

Solving the Longitude Challenge

300-Year-Old Discovery Remains Vital to Scientific Research Today

Photo courtesy of the National Maritime Museum, London.

Global position is described by two coordinates, latitude and longitude. Lines of latitude measure positions north and south and run parallel to the equator. Lines of longitude run pole to pole and measure positions east and west. Latitude is easy to measure from the sun. Longitude presents a bigger challenge. In the early 1700s, countries including Spain, the Netherlands, and France offered rewards for solving the longitude problem. But it was Britain that the approach paid off as a result of the 1714 Longitude Act.

In 1714, the British Government offered, by Act of Parliament, £20,000 for a solution which could find longitude to within half a degree (equivalent to 2 minutes of time), and a group later known as the Board of Longitude was set up to assess submissions and offer rewards. These experts included the Astronomer Royal at Greenwich and other scientific, maritime and political leaders. It was considered by many one of the greatest scientific challenges of the century.

One of the remarkable things about the longitude story is that two practical solutions were developed at the same time. In the field of mechanical timekeeping, John Harrison, a working-class joiner and clockmaker with little formal education came closest to receiving the reward money through his extraordinary mechanical talent and determination, culminating in his marine timekeeper, H4. This would become the instrument known as the marine chronometer. At the same time, the work of John Hadley, German astronomer Tobias Mayer and others perfected the instruments and astronomical tables necessary for the lunar distance method. Greenwich was central to the story.

Above all, Astronomer Royal Nevil Maskelyne's observations at the Royal Observatory, his work on the Nautical Almanac and the Board of Longitude demonstrated the complementary na-

ture of astronomical and timekeeper methods, ultimately leading to the successful determination of longitude at sea. As solutions were developed, the Royal Observatory became a testing site for marine timekeepers and the place at which the astronomical observations needed for navigational tables were made. It was this work that would eventually lead to Greenwich becoming the home of the Prime Meridian, zero degrees longitude for the world.

To mark the tercentennial of the Longitude Act of 1714, a new exhibition at the National Maritime Museum (located in Greenwich) runs from July 2014 to January 2015 called, "Ships, Clocks & Stars: The Quest for Longitude." This exhibition draws the latest research to shed new light on the history of longitude and how it changed our understanding of the world.

Highlights from the exhibition include all five of Harrison's famous timekeepers. H1, H2, H3 and H4 will move from the Royal Observatory Greenwich to be displayed in the National Maritime Museum for the first time in nearly 30 years. H5 is being loaned from the Worshipful Company of Clockmakers. Also featured is the original Longitude Act of 1714, which has never been on public display before; an intricate 1747 model of the *Centurion*, the ship which carried out the first proper sea trial of Harrison's H1, and the elegant, padded silk 'observing suit' worn by Nevil Maskelyne at the Royal Observatory during the 1760s.

If exhibitions and celebrations weren't enough, The Longitude Prize 2014 was launched this year to bring together both ama-

teur and professional scientists to help solve some of *today's* greatest global challenges. The Longitude Committee (led by Astronomer Lord Martin Rees) brought together more than 40 scientists, engineers and politicians to discuss global challenges in energy, environment, global development, technology/robotics, communications and health and wellbeing.

After a heated debate, the British general public had the opportunity to vote on the proposed area of concentration for the Longitude Prize 2014 and the public chose antibiotics. The challenge is to create a cost-effective, accurate, rapid and easy-to-use test for bacterial infections that will allow health professionals to administer the right antibiotics at the right time. The Longitude Committee and Nesta are finalizing the criteria for how to win the £10 million prize. Contestants will have five years to solve the challenge. The success of this research will mirror that of the inventors, scientists and curiosity seekers that came together back in 1714. For more information, visit www.rmg.co.uk or www.longitudeprize.org. **PTE**

