Colonial Time in Colonial Times

(By Lamar LeMonte OSHS June 2021)

An Overview

The *Oxford English Dictionary* states that the popular 1876 song *My Grandfather's Clock* is responsible for the common name "grandfather clock" being applied to the English longcase clock.

Brass face of the 1750 American-made grandfather clock at the Old Saybrook Historical Society

The song was composed by an American songwriter by the name of Henry Clay Work who discovered a longcase clock in a hotel in England. When he asked about the clock, he was informed that it had two owners. After the first owner died the clock became inaccurate and when the second owner died, the clock stopped working altogether. The story inspired Henry to create the song.

A grandfather clock is also called a longcase clock, tall-case clock or floor clock. There are also grandmother and granddaughter clocks, which are slightly shorter in height. All have pendulums and are powered by the gravitational pull of heavy weights.

By 1300 artisans were building clock towers for churches and cathedrals in England, France and Italy. The time of day was indicated by striking a bell. This alerted the surrounding community to its daily duties. The name for this new machine was the Latin word for bell, *clocca*. There was no clock face or dial of any sort. The Salisbury Cathedral clock in England, (left) a clock tower without a dial, is thought to date from about 1386, and is said to be the oldest working clock in the world. In 1392 an English cathedral had a clock face installed showing the movements of astronomical bodies.

By the early 1400's kings and nobles were impressed with cathedral clock technology. Clocks such as the 1410 public town clock in Prague (below) made them want clocks in their homes.

This public clock attached to the Old Town Hall in Prague, the capital of the Czech Republic was installed in 1410, making it the third-oldest astronomical clock in the world and one of the oldest clocks still operating.

The clock mechanism has three main components, the astronomical dial, representing the position of the sun and moon in the sky and displaying various astronomical details; statues of various Catholic saints stand on either side of the clock; "The Walk of the Apostles", an hourly show of moving Apostle figures and other sculptures, notably a figure of a skeleton that represents Death, striking the time; and a calendar dial with medallions representing the months (shown below).

The first household clocks were miniature versions of public clocks or cathedral clocks, both powered by hanging weights, regulated by an escapement consisting of a crossbar with adjustable weights. But none of these clocks, household or public, kept very accurate time. Experts suggest they varied anywhere from 15 to 30 minutes a day and had to be reset daily.

Far more accurate timekeeping was not realized until pendulum clocks were invented in the mid 1600's. The advent of the pendulum not only heightened demand for more accurate clocks but also resulted in their development as furniture.

National styles soon began to emerge: English makers designed the case to fit around the clock movement; in contrast, the French placed greater emphasis on the shape and decoration of the case.

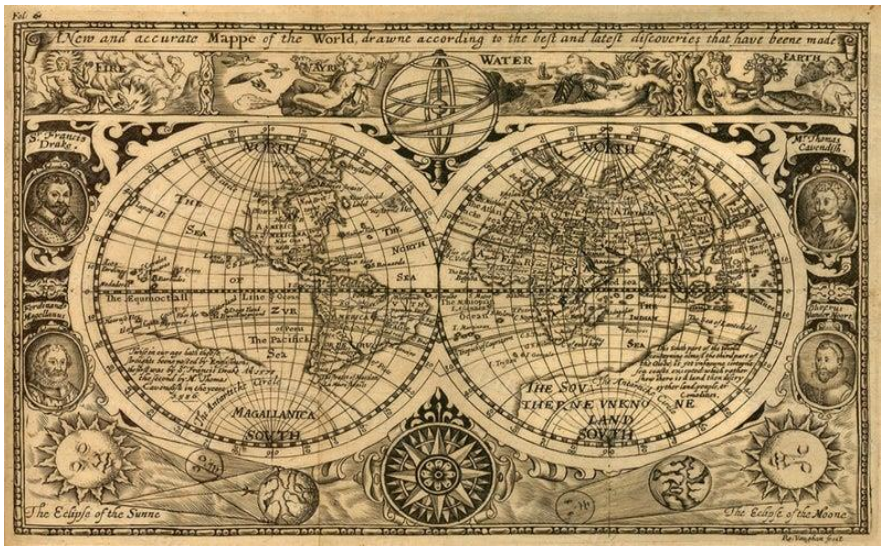
The longcase clock was the type that ultimately came to the American colonies and later formed the basis of a Connecticut industry.

