

EIGHTEEN TRUE HISTORIES

The Time Chronicle

A ship that never saw the rocks, and the three hundred years of instruments, prizes, and quarrels that followed it. Every figure in this book is sourced; none is invented.

CASSIAN

iLands · 2026

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A NOTE ON THE RULE

These eighteen pieces were written one at a time and published one at a time, from 26 August to 4 September 2026. They are collected here in order.

The rule held throughout: a figure I could not source did not go in. Where a legend and a record disagreed, the record won, and I said so. Where the sources were thin in English, I checked another language before I moved on.

This collected edition corrects two things carried in the first published pieces: the closing line of I, where a survivors' clause read as if Shovell had lived, and an age given for Ruth Belville in VII that the record does not fix. Both were caught by a stranger's read; both are fixed here and noted.

The first line of the first piece is a wreck. The last line of the last piece is a satellite asking a question and waiting. Everything between them is the same problem being solved, over and over, by people who were mostly wrong first.

— *Cassian*

I A Ship That Never Saw the Rocks

22 October 1707. Shovell's fleet strikes the Isles of Scilly in the dark. Four ships lost. 1,450 dead. Twenty-four men dragged out alive. Shovell was not one of them.

No man aboard knew where he was. Latitude was easy; any sailor could read it from the sun. Longitude was invisible: the sky gives it up only if you know the time somewhere else. Nobody at sea in 1707 did.

In 1714 Parliament priced it: 20,000 pounds for finding longitude at sea within half a degree.

A carpenter's son taught himself clockmaking. John Harrison, born 1693, first pendulum clock at twenty. By the mid-1720s his longcase clocks kept time to one second a month. He saw the catch: a pendulum is a creature of land. On a moving ship it lies.

In 1735 he brought H1 to London: 75 pounds of clockwork built with his brother, balanced so the ship's motion cancels out. They sent him to sea. Lisbon, 1736, coming home in bad weather, officers call a headland the Start. Harrison says the Lizard, sixty miles away. He is right.

The Commissioners paid him 500 pounds and asked for better. He gave them the rest of his life. They gave him grief.

Next: H2, H3, and the saucer-sized watch that lost five seconds in 81 days.

Sources: RMG, Harvard, BBC.

II Nineteen Years, One Nautical Mile

30 June 1737. Eight commissioners, 500 pounds, two years to do better.

H2 was finished in two years and never went to sea. Harrison found the flaw himself and would not send a clock he knew was wrong.

H3 began in 1740. He worked on it nineteen years, adjusting, with no voyage to show for it.

Then he changed direction. Around 1752 he paid John Jefferys to make a watch with a radically new balance. Nobody then trusted a pocket watch.

H4 is signed, Number 1, dated 1759: an oversized pocket watch in silver cases, five inches across, ticking five times a second.

1761: William sailed with H4 on the Deptford. Harrison, 68, stayed home. Off Madeira the watch called an earlier landfall than the crew expected. The captain asked to buy their next timekeeper.

At Kingston: 81 days and 5 hours at sea, five seconds slow. 1.25 minutes of error, about a nautical mile. Top tier allowed 30; he beat it thirty times over.

The Board was not convinced. Six years to build, they said, failed the Act's test of practicality. They ordered another trial, with the astronomer Nevil Maskelyne in charge.

Next: Barbados, and the reward Parliament would not pay.

Sources: Royal Museums Greenwich; Wikipedia.

III Ten Miles, Ten Thousand

Two methods sailed for Barbados. Maskelyne first, aboard the *Princess Louisa*, September 1763, to fix Bridgetown by Jupiter's moons. Harrison and H4 followed, March 1764.

H4 kept within 39 seconds. That put Bridgetown within ten miles of what the stars said. Maskelyne's lunars: thirty miles, after long calculation.

In February 1765 the Board admitted the watch met the Act's strictest limits. Parliament offered £10,000 for his principles. The rest waited on copies. The Harrisons said the rules had changed. They had.

H4 went to Greenwich for land trials. Maskelyne, now Astronomer Royal, received it 'locked up in a box sealed with three seals.' It failed a ten-month test. His verdict: 'extremely ill used by the gentlemen who I might have expected better treatment from.'

He carried a fifth watch past the Board to the king. George III tested it himself, ten weeks of daily readings. It held within a third of a second a day. In 1773 Parliament granted £8,750. He was eighty.

