 178, 194-95.

⁷"SUNDAY, [APRIL] 18TH. This morning I wrote a letter for Heber to his wife Vilate, which was sent by Brother Ellis Eames who has concluded to go back on account of poor health." Clayton, *Journal*, 79.

"TUESDAY, [AUGUST] 10TH. . . . Now what have I done for Brother Kimball? . . . I have written in his journal 124 pages of close matter . . . besides writing letters, etc." Clayton, *Journal*, 342-44.

⁸Clayton, *Journal*, 156, 159:

TUESDAY, [MAY] 18TH. . . .

. . . After encampment was formed, went with Elder Orson Pratt to Dr. Richards' wagon to enter into arrangements for making a map of our route. The doctor wants me to do it, assisted by Elder Pratt's observations. He handed me Fremont's map, and I retired to my wagon to commence operations, but soon found that the map does not agree with my scale nor Elder Pratt's calculations. I then proposed to Elder Pratt to wait until we get through the journey and take all the necessary data and then make a new one instead of making our route on Fremont's.

⁹Clayton, *Journal*, 138.

MONDAY, [MAY] 24TH. . . . I have been writing in Elder Kimball's journal since dark, and have but little chance to write as much as I want in my own and his both, but I feel determined to do all I can to keep a journal of this expedition which will be interesting to by children in after days, and perhaps to many of the Saints. (Clayton, *Journal*, 180, 182)

From the above entry, it is clear that Clayton, on this occasion, wrote Kimball's journal first and then, apparently, copied it back into his own journal with augmentations.

¹⁰William Clayton, *The Latter-Day Saints' Emigrants' Guide* (St. Louis: Chambers and Knapp, 1848), preface.

¹¹Clayton, *Journal*, 136.

¹²Clayton, *Journal*, 81, 83.

¹³Clayton, *Journal*, 88, 91.

¹⁴Clayton, *Journal*, 136-37. Clayton does not describe the particular method he used for observing or for tallying the rotations of the wagon wheel. I am not aware of a single source document that corroborates his use of a piece of "red flannel" tied to a spoke to note wheel rotations. This widely reported detail appears to be an embellishment by later writers. The pages of Clayton's journal contain no counting data or calculations. Worksheets were evidently used for this purpose and later discarded. Clayton did not know that a wheel 4' 8" in diameter was one of the standard sizes manufactured by wheelwrights of that period.

¹⁵Orson Pratt, *The Orson Pratt Journals*, ed. Elden Jay Watson (Salt Lake City: Elden Jay Watson, 1975), 390-92. The principle of the "endless screw" is centuries old. Today, we call it a worm gear. It was commonly used in many odometers of that period. In this respect, Pratt's design proposal was not new or unique but rather a practical application of his general knowledge of gear works.

¹⁶Clayton, *Journal*, 149.

¹⁷Clayton, *Journal*, 143. On May 12, Thomas Bullock, clerk of the pioneer company, also noted the event in his journal: "Travelled 12 miles, according to William Clayton's Roadometer, attached this morning." Will Bagley, ed., *The Pioneer Camp of the Saints: The 1846 and 1847 Mormon Trail Journals of Thomas Bullock*, Kingdom in the West: The Mormons and the American Frontier, vol. 1 (Spokane, Wash.: Arthur H. Clark, 1997), 153.

¹⁸Clayton, *Journal*, 151–52.

¹⁹Amasa M. Lyman, "Amasa M. Lyman's Journals—1847 and 1858–1863," typescript, 27, BYU Archives.

²⁰"I wish it understood that during the forepart of our journey we had to guess at the distance, and sometimes overstated it. But by the mechanical genius of Appleton Harmon's, we have now the distance counted off to us like clock-work through the agency of a machine attached to his wagon bed, the wheels of which are turned by the revolutions of the wagon wheel." Erastus Snow, "From Nauvoo to Salt Lake in the Van of the Pioneers: The Original Diary of Erastus Snow," *Improvement Era* 14 (October 1911), 1099.

"[Monday, May] 10th [1847] Traveled ten miles. Bro. Appleton M. Harmon made an odometer attached to the wheel of Wm. Clayton's wagon, enabling bro. Clayton to measure the distances of each days travel." Brigham Young, *Manuscript History of Brigham Young—1846–1847*, ed. Elden Jay Watson (Salt Lake City, Elden Jay Watson, 1971), 554.

"A.M. Harmon fixed a roadometer by which we have since measured." Lyman, "Journals," 26.

²¹Clayton, *Journal*, 151–53.

²²Clayton, *Journal*, 163.

²³Clayton, *Journal*, 224–26.