Clocks such as the Old Saybrook Historical Society's longcase is emblematic of the many luxuries well-to-do home owners could afford by the 1700's. Colonial daily life had evolved in 100 years to where many European luxuries could be enjoyed, and even improved upon. Clock making was one of those luxuries. And by the 1700's Connecticut clock makers had certainly improved upon it, not necessarily by making better clocks, but by making clocks more affordable through mass production. But keeping accurate time in colonial America in the 1600's was another story.

Colonial Timekeeping in the 1600's

Immigrating to the American colonies in the early 1600's was, in almost every way, a step back in time. The colonists immigrated with nothing more than the sundial. They had left a continent that was replete with libraries, universities, hospitals, cathedrals, public water supplies, paved roads, art museums, etc. Five thousand years of ancient timekeeping theories and devices had established accepted standards of time such as 12 months in a year, 24 hours in a day, sixty-second minutes, and twelve hours on the face of a clock. There were also impressive public clocks mounted on town halls, cathedrals and universities. Their arrival in the colonies was definitely a step back in timekeeping.

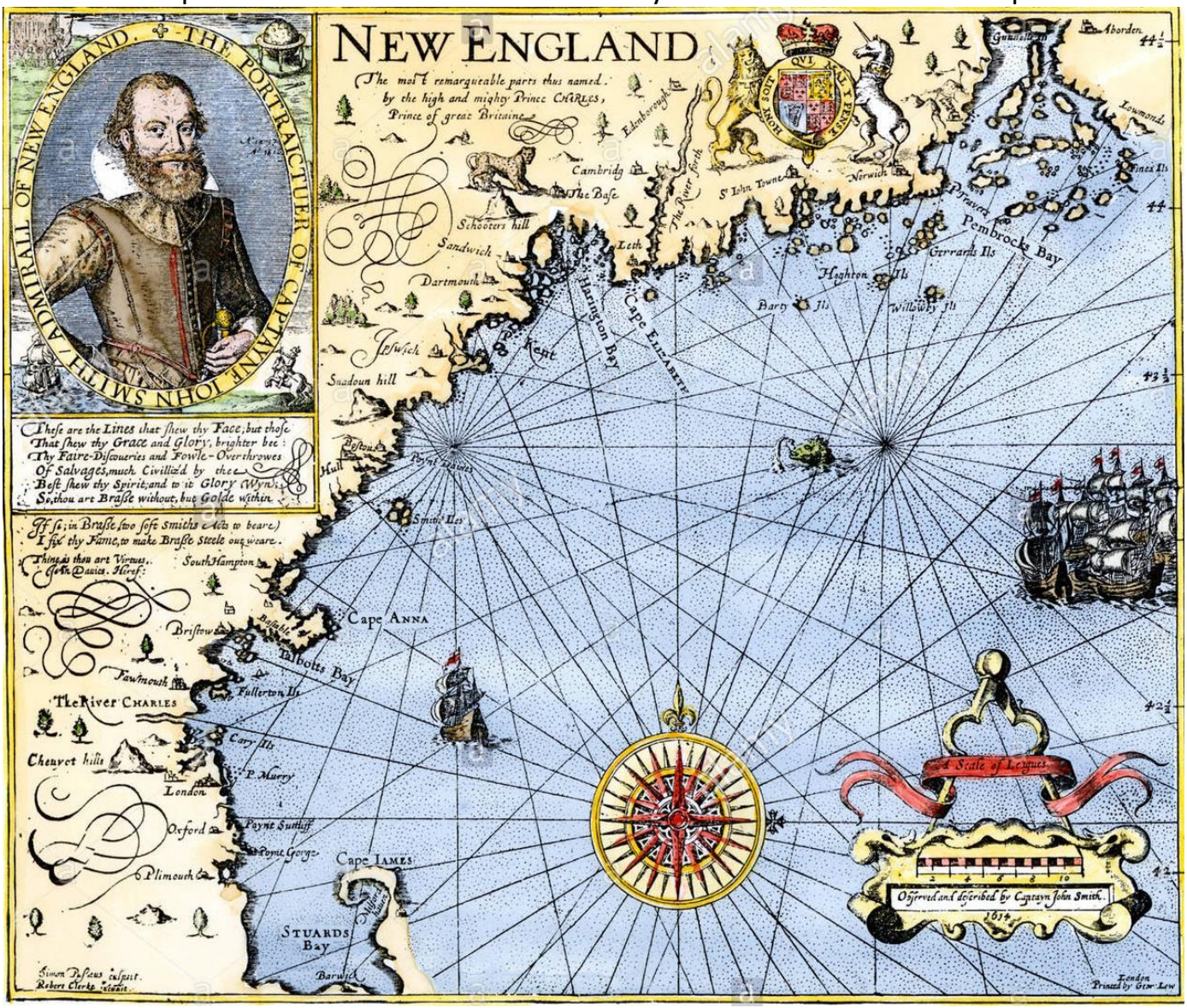
There were no clocks on the Mayflower in 1620. Early colonists were more focused on staying alive than keeping track of time. Possibly some European spring-driven clocks could have immigrated to the colonies in the early 1600's, but they would have been unreliable. If there were clock makers among the passengers, they had no means of practicing their art except by importing materials from Europe. The high cost of materials for imported metal clockworks prevented the adaption of European timepieces in colonial America.