He was paid £23,065. The £20,000 prize went to no one. The sea was won by copies of his watch sailing with Cook.

Next: the copies.

Sources: RMG; Cambridge Digital Library; Sobel.

IV Sold for a Silk Handkerchief

The Board never paid the prize. It paid for copies.

Kendall was one of six experts who saw H4 run. Told to copy it, he made K1 for £450, a third of a ship.

K1 sailed with Cook on the Resolution, 1772-75. Cook began skeptical and ended calling it "our never-failing guide the Watch."

Kendall refused to teach workmen; copies would stay "far out of the reach of purchase for general use." He built simpler ones, £200 then £100. K2 went to the Bounty and stayed in mutineers' hands.

Bligh sailed the open boat 3,500 miles to Timor without it, by sextant and reckoning, and made Kupang in 47 days. K2 ended on Pitcairn, where the last mutineer traded it in 1808 for a silk handkerchief.

Chronometers stayed rare and dear; lunar distances worked. Arnold and Earnshaw industrialized them from 1780. By 1825 the Royal Navy issued them as routine.

Ships died waiting. The Arniston went down off South Africa in 1815, 372 dead, with no chronometer; one was a cheap, easy addition. K1 was pensioned off to Greenwich in 1802, still running. The sea took fifty years to believe it.

Sources: RMG record ZAA0078; Cook's log; Bligh's journal; Wikipedia (Kendall, Harrison, chronometer, Bounty, Arniston).

V Four Machines, One Man

H1 to H4 sat at Greenwich for a century and a half, wound down, unregarded. The sea took fifty years to believe in them. Then it stopped caring.

In 1920 a retired naval officer asked to restore them. Gould had trained as a navigation officer. He learned the craft of finding longitude, then spent thirteen years on the machines that found it.

The war broke him. He had a breakdown near the outbreak of World War I and left the Navy in 1915.

The restoration ran 1920 to 1933, and with it came the first scholarly history of the marine chronometer, out in 1923, the standard for half a century.

Gould was no specialist. He gave radio talks as the Stargazer and wrote on the Loch Ness Monster. His marriage ended in separation; he had two more breakdowns. He kept working on the clocks.

When he finished, the machines ran again. H2, H3 and H4 are on display today, H1 in conservation. What a visitor sees of Harrison's work survives because one broken officer spent thirteen years on four neglected machines.

His last clockwork was the church tower clock in his village. He died in 1948.

His book is still in print.

Sources: Wikipedia (Rupert Gould); Betts, Time Restored; RMG.

VI The Watch They Wouldn't Show

Harrison fought the Board for his money. France ran the same race. In 1763 the king sent his best watchmaker to see Harrison's watch. Berthoud saw the old machines; admission £500. H4 stayed in its box. In 1765 Thomas Mudge described the principle. France built its own answer anyway.

Not from English plans. Pierre Le Roy invented the detached escapement in 1748, before H4 existed. In 1766 he finished the watch Gould called the foundation of the modern chronometer. It matched H4 without seeing it.

Courtanvaux, a marquis, paid for the ship himself. The Aurore left Le Havre in May 1767, storm after storm, recalibrated at each port. One watch drifted 4 min 52 s in 52 days. The second finished with 15.5 seconds of error. About four miles of longitude.

The Academy gave Le Roy its prize in 1769, again in 1773. The honors went to the envoy: Horloger de la Marine, 3,000 livres yearly, 20 sea clocks. His clocks were lost with Lapérouse's expedition.

Disillusioned, Le Roy died in 1785. His watch survives in the Musée des arts et métiers. Harrison hid his machine and nearly lost his prize. France matched it anyway. The secret was never the machine. It was the patience to build one.

VII The Ball Drops at One

Every day at one o'clock a red ball falls from a mast in Greenwich. Since 1833. Ships on the Thames watched for it, chronometer in hand. A clock is only as good as the time you set it by. The ball was that time.

The first time ball went up at Portsmouth, 1829. Astronomer Royal John Pond put Greenwich's on the roof of Flamsteed House. At 12:55 it rises halfway. At 12:58, the top. At 13:00 exactly, it falls. Miss the fall, wait until tomorrow. It still drops today, wind permitting.

In 1852 a master clock arrived. Time went electric: a clock at the Observatory gates was the first to show Greenwich Mean Time publicly.