²⁴Appleton Harmon, *Appleton Milo Harmon Goes West*, ed. Maybelle Harmon Anderson (Berkeley, Calif.: Gillick Press, 1946), 40.

²⁵Norman E. Wright, "Odometers: Distance Measurement on Western Emigrant Trails," *Overland Journal, Oregon-California Trails Association* 13 (fall 1995): 14–24.

²⁶O. A. Garretson, "The Lewelling Family—Pioneers," *Iowa Journal of History and Politics* 27 (October 1929): 558.

²⁷Clayton, *Journal*, 338, 340.

²⁸Clayton, *Journal*, 342, 344.

²⁹Of all the participants in the pioneer odometer episode, we know least about the life of William Avidus King. I have searched extensively in Utah, Massachusetts, Maine, and New York to obtain more information with the hope of documenting the specifications of his one-thousand-mile-measuring machine. My efforts have produced only scattered pieces of biographical data. The following facts regarding his life have been established:

Born: July 3, 1820 at Paris, Maine

Parents: George and Polly Hall King

Siblings: Miranda, Augustus, Erastus, Octavius, and Cyrenus

Joined the Church in early 1840s

Ordained an Elder in 1844 (est.)

Member of the 25th Quorum of Seventy in Nauvoo

Adopted son of Heber C. Kimball

Carpenter on the Kimball home in Nauvoo

Endowed in the Nauvoo Temple, January 10, 1846

Member of Brigham Young's 1847 pioneer company

After returning to the East, he never came back to Utah

Met Erastus Snow in Cambridge, Massachusetts, in July 1850

Lived in New York City in March 1851
 Reportedly left the Church
 Believed to have died in Boston in 1862

A significant amount of King family research remains to be done. The author will be grateful to any reader who could provide additional information.

"WEDNESDAY, [AUGUST] 4TH [1847]. This morning William A. King commenced making a new roadometer." Clayton, *Journal*, 341.

"William Clayton, with the assistance of William King and Orson (Whitney) was engaged today in making a new Roadometer, as he intends to start back with the ox teams on Monday next." Howard Egan, *Pioneering the West, 1846 to 1878; Major Howard Egans' Diary* (Salt Lake City: Skelton Publishing, 1917), 115.

³⁰Clayton, *Journal*, 360-61.

³¹Egan, *Pioneering the West*, 122.

³²Egan, *Pioneering the West*, 123.

³³Clayton, *Journal*, 341.

³⁴Clayton, *Journal*, 341.

³⁵Clayton, *Journal*, 346.

³⁶Clayton, *Journal*, 346-47.

³⁷Egan, *Pioneering the West*, 122.

³⁸Clayton, *Journal*, 362.

³⁹Clayton, *Journal*, 376.

An often asked question is, "How accurate were Clayton's measurements?" The answer, his measurements were reasonably accurate. An odometer, however, is not a high-precision device. Years later, the accuracy ascribed to Clayton's wooden instrument was distorted. In particular, a sign that described the odometer artifact [Lowe's] in the old Church Museum on Temple Square read as follows: "The difference between the measurements made by this instrument and those made by the government surveyors who subsequently passed over the route, was less than 60 feet." The government surveyor referred to was Albert Carrington, a member of the Church, who in 1849-50 was assigned to assist Captain Howard Stansbury of the U.S. Army in his survey of the Great Salt Lake. Afterwards, he accompanied Stansbury to Washington, D.C., where the final government report was prepared. In 1851, Carrington returned to Salt Lake City over the same route that Clayton had taken, measuring the distances with a brass, pendulum odometer similar to an English viometer.

On July 17, 1851, Carrington made the following notation in his journal: "Clayton only measured the track and we measure turning off to water and camp etc." When Carrington completed his journey, he totaled the distance from Kaneshville to the Temple Block in Salt Lake City and found it to be 1,203 miles. This total included a 150-mile detour around the Loupe River to avoid high water and twenty-two additional miles traveling on the north side of the Platte River from the Ft. Laramie ford to the upper ferry. Subtracting these from the total gives 1,031 miles, which agrees exactly with Clayton's total published in his 1848 *The Latter-Day Saints' Emigrants' Guide*.

The identical totals of the two measurements appears to be the source of the statement on the Church Museum sign. Although Carrington included the measurement of all the side trips, he later approximated them to be nine miles so

as to make his total mileage agree exactly with Clayton's. Precision, therefore, was not a consideration. The "less than 60 feet" difference between the two surveys is undoubtedly fictitious.