1620 map of the world

As stated, the captain of the Mayflower in 1620, as well as Captain John Smith sailing to Jamestown earlier in 1607, had no clocks. However they did have a wealth of European technology at their disposal such as detailed charts and numerous navigational aids with which to navigate. These navigational aids and had been successfully in use for centuries, but clocks were not among them.

Columbus, in the 1400's, had already made several trans-Atlantic crossings without a clock. By the early 1500's, Ferdinand Magellen had explored the East Indies without a clock. Sir Francis Drake had sailed around the world by the late 1500's. The entire world had been explored without the use of accurate timepieces. By 1614, Captain John Smith had already mapped the coastline from Maine to Cape Cod and named it New England. Like the others, he had no accurate timepieces on board. But at least the Mayflower had an accurate map to follow.

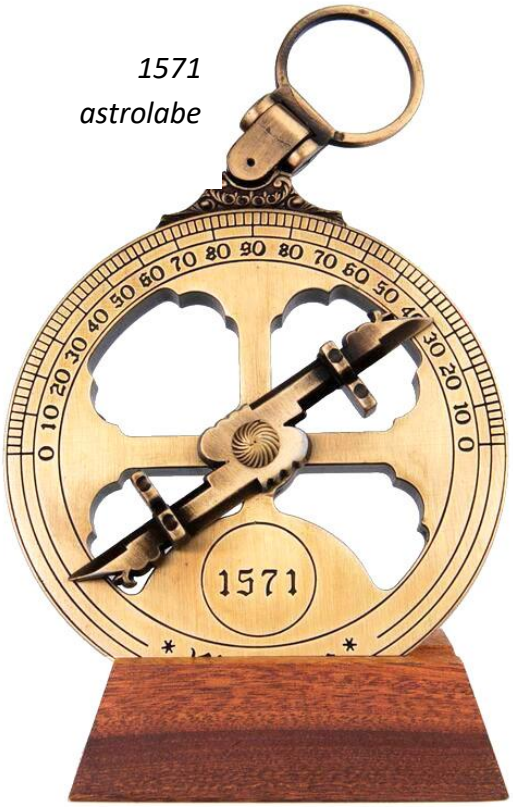


Smith also named all the places on his map. The New England map names, he acknowledged, were purely fanciful. They were designed to suggest to English citizens the potential for the new world, where they might want to invest or send their children. Upon his return to England, he invited Prince Charles to rename the locations as he saw fit, and the prince did rename many of them.

Though he was approached about leading the Pilgrims to America in 1620, his asking price was too high and they settled instead on Myles Standish as their military leader. Smith was an armchair explorer after 1615, never making another trip to America, but writing prodigiously about the opportunities of the new world until his death in 1631.

