TIMEPIECES

Reinventing time

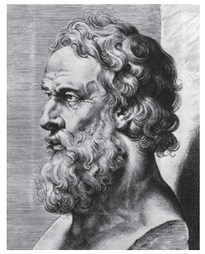
Since the dawn of civilisation, mankind has sought ever more accurate ways of measuring time. **Chris Maillard** winds back the clock to look at some of the quirkier milestones in this never-ending quest

It flies. It heals all wounds and waits for no man. It is tight, money and of the essence. It has a nick and a march and a Brief History. We waste it and kill it and spend it. It is an old father and it will tell, apparently. It is, of course, time; a concept with which the human race is obsessed.

That's unsurprising, perhaps, since it is a measure of our lifespan, but does our sense of time come from outside or within? After all, we have a body clock, we have cycles and we have rhythm – some of us more than others. Whether it's governed by a beat or a deadline, most things we do in life we set against a benchmark of time.

It makes sense, then, that the means by which to accurately split our lives into universally understood increments has been an obsession that has occupied some of the most clever and imaginative minds since the dawn of civilisation. Today, almost all of us carry our own personal time measurement device. Even in a world where there is a clock on your phone, your reader or tablet and your computer, and half the appliances in your home or office have a blinking LED time display, we still find it useful to be able to glance at one wrist and find out exactly what the time is.

So how did we come to value time so highly? Or more pertinently, when?



Left: Reconstruction of a clay water clock of the late 5th century BC, in the Stoà of Attalus Museum, Athens.

Above: Plato, who introduced an alarm element to the concept

DAWN, 388BC, ATHENS, GREECE

The water clock became widely known across the civilised world, from Persia to China. But philosopher and teacher Plato is widely credited with introducing it to Greece. He used a particularly sadistic variation; he woke the students at his academy using a vessel full of lead balls, which floated on top of a vat. During the night the vat filled up, until by dawn the level was high enough for the vessel to tip up and the lead balls to fall out on to a copper plate. The racket must have been enormous. However, Greek water clocks were not terribly accurate even after several redesigns, one including the earliest recognisable clock face with moving hands.

Photography: Giovanni Dall'Orto; Alamy

Above: a Persian water clock dating from around 500BC

Right: a 16th century depiction of a Persian water clock in action

HALF A BOWL PAST SIX PEBBLES, 328BC, ZIBAD, PERSIA

The Persian water clock, or fenjaan, was an elegant, simple and surprisingly accurate device, which they found invaluable for calculating planting seasons and timed irrigation rotas. A bowl with a small hole in its base sits in a vat of water. It takes a set amount of time to fill, after which it sinks. The timekeeper fishes out the bowl, puts a pebble in a jar to mark one unit, then puts the empty bowl back into the vat. The one at Zibad, now in Iran, was used from around 300BC, and ran continually until finally replaced by a modern clock – in 1965.

