

## ROMAN CHARIOTS, RAILROAD TRACKS, MILSPECS, AND URBAN LEGENDS

Every culture has its urban legends. While myths, fairy tales, folklore, and traditional legends are generally considered fictional, allegorical, or exaggerations of the truth, urban legends are reported as fact and are widely believed to be factual among the masses. Urban legends are extremely difficult to combat even when evidence exists to disprove them because they seem reasonable, they fit comfortably into an individual's personal beliefs, and most people are not inclined to go in search of "the truth."

American history is especially full of urban legends. Most Americans think they know about such things as the Pilgrims landing on Plymouth Rock<sup>1</sup>, U.S. Independence Day<sup>2</sup>, the Liberty Bell<sup>3</sup>, and hundreds of other "historical facts." What most Americans know, however, are the urban legends.

The world of standards and standardization also has its share of urban legends, which seem to be on the increase because of the Internet and email. One standardization urban legend that has been making the rounds over the last seven years or so deals with the connection between Roman chariots, railroad tracks, and MilSpecs. The story begins with a question asking why the U.S. standard railroad gauge (the distance between rails) is 4 feet 8-1/2 inches, which seems an odd number. The answer given is that English expatriots built U.S. railroads, and 4 feet 8-1/2 inches was the standard railroad track gauge in England because the railroad tracks were built on top of road ruts created by the Romans to accommodate their war chariots. Supposedly, the Romans had a MilSpec that set the wheel spacing at 4 feet 8-1/2 inches for their war chariots and all Roman rut roads. Eventually, railroad tracks were laid on top of the road ruts. The final punch line is that the U.S. standard railroad gauge derives from the original MilSpec for an Imperial Roman army war chariot proving that MilSpecs and bureaucracies live forever.

The only problem with this story is that none of it is true, except the fact that the standard U.S. railroad track gauge today is indeed 4 feet 8-1/2 inches. Over the years, I estimate that people have sent me over 200 email messages transmitting this story, and I

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<sup>1</sup> The two publications written by the Pilgrims themselves about their arrival in the New World, William Bradford's 1620 journal and a book published in 1622 known as *Mourt's Relation*, never mention any rocks. The urban legend of Plymouth Rock supposedly has its origins in 1741 when a 95-year old man named Elder Faunce, distressed over the town's plan to build a wharf over the rock, began a public campaign to block construction by proclaiming that his father had told him that this granite rock is where the Pilgrims first set foot in the New World. His emotional appeal struck a chord with the public, and despite a lack of supporting evidence, the Plymouth Rock became part of American history.

<sup>2</sup> Americans celebrate July 4<sup>th</sup> as Independence Day, but the historical records and newspapers clearly show that the Continental Congress declared independence on July 2<sup>nd</sup>. The reason Americans celebrate July 4<sup>th</sup> is because it is the date on the Declaration of Independence. The document announcing independence came to overshadow the act of declaring independence.

<sup>3</sup> Because of a fictional story written by George Lippard in 1847 about an old bellman ringing the Liberty Bell at the moment that the Continental Congress declared independence, the Liberty Bell has become a venerated icon of the American Revolution. In fact, it was not called the Liberty Bell until 1837, when the bell became the symbol of the abolitionist movement because of the inscription on the bell taken from Leviticus: "Proclaim Liberty throughout all the Land unto all the inhabitants thereof." The historic fact is that the Liberty Bell symbolized the quest for liberty for enslaved African-Americans and not the colonists. But once again, the urban legend prevailed.

have heard it repeated at many conferences. I would like to try to counter this urban legend with some historical facts.

For starters, the Roman army did not use chariots for warfare. Chariots were technologically obsolete by 600 BCE, centuries before the rise of Rome. While chariots were a technological leap when they came into use around 1800 BCE, they were far from the ideal weapon portrayed by Hollywood. Chariots were unstable and restricted in use to open and flat terrain. They were also expensive and difficult to make and maintain. The armies of the ancient world used chariots because the horses available to them were too small to carry a mounted soldier in armor and with weapons. Once horses were introduced that were large enough to carry a fully equipped soldier, cavalry quickly replaced charioteers. Cavalry was far more mobile, easier to maintain, and made more effective use of manpower since a chariot required a driver and fighter, whereas a single soldier could ride and fight on horseback.<sup>4</sup>

The Roman legions that conquered the ancient western world were made up primarily of armored infantry supported by cavalry, light infantry, archers, and engineers. The Roman legions never used the technologically inferior chariot. Chariots were very popular in the Roman circus games and for ceremonial processions, but they were not used militarily or commercially. The suggestion that the Roman army developed a MilSpec for chariot wheel spacing that necessitated the placement of road ruts at 4 feet 8-1/2 inches is pure fiction.

The other aspect of this standardization urban legend that is pure fiction is the suggestion that the standard track gauge in the U.S. has always been 4 feet 8-1/2 inches. At the beginning of the American Civil War in 1861, there were more than 20 different railroad track gauges in the U.S. ranging from 3 feet to 6 feet.<sup>5</sup> In fact, 5 feet was by far the most prevalent gauge in the South<sup>6</sup>, so if the Confederacy had won the war, the standard size in the U.S. might be different today. The table below shows some of the variety of gauges in the U.S. and Canada at the beginning of 1861.<sup>7</sup>

Track Gauge	Miles of Railroad Track	Percentage of Total Mileage
4' 8-1/2"	17,712	53.3
4' 10"	3,294	9.9
5' 0"	7,267	21.8
5' 6"	2,896	8.7
6' 0"	1,777	5.3
Others	-----	1.0

Probably more than any other single event, the American Civil War is why the U.S. has the one standard track gauge today. The Civil War was the first war in which railroads played an important part in transporting troops, equipment, and supplies. The

<sup>4</sup> Martin Van Creveld, *Technology and War from 2000 B.C. to the Present*, Collier Macmillan Publishers, 1989, pp. 12-17; and John Keegan, *A History of Warfare*, Key Porter Books, 1993, pp. 257-263.