⁴⁰James B. Allen, "Biographical Introduction," *The Latter-Day Saints' Emigrants' Guide*, ed. Stanley B. Kimball (Gerald, Mo.: Patrice Press, 1983), 7.

Clayton's published guide, prepared with such meticulous care, is silent with regard to the contributions of Orson Pratt, Appleton M. Harmon, and William A. King in designing and building the machines that provided the data.

⁴¹Guy E. Stringham, "Appleton Milo Harman—Building in Zion" (master's thesis, Brigham Young University, 1970), 49–69.

⁴²Era P. Lowe, "Life Sketch of Thomas G. Lowe: Pioneer of Franklin, Idaho," typescript, 6, BYU Archives.

⁴³Lowe, "Life Sketch," 6.

⁴⁴"Arizona Matters," *Deseret Evening News*, August 10, 1876, 3. The precise operation of the Lowe odometer remains unclear because machine parts that transmit motion from the larger to the smaller gears have been lost. In addition, the size of the wagon wheel that drove the instrument is unknown. From the 1876 *Deseret Evening News* article, however, we learn that the largest gear counted forty-two revolutions of the wagon wheel and that each tooth of the smallest gear represented one-third of a mile.

⁴⁵"The specimens of reptiles brought from Arizona by Brother Thomas Lowe, of Franklin, have been placed in the Deseret Museum by him, and also the roadometer of his invention, where they can be seen by all desiring to examine them." "In the Museum," *Deseret Evening News*, August 12, 1876, 3.

⁴⁶Label on Lowe's odometer, Deseret Museum.

⁴⁷"The Pioneer Odometer," in B. H. Roberts, *A Comprehensive History of The Church of Jesus Christ of Latter-day Saints, Century One*, 6 vols. (Provo, Utah: Corporation of the President, The Church of Jesus Christ of Latter-day Saints, 1965), 3:190–91.

⁴⁸The odometer in an automobile measures the distance traveled whereas the speedometer shows the rate of speed. These two instruments are structurally related so that they are often referred to collectively as the "speedometer."

⁴⁹"Pioneer Measuring Device May Prove to Be First Speedometer Ever Made," *Deseret News*, May 19, 1921, 8.

⁵⁰Albert A. Gentry, "Antiquity of Devices to Measure Distance Traveled by Vehicles," *Deseret News*, June 4, 1921, 7.

⁵¹Today, many people still believe that the Mormon pioneers were the inventors of the first odometer in history. This is a clear demonstration of the power of the printed word—even an erroneous claim appearing in print is accepted as fact. This is particularly true where pride in a common heritage is engendered or enhanced. Once the information appears in print, it takes on a life of its own. Without verification, subsequent writers follow what was previously written and the myth spreads to an ever widening audience. The rapid acceptance and dissemination of the myth of the Mormon pioneer odometer is not a unique cultural phenomenon.

See William E. Berrett and Alma P. Burton, "The Birth of the Odometer," *Readings in LDS Church History from Original Manuscripts* (Salt Lake City: Deseret News Press, 1953–58), 272.

It interested me to learn that a disciple of Brigham Young invented the speedometer. Few of us ever give the origin of that delicate and useful instrument a thought [in its artistic little frame in front of us]. We consult it occasionally to learn just how many miles per hour we are exceeding the speed limit.

Until I read Werner's *Life of Brigham Young*, I never gave the speedometer a second thought. Perhaps if the Mormons had not set out from Nauvoo, Illinois, for the Far West, it might not have been invented.

The far seeing Brigham wanted to know distances, and he assigned the faithful William Clayton to that job. Clayton sat all day long with his eyes glued to one of the wagon wheels, counting the number of times it revolved each day. This exacting task soon got on Clayton's nerves. It occurred to him that an attachment on a wagon wheel would be "more accurate and less burdensome" than his guesses based on the wheel's revolutions. (Fremont Older, "The First Speedometer," *San Francisco Call Bulletin*, September 23, 1931)

Fremont Older wrote follow-up commentaries on the Mormon pioneer odometer which appeared in the *San Francisco Call Bulletin* on October 31, 1931, and on August 31, 1932. See also Helen Kroll, "Books That Enlightened the Emigrants," *Oregon Historical Quarterly* 45 (June 1944): 109; "Crude Speedometer Built to Measure Miles," *Deseret News*, July 22, 1931; and Harmon, "World's First Speedometer," 12.

⁵²"Proves Orson Pratt Was Not Inventor," *Salt Lake Telegram*, July 13, 1921, 7.

⁵³"Local News," *Logan Journal*, July 12, 1921, 11; "Thomas G. Lowe Proves Claim to Roadometer," *Logan Journal*, August 16, 1921, 4.