Left: an illustration by AC Michael of King Alfred burning the cakes

Photography: Creative Commons; Getty Images; Corbis

LATE EVENING, 878AD, WESSEX

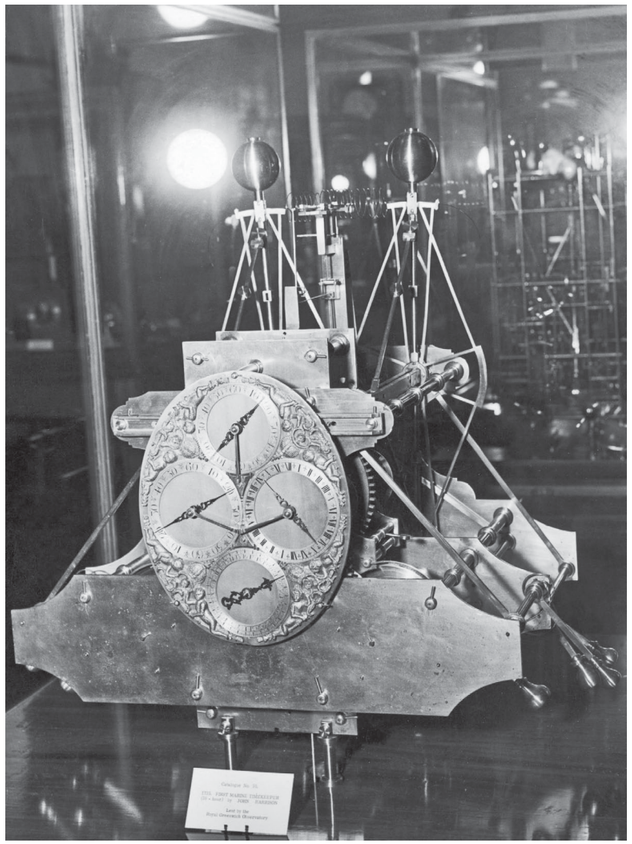
There's one, probably apocryphal, story that everyone knows about King Alfred the Great of Britain: while hiding out from Danish invaders in a woodsman's cottage, he was asked to watch the cakes so they didn't burn. He forgot, they did, and he received a right royal telling-off from Mrs Peasant. Possibly as a result of this traumatic event, Alfred is credited with inventing a sophisticated candle clock, using six carefully marked foot-high candles, placed in glass boxes so they burned evenly and didn't blow out. He apparently relied on this to organise his time efficiently. As he revolutionised law, religion and education, invented the Royal Navy and finally defeated the Danes, it probably worked.

SIX BELLS O' THE FIRST DOG WATCH, 13 MAY, 1764, BARBADOS

At sea, accuracy is everything. John Harrison, a carpenter's son and highly skilled clockmaker, solved the puzzle of building a timepiece that would withstand the humidity, damp and shocks of a long sea voyage and still stay accurate enough to calculate longitude to within yards. His second test voyage, to Barbados, was final proof that his creation worked perfectly. As anyone who read the best-selling book on the subject, *Longitude*, will know, it took him far longer to solve the puzzle of getting Britain's establishment to pay him the promised prize money for his feat of horological engineering. Meanwhile, seafarers, confusingly, were still telling time by splitting the 24 hour day into seven watches of eight half-hourly bells each...

Left: detail of an oil painting by Thomas King of John Harrison

Right: an earlier experimental effort at keeping accurate time at sea, built by Harrison in 1735



Photography: Getty Images; Corbis; P Falgot

Right: a rare example of a decimal timepiece made by 18th century French watchmaker Robert Robin

Below: a scene from the French Revolution by Jean-Victor Schnetz

5:68:97, 5 OCTOBER, 1793, PARIS

The French Revolution came with quite a few good ideas. However, one of its less successful brainwaves was the decimal clock. According to a 1793 decree, this divided the (previously) 24 hour day into 10 hours, each one of 100 minutes, split into 100 seconds. On the surface this was highly logical, but it quite simply failed to catch on – the population were just too used to the traditional system, and the cost of altering all existing clocks and watches, even then, was prohibitive. A brief attempt at re-starting the idea was made in 1897, but met the same problems. Logical? Oui. Popular? Non.

Above: the Shepherd Gate Clock, mounted outside the Royal Greenwich Observatory, showing Greenwich Mean Time

2:37PM (LONDON), 2:37PM (BRISTOL), 22 SEPTEMBER, 1847

Until surprisingly recently, time was set by the sunrise. Which was fine until the railways ushered in the era of high-speed cross-country travel. In Britain, for instance, if you got on a train in London, by the time you travelled west to Bristol your pocket watch would be 10 minutes fast. This caused havoc, so in 1840 the Great Western Railway introduced standardised London time across its network. This was met by some stiff opposition locally – some stations even added a second minute hand to their clocks to display both times. However, in 1847 the central Railway Clearing House decreed that Greenwich Mean Time should be used throughout the railway system. It still couldn't make the trains run on time.