<sup>5</sup> Robert L. Frey, ed., *Encyclopedia of American Business History and Biography, Railroad in the Nineteenth Century*, Bruccoli Clark Layman Book, 1988, p. 333.

<sup>6</sup> Thomas E. Griess, ed., *Atlas for the American Civil War*, The West Point Military History Series, Avery Publishing Group, Inc., Atlas Map No. 2.

<sup>7</sup>Frey, op. cit., p. 343.

variety of track gauges forced army units to unload and then reload cargo at the junction point between lines with different gauges. Such delays were inconvenient, expensive, and annoying for civilians during peacetime, but for an army to experience such delays sometimes meant the difference between victory and defeat.

While the U.S. government did not mandate conversion to a standard track gauge, it did take steps that accelerated standardization towards the 4 foot 8-1/2 inch gauge. In 1862, the United States Military Railroad organization was created to address a number of rail transportation issues, including standardization of track gauges. Since the 4 foot 8-1/2 inch track gauge accounted for more than half the track in the U.S., it made sense from a military and economic viewpoint to promote this as the standard gauge. More than 4,000 miles of new track was laid down in the North during the war, most of which conformed to the 4 foot 8-1/2 inch track gauge.<sup>8</sup> In some cases, the Union forces altered the track gauges of captured Confederate rails. For example, the 5-foot gauge of the Norfolk & Petersburg rail was changed to 4 foot 8-1/2 inch gauge.<sup>9</sup> In other cases, the government succeeded in convincing nonstandard Northern railroads, such as the New York Central, to change their track gauge.<sup>10</sup> Finally, the Pacific Railway Act of 1864 mandated the standard 4 foot 8-1/2 inch gauge for the Transcontinental Railroad.<sup>11</sup>

The most significant contribution of the government for standardizing track gauges was to serve as a catalyst in bringing together industry to promote railroad cooperation during the Civil War. In February of 1862, Secretary of War Stanton and other government leaders met with the owners of the major railroads to discuss a number of issues, including standardization of track gauges.<sup>12</sup> These meetings continued throughout the Civil War. Following the war, industry continued to meet, and on September 18, 1867, representatives from twenty-nine railroads formed the Master Car Builders Association. At the top of their agenda was the standardization of track gauge in the U.S. It would take another nineteen years, but through the cooperative efforts of industry brought together initially by government, commercial railroad track gauges in the U.S. were at last standardized to 4 feet 8-1/2 inches in 1886.<sup>13</sup>

The original question of just how did such an odd track size of 4 feet 8-1/2 inches still remains. The truthful answer is that no one really knows. Some people believe that train tracks were merely laid on top of road ruts left by wagons and that the width of the wagons were determined by the width of two horses side by side hauling the wagon. While it does seem reasonable that train tracks were often laid on top of wagon wheel ruts, the distance between wagon wheel ruts was not universal.

Everyone seems to agree that this odd track size did originate in England from a railway pioneer named George Stephenson who used the 4 feet 8-1/2 inch track gauge when building the first public rail line, the Liverpool & Manchester Railway, in 1830.

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<sup>8</sup> Thomas Weber, *The Northern Railroads in the Civil War, 1861-1865*, King's Crown Press, 1952, p. 15.

<sup>9</sup> Allan Nevins, *The War for the Union: War Becomes Revolution 1862-1863*, Charles Scribner's Sons, 1960, p. 462.

<sup>10</sup> Allan Nevins, *The War for the Union: The Organized War 1863-1864*, Charles Scribner's Sons, 1971, p. 23.

<sup>11</sup> Achsah Nesmith, "A Long, Arduous March Toward Standardization," *Smithsonian Magazine*, March 1985, p. 83.

<sup>12</sup> Phillip Shaw Paludan, *A People's Contest, The Union and Civil War 1861-1865*, Harper & Row Publishers, 1988, p. 141.

<sup>13</sup> Frey, *op. cit.*, p. 333.

Why he chose this odd size is a matter of conjecture. Some historians maintain that the rails were originally laid 5 feet apart on top of wagon wheel ruts, but because the early edge rails were 1.75 inches across the top and early trains ran on the inside edges, Mr. Stephenson had to subtract 3-1/2 inches for the railroad car wheel spacing making them 4 feet 8-1/2 inches. As railroad track technology improved so that the train wheels ran on top of the tracks, the tracks were moved closer to fit the rail car widths. Still others maintain that Mr. Stephenson originally designed the track gauge to measure 4 feet 8 inches, but during construction, he added in an extra half inch to allow for a little more leeway between rails and wheel flanges.

How ever the 4 foot 8-1/2 inch track gauge happened, it's clear that the Roman military specification for "Chariots, War, Two-Horse" had nothing to do with it. While many things "standardized" today were first documented in either military or federal specifications – four-inch spacing of faucet's for lavatories, standard sizes for floor tiles, rules for statistical sampling – someone else gets credit for track gauge spacing. Many believe that once an urban legend makes it to the Internet, it can never be undone. Perhaps. But we in the standards community have a reputation for requiring data to support contentions, and then challenging the data. So challenge the legend – when confronted with the chariot story, email back the truth. Just maybe we can knock this one legend off the tracks – whatever gauge they may be.