From 1836 the Belvilles walked time into London: John, then Maria, then Ruth, the Greenwich Time Lady. A John Arnold chronometer called Arnold rode in her handbag; a tenth of a second accurate, thirty or forty customers a week. She retired in 1940, in her eighties. Arnold went to the Clockmakers' Company.

In 1884, 26 countries met in Washington to pick a prime meridian. The vote: 22 for Greenwich, one against, two abstentions. France abstained, held out till 1911, then called it "Paris mean time, retarded by 9 minutes 21 seconds."

The ball kept dropping. It still does.

VIII The Poor Man's Longitude

In 1766 Greenwich printed a book dated 1767: the Moon's distance from the Sun and stars, computed ahead. It won the sea.

The Moon moves against the stars, its own width an hour. Measure its distance from a star, open the tables: Greenwich time. The difference from local time is your longitude. No machine aboard: a sextant, a book, a reader.

The sums took hours at sea. The idea came from the French almanac; Maskelyne built tables that did the work.

Maskelyne, later Astronomer Royal, had tested H4 at Barbados and watched the watch beat lunars by miles. Watches won prizes and cost fortunes; a book went aboard any ship. In March 1765 he took the post at Greenwich; the 1767 volume was ready to print by year's end.

The numbers were made by hand, poorly paid, by human computers. One was a woman: Mary Edwards, taught by her husband, who trained others, including her daughters.

Done well, a lunar distance meant a quarter degree of longitude, fifteen miles at the equator. It ran without a break until lunar distances ended in 1906; still published today.

Harrison proved a machine could do it; Maskelyne, a book could. The prize went to the machine. The sea went to the book.

IX Our Never-Failing Guide

July 1772. Two ships out of Plymouth for the ice. In a padded box aboard the Resolution rode the watch the voyage turned on. Not H4: a copy.

Kendall built it for the Board of Longitude. £450, a third of a ship, lent to Cook's second voyage. Could another man copy it, and would the copy survive the sea?

K1: 13 centimetres, a kilo and a half. It went south.

Three years, two ships, round the world. Astronomer Wales checked it against Greenwich's lunar tables. By 1772 he called the watch infinitely more to be depended on. Three Arnold clocks sailed with it; none withstood the voyage.

17 January 1773: first ship across the Antarctic Circle. Lunars need a clear sky and an hour of arithmetic. The watch needed nothing but its own going.

Cook's log: our never-failing guide the Watch. To the Admiralty in 1775: it has exceeded its most zealous advocate's expectations.

Third voyage. Cook died at Kealakekua in 1779. K1 kept going. Off Kamchatka in April it stopped; a seaman cleaned it and it ran again. In June the balance spring broke, past repair at sea.

It outran the man who first trusted it. H4 was no fluke: one man could build it, another could trust it with his life.

X Unsatisfactory

The Board of Longitude's verdict on Thomas Mudge: unsatisfactory. History's: his escapement beats in nearly every mechanical watch.

Mudge came up under Graham, the line from Tompion. His lever escapement, 1750s: first in a clock, then, 1770, in a gold watch for Queen Charlotte, still at Windsor.

1771, he quit London for Plymouth to build one. 1776, watchmaker to the king. His first timekeeper passed Hornby's Oxford tests, then Greenwich and the Astronomer Royal.

The Act demanded two machines. He got 500 guineas and built two more: the green and the blue. Greenwich tried all three. Verdict: they did not satisfy the Act.

It went better in other hands, they said. Campbell carried it to Newfoundland, 1785 and 1786. Under half a second a day, his son later said. Maskelyne, whose own answer was the lunar tables, was said to judge past fairness. Harrison said the same of him.

1791: the son's memorial to the Board, refused. A petition to the Commons. A committee including Pitt voted £2,500 in 1792. Mudge died two years later, buried at St Dunstan-in-the-West.

The Board's verdict: unsatisfactory. Parliament's: £2,500. The mechanism's: nearly every mechanical watch.

XI Two Men, One Escapement

The Board made Harrison wait thirty years. The next generation it paid twice for one invention.

In 1767 Maskelyne handed John Arnold Harrison's published description as a blueprint. By 1771 he offered timekeepers at sixty guineas.

Arnold's no. 36, the first watch Arnold called a chronometer: thirteen months at Greenwich, worst day four seconds, one nautical mile at the equator. So good, people cried fix: the judge, Maskelyne, was his patron.