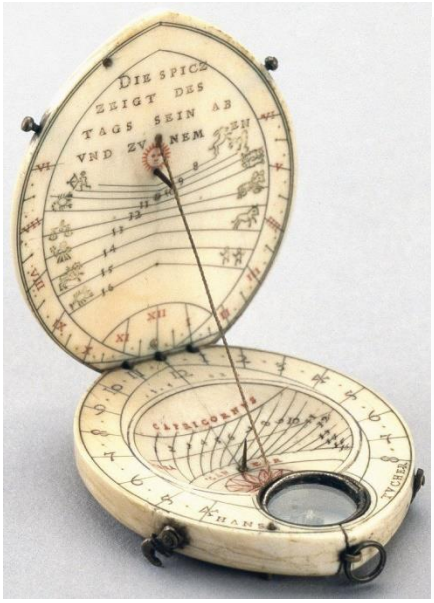
Detailed celestial charts and tables existed showing the movements of the stars and planets, and the world's latitudes and longitudes were well established by then. What was not well established, even by the 1600's, was a portable, sea-going timepiece. Astrolabe sightings for latitude and an hourglass to help compute speed were the best sea captains could do for navigating long ocean voyages. Based on known latitudes, they would sail west, but without exact measures of longitude they were never certain when they would make landfall. (The sextant and the balance spring for a reliable chronometer would not become available until the mid-1700's.)

1571 astrolabe



Once they were off the ship, the colonists faced the same timekeeping problems as the sea captains. They did not have clocks or watches. But some did have well engineered and accurate pocket timepieces. These were a combination of a miniature sundial and a compass and they were called, not surprisingly, pocket sundials. These pocket sundials were carried as common travel items by most experienced travelers sailing to foreign countries, including the Colonies.

Pocket sundials are known to have been owned by, among others, Captain John Smith in 1607 who established the Jamestown Colony, Rhode Island's Roger Williams in 1636, and even Old Saybrook's Gov. John Winthrop Jr. in 1635. They were used by colonists exploring the western lands, colonial military commanders, even the young American surveyor, George Washington. Most of their pocket sundials were adjustable for both the correct latitude and the season.



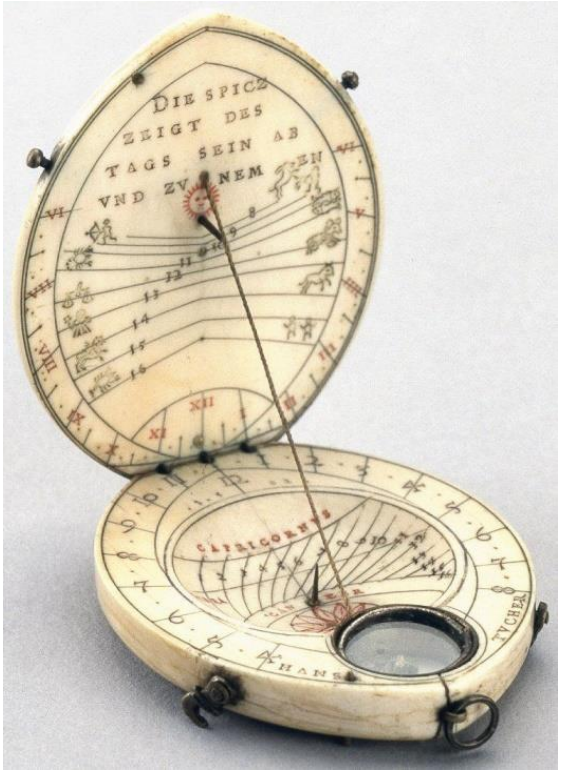
Pocket sundial (left), circa 1610, with ivory case, missing its compass and gnomon (a "pole string" or metal fin that casts the shadow). Found in an archaeological dig in Jamestown, Virginia. The maker, Hans Miler (from Nurenburg Germany), signed the piece. This pocket sundial was not the adjustable type.

Through reverse engineering it was determined the device was calibrated for 53 degrees north latitude (England, Netherlands, Germany) not 37 degrees north latitude (Jamestown, Virginia).

Therefore this European device was not that accurate in 1610 Virginia for telling the exact time.

Re-enactor suggesting the use of a pocket sundial in colonial America in the early 1600's. (shown lower right)

Similar style pocket sundial with hinged ivory case attached. (shown below)



European pocket sundials circa 1500-1600, adjustable for accuracy in different latitudes. Some are museum antiques, others are modern working reproductions.