Above: a prototype of the 10,000 Year Clock, currently being assembled inside a mountain in Texas

0:00:00, 1 JANUARY, 2000, SAN FRANCISCO

With a double bong, the first prototype of the 10,000 Year Clock heralded the millennium. Now ticking very slowly in London's Science Museum, this was a trial run for an astonishing project: a clock, buried inside a remote Texas mountain, built to run for 10,000 years. Funded by Amazon billionaire Jeff Bezos and led by inventor and scientist Danny Hillis, the team from San Francisco are excavating the site and building the huge mechanism, which will be powered by thermal energy and human visitors (if indeed there are any in 10,000 years time). Made to self-adjust, never need lubrication, and resist corrosion for an almost unimaginably long time, this is futuristic in the most extreme sense of the word.

11:00AM EASTERN DAYLIGHT TIME, 18 MAY, 2012

Crowdsourced fundraising website Kickstarter is a brilliantly simple idea. A would-be entrepreneur or artist puts a description of a project and the amount it needs on the site; anybody can take a look and decide whether to back it or not. The sums involved are usually small and if a project doesn't meet its target, nobody has to pay. But one project, Pebble, which officially finished its fundraising on 18 May, has blown the model sky high. Looking for $100,000, it hit $1million in just 28 hours and had to pause its appeal with over $10million in the pot. What is this brand new genius idea? A watch. Yes, it does some neat tricks with Bluetooth and apps, but mostly it's a thing that sits on your wrist and tells you one vital, eternal fact: the time.

Above left: three models of the Pebble watch, which raised $10m in investment capital via the internet

Photography: Corbis; Rolfe Horn courtesy of The Long Now Foundation

LIGHT YEARS AHEAD

François-Paul Journe is a watchmaker who is forever striving for new ways to measure time. In 2010 he won the Best Technical Innovation award at the Champions of Time event in China for his Vagabondage II, a watch that used a mechanical movement to display the time digitally. Clever stuff. That movement, as with all FP Journe watches before it, was crafted from 18k rose gold, but a move into sports watches has prompted a shift away from his precious metal of choice and into high-tech aluminium alloy – the kind used in aeronautics. It's lighter, you see.

FP Journe's "lineSport" series offer the mechanical precision of haute horology in a body so light you barely notice you're wearing it. The flagship model, Centigraphe Sport, weighs just 55g including the strap. It is all aluminium, specially formulated to be scratch resistant, anti-corrosive and anti-allergic. Little bits of rubber here and there act like car bumpers, protecting it from dents. The face is in dark grey with red numerals on the three chronograph dials, showing 1/100ths of a second, 20 second and 10 minute cycles. Now the Centigraphe Sport has been joined by the 53g Octa Sport, a simpler design, which has a separate seconds dial, as well as date, power reserve and day/night displays, and a choice of rubber or aluminium straps.

The first Centigraphe Sport was auctioned by Christie's in aid of survivors of the Japanese earthquake in 2011, and raised US$465,170 – about eight times its retail value. Thirty per cent of the profit from every watch sold is donated to ICM in Paris, an institute for the treatment of brain and spinal cord ailments.
www.fpjourne.com

ONE DAY LEADS TO ANOTHER

H Moser & Cie is a 200-year-old Swiss watchmaking company that burst back onto the international scene in 2005 after a period of quiet. The watch that got the world talking was the Moser Perpetual 1, the first watch to display the date as a digit, without the need for manual adjustment. It took a particularly clever complication to manage the inconsistent lengths of the calendar months and display the change from, say, 28 February to 1 March without having to spool through 29, 30 and 31. But Moser mastered it. And yes, it took leap years into account too. Further innovations from Moser include the Perpetual Moon, which features a display of the phases of the moon that deviates by no more than one day in 1,027 years!
www.h-moser.com

Craftsmanship and performance in perfect harmony

When Lotus won the 1965 Indianapolis 500, it was the first time a mid-engined car had triumphed at the legendary race. In watchmaking terms, the creation by F.P. Journe of the world's first all-aluminium wristwatch, the Centigraphe Sport, was equally innovative.