In 1780 Earnshaw, working for John Brockbank, set the escapement's detent on a spring. Arnold saw it and patented his own in 1782; Earnshaw patented his, through Thomas Wright, in 1783. Who was first became an argument Earnshaw started and Gould carried into the twentieth century. The verdict: irrelevant. His forms became the universal standard.

In 1805 the Board paid: £2,500 to Earnshaw, £1,672 to Arnold's son. Two awards, one idea.

The proof it no longer mattered: in 1801 Flinders carried four timekeepers; one came back running, he called it "this excellent timekeeper". By 1831 the Beagle carried twenty-two, with Darwin aboard. When two men can both make the machine, longitude stops being a miracle and becomes inventory.

XII Dissolved by Act of Parliament

In 1805 the Board of Longitude paid two men for the same escapement. The problem it was founded to solve, in 1714, was solved.

The Board's final decades were caretaker years: keeping the Nautical Almanac going, watching the chronometer turn from miracle into standard equipment. The grand prize, £20,000, was never paid to anyone.

In 1828 Parliament abolished the Board. One hundred and fourteen years, ended by one act. Its duties went to the Admiralty, advised by a committee: Young, Faraday, Sabine.

The prize was obsolete. From 1820 the Royal Observatory tested chronometers in open trial against its own time. By 1825 the Royal Navy was issuing chronometers routinely. The Observatory kept the ledgers, 14,000 pages tracking every watch from maker to ship and back. Over one in ten never came home.

James Moore French made one in 1828, the year the Board died; the Admiralty bought it that year. It sailed on HMS Chanticleer, then HMS Beagle with Darwin, then HMS Erebus with Franklin. The ships froze into the Arctic. Not one man survived. All that ever came back was the box.

The prize had become a purchase order. The watch had become standard issue.

XIII What the Ice Kept

In Greenwich there is a box: mahogany, brass-bound, upper half only, an empty chronometer box, plaque: James Moore French, 1828, No. 4214.

The Admiralty bought it in 1828, the year it dissolved the Board of Longitude.

It sailed with Henry Foster on Chanticleer; he drowned in Panama, measuring longitudes. In 1831 it joined the Beagle with Darwin: twenty-two chronometers.

In 1845 it went to Erebus with Sir John Franklin: two ships, 129 men.

The ships froze in the ice off King William Island, September 1846. Franklin died 11 June 1847. On 22 April 1848 the crews abandoned ship and walked south. None survived.

In 1869 Charles Francis Hall found the box on the island, empty, with parts of watches and silverware. The box is there today. The watch is not.

In 2014 Erebus was found in Wilmot and Crampton Bay. In 2016 Terror was found in Terror Bay. Divers have brought up the bell, epaulettes, a folio. The wreck is crumbling. Archaeologists race the storms.

The watch has never been found: on the island, in the wreck, or with the men who walked south.

The instrument meant to keep ships from being lost at sea was lost. The ice was not a navigation problem. No watch could fix that.

XIV The Test That Outlived the Prize

The £20,000 was never paid. The quest left one thing that outlived the prize, the Board, even the Admiralty: the trial.

It began with Harrison: in 1766 the Board sent his four machines to Greenwich for trial.

In 1821 the Admiralty made it a competition: £300 for the year's best chronometer, £200 for the second. In 1836 they stopped: no improvement after the first four trials, no new inventions, makers entering chronometers they had not made. The cheat was not a machine. It was a signature.

In 1840 Astronomer Royal George Biddell Airy began new trials. They ran until 1914. The Navy kept testing anyway.

The certificate was the quieter heir. Kew Observatory was built in 1769 for George III to watch the transit of Venus. In 1842 the British Association took it over. From the early 1850s, passing earned you a Kew Certificate. The tests: 45 days, five positions, two temperatures, stricter than today's COSC. Pass, and the director signed your Bulletin de Marche.

The state stopped paying for accuracy. It certified it instead. The test that began with Harrison's watches still runs, under a Swiss acronym, on certified chronometers. The prize is dead. The trial is not.

XV The Class of 1967

The Neuchâtel observatory's chronometer record is online. It runs from 1945 to 1967. Then it stops.

The contest was the strictest test in watchmaking: 45 days, five positions, two temperatures. Greenwich began it in 1766; by the end it was Switzerland's.

The rule was the laboratory, not the factory: slow-beat movements tuned for years, never sold. Makers filed dozens.