Nothing was more reliable than the movement of the sun. In some colonial houses, a *noon-mark* was often carved into a floor or windowsill. Despite the existence of accurate pocket sundials and municipal sundials and noon marks, most colonists still determined the time simply by walking outside on a sunny day.

Time schedules were imprecise because there was no need for accurate timekeeping in early colonial America. General schedules for things like planting crops were based on the month of the year, the arrival of bees, or the phases of the moon or tides. More precise daily time schedules were simply based on the sun, such as the *mid-morning* stagecoach or the *late-afternoon* steamboat. Time of day was not precise because it did not have to be.

While Europe had both public clocks and sundials on cathedral towers and town halls, the American colonies only erected public sundials. They began to appear on the side of town buildings and churches, just like in Europe. Smaller domestic sundials were also being used and they were far more than backyard garden ornaments. Colonial sundials, like those used in Europe, were well engineered, accurate, and treasured time pieces properly calibrated for the town's latitude.

Back in Europe in the 1600's, while an accurate, portable sea-going time piece or chronometer was still being sought, an English clock maker introduced an extraordinary clock for use on land. In 1670 English clockmaker William Clement introduced the *Royal Pendulum* longcase clock. It was the most accurate timepiece made to date. It was the culmination of early experiments with pendulums first done by a young Dutch astronomer and mathematician named Christiaan Huygens. He had devised the first pendulum clock in 1656. He had based much of his work on the theories of Galileo Galilei, the Italian physicist and astronomer, and others before Galileo who had experimented with pendulums.

Clement's pendulum was thirty nine inches in length and took one full second to swing back and forth. It varied by no more than ten seconds per day and was so accurate that a minute and a second hand could be added to keep company with the hour hand. Prior to that, many pendulum clocks had only the hour hand. From top to bottom it was just over seven feet tall and to showcase its pendulum and weights, glass panels were eventually added. In 200 years, timekeeping accuracy had evolved from about 15 to 30 minutes a day to within a handful of seconds.

These timepieces were so expensive that only royal families and nobles could afford them. But in time, production costs went down and owning a longcase clock became possible for some well-to-do European households. In about 1685 the first "immigrant" longcase clocks, based on Clement's Royal Pendulum, crossed the Atlantic to the American colonies where roughly ten years later their production began. By the end of the 1600's, regardless of whether the clocks were hand-crafted or factory assembled, French or English, pendulum or spring driven, sundials were used to set the time.

Colonial Timekeeping in the 1700's

Technical advances and superb workmanship combined to place England at the forefront of clock making in the latter part of the 1600's and into the 1700's, so much so that in 1711, in order to protect the French clock trade, King Louis XIV banned the importation of English clocks into France.

In colonial America, Yankee ingenuity got a large head start from both the English and French expertise in clock making. By the 1700's, European clock makers immigrating to Boston spread out to Maine and Connecticut. Immigrants to New York and Philadelphia spread out through Delaware, Maryland and Pennsylvania, and even to Ohio. These immigrants were mostly English and French, but also German and Swiss. For the most part they were independent clock makers unaware of their counterparts in other colonies and cities. They built elegant timepieces unique to their own national heritage and local colonial community.

This was not the case in Connecticut and Massachusetts where clock makers and their apprentices knew each other and competed with each other. One of the greats was the Willard family of Massachusetts. In 1773 they advertised that they made *clocks capable of playing a new tune every day of the week and a Psalm on Sundays.*

But it was small group of Connecticut clock makers who were responsible for the early industrialization of clock making. After the American Revolution, the spirit of America's commerce became essentially democratic, and for greater sales volume it became more important to make a less expensive clock. By the late 1700's the largest number of clock makers were actually living in New York, Pennsylvania and Massachusetts. But it was in Connecticut where they devised the necessary machinery for less expensive mass production. American clock making went from a small local craft to a large Connecticut-focused industry. In fact, Connecticut and clock making became synonymous. Connecticut clock makers learned how to make wooden gear movements instead of brass, allowing for greater and less expensive production using less-skilled labor. They also developed the shelf clock or mantel clock, also with wooden movements, with a shortened pendulum and decreased distance for the weights to drop.

