St Mary-le-Bow, Cheapside, London EC2V 6AU

The Admiral Phillip Commemoration

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In a life crowded with achievement and adventure, Arthur Phillip is of course principally celebrated for his commanding of the First Fleet to New South Wales and, for five years, overseeing the nascent colony as its first Governor.

Previous addresses have looked at Phillip's enlightened and liberal approach to his governance, and his achievement in those first five years, creating a stable community under the most difficult of circumstances. This address looks at Phillip's great success as a navigator on that First Fleet's voyage to the antipodes, seeing his fleet of eleven ships safely to the other side of the world with minimal loss of life. To ensure that achievement, Phillip required the state-of-the-art scientific and technological instruments, which were just becoming available at the time, and we hear a little of the talented men who created them.

For the last 35 years, it has been my privilege, as Curator of Horology at Greenwich, to look after the historic navigational timekeepers at the National Maritime Museum. This collection, which is largest of its kind in existence, includes the actual marine timekeeper Phillip took with him on that voyage, and I have long felt connected to, and have admired, this savvy and intelligent man. Arthur Phillip was of course educated at Greenwich at the Royal Hospital's school. In his later years, he may have heard of the school's move into new buildings over the road, embracing Inigo Jones's Queen's House. These are of course the very buildings which, in the twentieth century, would become the National Maritime Museum, once the Royal Hospital School moved out to Holbrook in Suffolk in 1934.

The period in which Phillip guided that First Fleet to the antipodes was an intensely interesting one from a navigational standpoint; for many curators of navigational technology it is this very period which is the most important in the whole history of navigation. The keyword on everyone's lips at that time - and of course for we historians looking back - was Longitude. Since the days of Columbus, ships had been taking to the open seas, out of sight of any coastline with which to know their position, and discovering more accurate means of finding ones position on a chart was of paramount importance. As we all doubtless recall from our geography lessons at school, to find ones position on a chart one needs those two well-known co-ordinates, the latitude and the longitude. The latitude, how far North or South one is from the equator, is the easy one to find; even the ancients knew, that by observing the Sun at midday, or certain stars at night, one could readily determine one's latitude on the chart. But to mark one's exact place on the chart it was also necessary to know one's longitude, the east-west co-ordinate, how far around the world one was from home, and this was much more problematic. The solution was simple in principle, as how far around the world one is from home is the same thing as the difference in local time between the two places, each hour's time difference equating to fifteen degrees of longitude. Therefore, all one needs to know is one's local time where the ship is, which is easy enough, even with no land in sight, by observing the Sun at Noon and, if one knows the 'time back home', at that same moment, the longitude can readily be found. But how on earth can one know time back home when in the middle of an ocean? In theory, the answer is simple, you take an accurate clock with you which is set to home time before you leave and keeps home time for the whole voyage. The hands must never be touched, the clock must be kept going and must keep good time for

weeks and months in spite of the widely varying temperatures and the motions of the ship. And this, of course, was the problem, thought by most to be insuperable: surely no such clock was possible - even a huge government reward offered in 1714 for any practicable method of finding longitude at sea, did not seem to be producing a viable solution. And, as a pupil at the Royal Hospital School in the early 1750s Phillip would have learned of the theory of finding longitude, but also of the great difficulties in practice. In particular he would have been assured that the concept of a marine timekeeper as a solution was highly unlikely ever to succeed though the reasons for this general opinion are too detailed to discuss here.

However, as history relates, it was that extraordinary maverick, the self-taught carpenter from Lincolnshire, John Harrison who proved it was possible, earning for him the great longitude reward and a place in history. His fourth marine timekeeper, a large watch known today as H4, completed in 1759, the year Arthur Phillip had just come of age, demonstrated on two practical trials across the Atlantic that the system worked. The controversy surrounding those trials is another story, but suffice to say many were still deeply sceptical. It was several decades before the scientific, political and military establishment were convinced, but Arthur Phillip, and the First Fleet, would have their part to play in demonstrating the usefulness of such a timekeeper. In attempts to prove the viability of H4, copies of Harrison's pioneering timekeeper were made, one by himself and one, at the behest of the Government, was commissioned from the top London watchmaker Larcum Kendall. This timekeeper, known today as K1, was inspected by Harrison himself and declared even more finely made than his original. And that is saying something. With their state of the art, high frequency, high energy oscillators to keep time, and the multitude of ruby and diamond bearings ensuring friction was minimised, H4 and K1 were the most complex and beautifully made timekeepers in existence at the time. And it was this timekeeper, K1, which Arthur Phillip had the good sense to demand as his guiding light among his instrumentation for the first fleet in 1786.

Good navigators do not allow prejudice to get in the way of anything which might prove useful in finding their way safely across the seas, and Phillip was undoubtedly aware that, some years before, his fellow officer, Captain James Cook had been issued with this same remarkable timekeeper on both his second and third voyages to the south-seas. Understandably, given the general scepticism about the timekeeper method, Cook had been doubtful of the value of such a device. However, in practical use at sea, Cook soon found the timekeeper K1 was invaluable, and began referring to it in his journals as "...my trusty friend", and "...my never failing guide". One could not have asked for better product placement than with the greatest navigator of the day. However, even if the navigator felt he could trust this new piece of high-tech, there was a significant problem. The design was both complex and extremely expensive to make. K1 cost the government £500. For the price of just 50 K1s the Navy could have paid for Arthur Phillip's ship, Sirius , complete.