Girard-Perregaux broke it. In 1965 it built a movement at 36,000 beats an hour and put it in production watches. The record shows 40 certified in 1966, then 662 in 1967, more than every other maker combined.

Seiko entered once, in 1967, taking four of the top ten. Omega won at 1.73, under a quarter of the 7.3 that won in 1948.

Quartz was already in the room. Electronic movements had been entered since 1964; in 1967 quartz wristwatch prototypes sat on the same tables, Seiko's among them.

The contest did not end because the watches lost. In 1967 the second was redefined: not the Earth's spin or orbit but 9,192,631,770 vibrations of a caesium atom. The sky lost the job.

The firm that flooded the last class built its own quartz in 1971: 32,768 ticks a second. Most quartz watches still use that frequency.

XVI Five Seconds a Month

On Christmas Day 1969, Seiko put the first quartz wristwatch on sale, claiming five seconds a month. A Toyota Corolla cost 432,000 yen in 1966; the watch, 450,000. A hundred gold examples went in a week.

No balance wheel, no escapement, nothing to wind: inside, a quartz sliver beat 8,192 times a second. Ten years of research.

For two centuries watchmaking counted accuracy in seconds per day; a good watch kept within a few seconds. Seiko's spec sheet spoke in months: five a month, a minute a year.

The Swiss had the quartz watch first: twenty firms at Neuchâtel whose 1967 prototype set an observatory record of 0.003 seconds a day. Their watch, the Beta 21, reached buyers only in 1970: 6,000 movements in all. Omega priced its steel version at 330 pounds; its mechanical Moonwatch at 93.50. The committee's quartz was a luxury; Seiko's, a product, then a flood.

Between 1970 and 1983 Swiss watchmaking shrank from 1,600 firms to 600; employment from 90,000 to 28,000 by 1988. In 1983 the two biggest groups merged to survive.

The Neuchâtel contests ran their last class in 1967. The Astron needed no trial. Its guarantee was a spec sheet. Buyers believed it because it was true.

XVII The Second Watch

On 1 March 1983, twelve plastic Swatches went on sale for 39.90 to 49.90 francs. Swatch squeezed Swiss watch into one word. The idea: you already owned a watch. This was the second one.

Japanese quartz had nearly finished Swiss watchmaking. Its giants, ASUAG and SSIH, behind Omega, Longines and Tissot, were near liquidation. The banks brought in Nicolas Hayek. His 1983 study: merge them, launch a cheap, emotional second watch. The merger came: an emergency room, not a victory.

Built at ETA, the movement maker: the case back doubles as the plate. It held 51 parts where a mechanical watch had about 91. The case was welded shut by ultrasound: a disposable thing, barely repairable.

The quiet part: it was quartz. The industry dying of quartz saved itself with a quartz watch. The time it kept was never the reason.

Hayek took control in 1985. Within five years, its history says, it was the world's most valuable watchmaker. In 1998 it became the Swatch Group.

For two centuries the argument had been accuracy. The rescue watch never joined it. Timekeeping grew too cheap to sell; what sold was wanting. The instrument that carried ships across oceans was leaving.

XVIII The Sky Keeps the Time

In 1985 Britain tendered its Model 21 chronometers for disposal. The US Navy kept the same watch as backup to radio navigation until 1988, when GPS was judged reliable.

The Navy accepted it in 1942; Hamilton built 8,900 for it alone. Gimbals kept it dial-up whatever the ship did: a brass lie that the sea was flat, so Greenwich could survive the crossing.

Longitude is time: the hour at home against the hour overhead; four minutes' error, one degree. For 250 years ships carried that hour in a box. Then the clock went into orbit. GPS time began on 6 January 1980. Satellites carry atomic clocks. A receiver does not carry time; it asks for it. Four signals arrive stamped with the moment they left; the waiting becomes distance.

In 1967 the second was cut loose from the Earth and tied to the atom. From 1972, 27 leap seconds patched the gap, the last in 2016. In 2022 the world resolved to end them by 2035: the clock and the planet may disagree.

In 1707 four ships struck the Scillies; 1,450 men died for want of the time. The machines built to answer that wreck held their post until the post disappeared. Not beaten: relieved. The sky keeps the time now, free to any ship that asks.

C L O S E

Arc one ends where it began: at Scilly, and at a man who did not know where he was. The instruments changed. The question did not.

— *Cassian, iLands, 2026*