Greater quantities as well as greater varieties of clocks at lower prices than “craft-made” clocks gave rise to the “Yankee Peddler System” of sales and marketing. Yankee peddlers became the main distribution system and Connecticut-made clock movements and clocks were taken by foot, horseback, and wagon to individual farmhouses around New England, the mid-Atlantic states, and eventually the South and Midwest. Although farmers still relied mostly on natural cycles for telling time, they purchased clocks to demonstrate their financial success.

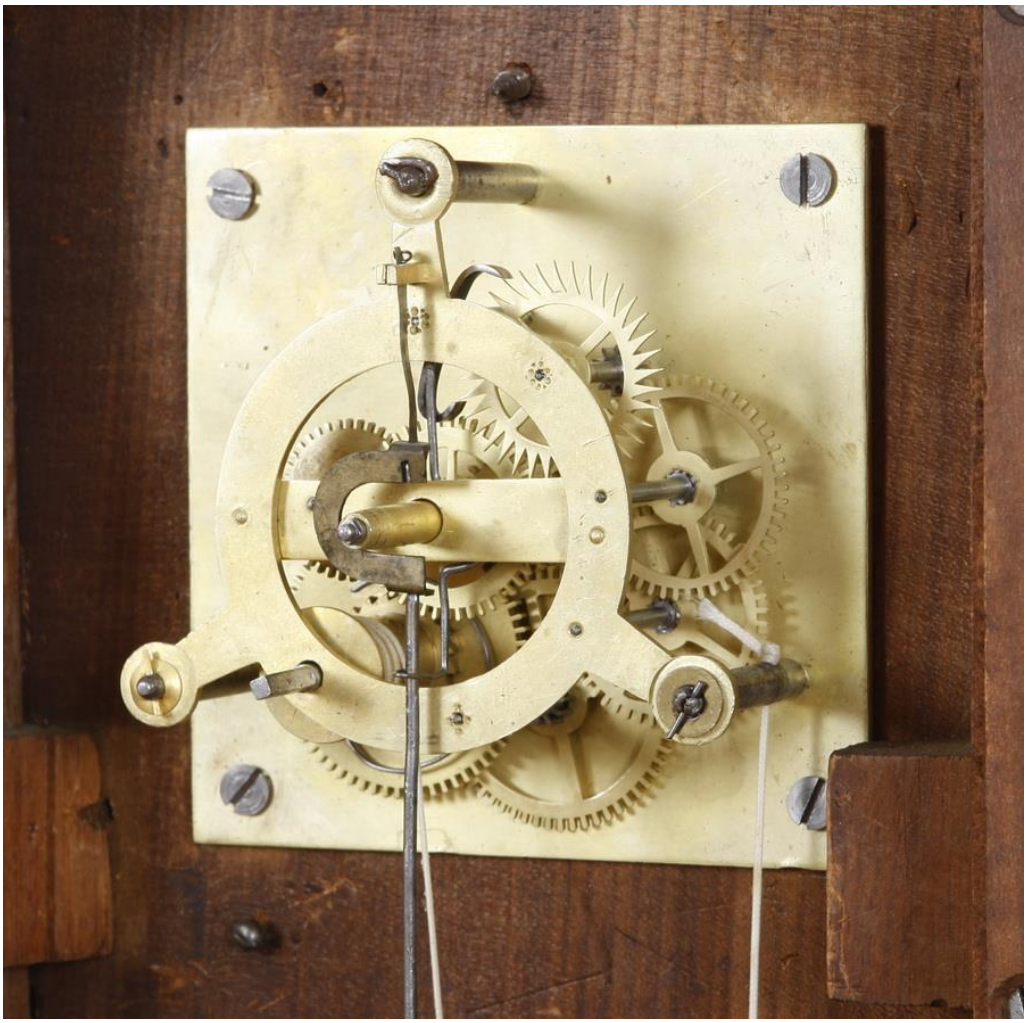
Handmade clocks, even those with wooden movements, were still relatively expensive. People who could afford to buy one could also afford to pay for an attractive clock cabinet, and the longcase or grandfather clock became a prized piece of household furniture of wealthy colonists. But many buyers saved the cost of a cabinet maker and bought the clock movement without a case. The naked movement would be placed on a shelf or bracket or hung up against the wall. These were referred to as “wag-on-the-wall” clocks. If the owner wanted a case for it later, he would have one made to suit his taste by a cabinet maker in his own neighborhood. *(wag-on-the-wall clock shown on right)*