And by the time of Cook's and Phillip's voyages, there was an alternative means of determining longitude just becoming available. Ever since its foundation in 1675, the Royal Observatory had been busy developing an astronomical method for finding longitude in which "time back home", as one might call it, was found, not with a clockwork timekeeper on the ship, but by observation of the very predictable motions of the moon against the background of the stars, a kind of celestial clock. The Lunar Distance Method, as it was known, was a more complex and time consuming way of finding longitude, requiring sets of astronomical tables and an improved angle measuring instrument. By the mid-1760s however, the Astronomer Royal at Greenwich had begun publishing the requisite tables in the form of the Nautical Almanac, and London's instrument makers were beginning to produce the improved angle measuring instrument, the

sextant. So, as long as the observations and consequent maths were done correctly, the lunar distance method of finding longitude was thought to be more certain and was preferred by the scientific and naval establishment.

That method was preferred, but it must be remembered there was a fascinating duality of purpose in the use of these new methods on voyages such as Cooks and Phillips, in that at one and the same time, these prototype instruments and techniques were themselves under trial, whilst also being relied upon to guide the ship. There was also another fascinating duality with such pioneering navigation, in that in unknown lands, the system was first used to create the chart itself, so the highest consistency and reliability was needed in these methods.

But Harrison's technology did not let them down, and a decade after Cook's successful voyages, Phillip was not to be disappointed in the performance of K1 on his own voyage. Using the timekeeper and the lunar distance method in combination, he guided his eleven ships safely to the southern hemisphere, minimising loss of life and eventually enabling a safe harbour to be found. As far as is known only Phillip carried a timekeeper, but the Commanders of the other ships would certainly have been versed in finding longitude by lunars and would have communicated among the fleet by signal. Nevertheless one wonders if, every morning Phillip was uncertain whether he would find his fleet intact, with no ships astray.

On arrival in what became New South Wales, Phillip decided the colony was not, after all, to settle at Botany Bay as had been recommended, but to search for a better location, and after further sailing northwards, discovered and charted Sydney Cove. Without the careful use of these up to date navigational techniques and the latest equipment, this successful outcome would have been virtually impossible and the timekeeper K1 played a vital part in this success.

By all accounts, Arthur Phillip was a meticulous and logical thinker. His headmaster noted right back in his schooldays that he was, "...to the smallest degree in everything he undertakes, always seeking perfection". No doubt it was this meticulous application of his navigation practice that contributed to the safety of the fleet. But the instrumentation itself had to be as perfect as possible too, both in design and in construction. One imagines then that Phillip would have related well to the elite group of pioneers involved professionally in creating these state of the art instruments, for it is precisely that determination, always to seek perfection, which enabled those pioneers in the horological world to succeed in their development work.

However, apart from a determination to find perfection, it would be a mistake to imagine those men to be similar to Arthur Phillip in nature. The fascinating truth is that the men who risked getting involved in this high-stakes pioneering industry, creating these fine and intricate machines, were about as far from the quiet, clinical and reasonable stereotype of a watchmaker as can possibly be – they were as colourful and varied a bunch of eccentrics as in any Shakespeare play or Dickens novel, some of them probably having more in common with the passengers on the First Fleet than with its Commander. The greatest of the horological pioneers, John Harrison himself, was deeply embittered, at the end of his life, at the establishment's lack of enthusiasm for his marine timekeeper design. His final published work appeared in 1775, when Cook was still on his second voyage with K1, and Phillip was serving in the Portugese Navy. Harrison's book was so critical of the scientific and naval establishment that one reviewer was uncompromising: "...we are obliged to declare it one of the most unaccountable productions we ever met with...every page of this performance bears marks of incoherence and absurdity, little short of the symptoms of insanity. Mr Harrison is doubtless a good mechanic, ... but the extravagance of his self-conceit and total want of urbanity toward several of the first

mathematicians and mechanics of the age, can be excused only by the debility of superannuated dotage." So much for the reputation of the man whose brilliance contributed to safe navigation for two centuries of world shipping.

Perhaps the greatest and most prolific of the next generation of entrepreneurial chronometer pioneers was John Arnold. Described by contemporaries as a lying, boasting thief of other people's ideas, contemporary court papers reveal Arnold as a serial wife-beater and bigamist. But his brilliance at horological design and manufacture, and his charismatic social climbing saw him widely admired in his day for his achievements. Thomas Earnshaw was another hugely important figure in this dysfunctional band of horological craftsmen; indeed, it was chronometers by Earnshaw which would a few years later enable Matthew Flinders to chart much of the coastline of Australia. Earnshaw was perhaps the most outspoken of all in his criticism of others. He nearly bit off more than he could chew when he accused Sir Joseph Banks, the President of the Royal Society himself, of being prejudiced in favour of John Arnold, and narrowly escaped being sued for libel.

By contrast, and appropriately enough, Larcum Kendall, the creator of Phillips timekeeper K1, was perhaps the nearest in character to Phillip himself. Born to an Oxfordshire Quaker family, Kendall was something of a loner, dedicating his life to practising and perfecting his craft of watchmaking. No surprise then that K1 was declared by Harrison even more finely made than H4, but Kendall was a first rate craftsman not a designer, nor an ideas man, and his later timekeepers, commissioned by the government as simpler versions of Harrison's design, were not nearly as successful as K1.

It was characters such as these then, who were actually pioneering this new technology, right at the time when Arthur Phillip was planning to set sail with the First Fleet. The early examples of the new instruments were thus available, but it took a man of Phillip's vision and intelligence to understand the need to persuade the authorities to supply them, and his practical experience and know-how as a navigator to ensure they were used to best effect. That the Fleet arrived in New South Wales with 95% of his complement alive and well is a testament to his compassionate management of passengers and crew, and his rigorous and careful navigation, but no small part of that achievement was due to his careful choice of up to date navigational technology, and to the talents of that eccentric and colourful band of horological pioneers in London.