*Science & Technology*

**GREENWICH TIME AND THE DISCOVERY OF THE LONGITUDE**
by Derek Howse
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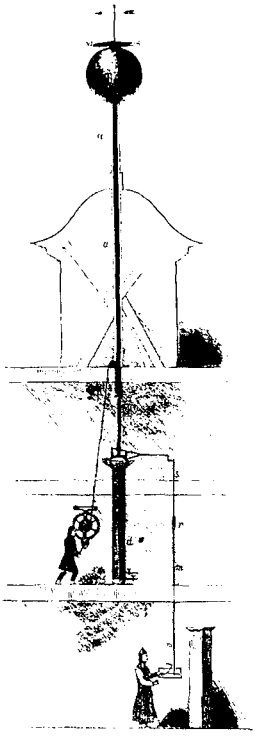

*National Maritime Museum.*

During the 16th and 17th centuries, Spain, Holland, Portugal, and Venice offered handsome prizes to anyone who could devise a practical method of determining longitude. The problem, really, was a matter of time, as Howse, of England's National Maritime Museum, explains. As far back as the 2nd century A.D., mariners could determine local time by checking the positions of the stars or sun. They could also ascertain latitude and direction. But even in the 17th century, a sailor had no means of knowing *precisely and quickly* where he was, because he could not be sure on a voyage of any distance how long it had taken him to get there. Needed was a highly accurate clock (to keep track of the time back at port) that would enable a seaman to convert the difference between port time and local time at any moment from hours into longitudinal degrees. Yet, as late as 1792, navigators had to rely on crude timepieces, and many found their ships bumping aground at night, in longitudinal error by as much as several hundred miles. That year, Englishman John Harrison perfected a portable clock able to withstand changes in temperature and the motion of a ship. As sea trade accelerated and as commercial railroads expanded, the push for an orderly system of time zones became intense. (In the 1870s, a cross-country U.S. rail passenger, for example, had to change his watch 20 times to make connections.) To provide a standard time for departing vessels, the Greenwich Observatory (established in 1676 for longitude research) had begun in 1833 lowering a ball from its roof every day at 1:00 P.M. Despite a few dire warnings that imposing a standard time was "usurping the power of the Almighty," Greenwich Mean Time (transmitted via telegraph) was, by 1850, adopted by 95 percent of the British people. In 1884, the International Meridian Conference fixed the Greenwich Observatory as the "common zero of longitude and standard of time-reckoning" throughout the world.