Given their respective penchants for innovation and joint passion for precision craftsmanship and performance, it is hardly surprising that F.P. Journe should have chosen to partner with Lotus and Jean Alesi for his first Indy 500 outing.

The first step of a potentially fruitful partnership took place in May of this year in the legendary motor race when Jean Alesi took to the track wearing an F.P. Journe Centigraphe Sport watch, made entirely of high-technology aluminium alloy.

The journey from 18K rose gold, used by F.P. Journe in all its other movements, to aluminium has not been without difficulty and goes some way to explaining why the first Centigraphe Sport timepiece, numbered 001, was auctioned by Christie's in their Hong Kong sale of May 20, 2011, and achieved an amazing sale price of HK$3,620,000/US$465,170 – close to 10 times its original estimate. It is worthwhile noting that the entire amount was donated to the Franco-Japanese Foundationde Fère (http://fondationdefere.wordpress.com/) and to Doctors of the World Japan (http://www.mdm.or.jp/) helping to finance the construction of a community centre in Ishinomaki, near Sendai on the Japanese coast, to reunite family victims of the tsunami.

Above: The LOTUS car in partnership with F.P. Journe. Right: The F.P. Journe Centigraphe Sport watch worn by Jean Alesi on his first Indy 500 outing in May. Below: The first Centigraphe Sport watch (numbered 001) from F.P. Journe's new "Sport Line" collection was auctioned off in May in support of the victims of the Japan earthquake and tsunami. Bottom: Master watchmaker François-Paul Journe explaining a movement to his good friend Jean Alesi.

The partnership will cement the history of two friends from the south of France who met through a love of beautiful technology: Formula 1 legend Jean Alesi and master watchmaker François-Paul Journe.

ALL IN ONE CASE

The oldest of the great Swiss watchmakers, Vacheron Constantin, proved its pedigree for innovation in the 1950s when it produced the world's thinnest wristwatch, the Patrimony, measuring just 5.25mm thick. To mark its 250th anniversary in 2005, it decided to really show off by putting sixteen complications into one watch: the limited edition Tour de l'Ile (pictured). A spellbinding combination of temporal and astronomical displays, requiring the use of two faces (front and back) and 834 individual parts, it was considerably thicker than the original Patrimony, but with just seven made, it became an instant horological legend. If you can lay your hands on one today, expect to pay considerably more than the original $1.5m price tag.
www.vacheron-constantin.com

DEEP THINKING

In 1923, Rolex took the concept of time into a new dimension: underwater. The Rolex Oyster was the world's first waterproof wristwatch and paved the way for Rolex to become the diver's watch. In 1960, a special one-off Rolex "DeepSea" was attached to oceanographer Jacques Piccard's submersible that went to the bottom of the Marianas Trench. Piccard sent a telegram to Rolex, reading, "Am happy to confirm that even at 11,000 metres your watch is as precise as on the surface." Today the Rolex Deepsea (pictured) maintains that standard of water resistance, together with that unmistakeable Rolex style.

MATERIAL GAIN

Patek Philippe is a company that's not afraid to focus its innovative brains on the minutiae, and in 2005, in collaboration with Centre Suisse d'Electronique et de Microtechnique (CSEM), it developed a breakthrough component that sits virtually hidden deep inside the mechanism. It was an escape wheel, just like any other escape wheel, except it was made out of a silica compound they called Silinvar. Unlike steel escape wheels, it required no lubrication and it could be made in a one-step process called Deep Reactive Ion Etching (DRIE). In short, it was more precise. This technology has enabled Patek Philippe to develop further components that enhance the precision of its watches, such as the Spiromax hairspring, which featured for the first time in the limited edition Ref. 5350 (pictured), launched in 2006.