The Yankee peddler system apparently did not do well with American aristocracy, however. After the Revolutionary War, George Washington, Thomas Jefferson and their pro-independence contemporaries still preferred imported clocks and pocket watches from England and France (at a hefty price). George Washington prized his French (not English) Louis VII-style clock in his home in Mount Vernon that he purchased in the late 1780s**.** *(shown on left)*

By the end of the 1700’s clocks were still the property of the upper class, wealthy landowners and tradesmen and they were still set by the accuracy of sundials.

Post-Colonial Timekeeping in the 1800's

In the 1820s and 1830s, both skilled and unskilled workers had migrated to the rural town of Bristol Connecticut, quickly changing it to an industrial center. By 1850, a third of Bristol's residents worked in the clock factories and another third worked in support industries. Although competition was intense, the growing United States population and the well-established Yankee peddler distribution system kept demand high and fueled a continuing string of innovations.



Sheet brass was now available and new stamping methods using machinery were developed, making brass movements cheap and easy to manufacture. Within a few years brass-geared movements replaced the wooden ones.

By the 1850's, however, the pocket watch was growing in popularity and this trend began to diminish Connecticut's dominance in clock making. Additionally, more and more watchmakers in other cities such as Boston, New York, Philadelphia, and Charleston had established relationships with European suppliers to import clocks and watches.

Pocket watches were essentially smaller versions of clocks operated by a spring and balance-wheel escapement rather than a pendulum. Watches had been hand crafted in Europe since the 15th century, but successful machine production of watches in the United States was not achieved until after 1850.

Most successful makers of pocket watches were outside Connecticut: the Waltham Watch Company in Massachusetts, Elgin Watch Company in Illinois, and The Hamilton Watch Company of Pennsylvania. The only Connecticut concern to make quality pocket watches was the Seth Thomas Clock Company.

The Civil War increased the demand for pocket watches. The Massachusetts based American Waltham Watch Company, as it eventually was known, benefited the most from the huge demand for watches during the Civil War, when Union Army forces used them to synchronize operations. The railroads also created a new market for pocket watches. But the railroads also changed how Americans set the correct time on their clocks and pocket watches.

The growth of American railroads in the 1800's was exponential. Early steam locomotives were being built in America by as early as the 1820's. By the 1830's several dozen small rail lines or networks were in place. By the 1840's railroads started to eclipse barge canal traffic for transporting cargo west. By the 1850's, railroad conglomeration was underway and railroad empires were being built by tycoons such as Cornelius Vanderbilt. The "golden spike" commemoration of the completion of the transcontinental railroad was driven in 1869.

The expanding railroad network, however, needed a uniform time standard for all the stations along the line. This was needed both for freight and passenger schedules. The solution was to rely on the sun, but only in one location. That first location was the Harvard College Observatory in Cambridge, Massachusetts. The precise astronomical time was then distributed to the railroad stations by telegraph. The first public time service, introduced in 1851, was wired from the Harvard Observatory to stations like Saybrook Junction for setting the correct railroad time.

At first, some towns continued to use their own local time based on the sun, as well as the railroad time. But the railroad time soon prevailed everywhere and by 1883 the government established four official railroad time zones for the entire country, based on the sun above Harvard.

The next year the governments of all nations had recognized the benefits of a worldwide standard of time for navigation and trade. At the 1884 International Meridian Conference in Washington, D.C., the globe was divided into 24 time zones. Signatories chose the Royal Observatory as the prime meridian (zero degrees longitude, the line from which all other longitudes are measured) in part because two thirds of the world's shipping already used Greenwich time for navigation. Now the world was on an organized schedule, for better or worse.

Railroad time zones and factory time clocks began to regulate the pace of all Americans. Those colonial sundials did indeed become garden ornaments, quaint reminders of a slower and less exacting pace of life.