



JOHN HARRISON'S No. 4 chronometer, which solved the problem of determining longitude at sea.

satyrs, griffins and goodness knows what."

At the end of the 15th century dawned the heroic age of map making, the sun in this instance being the rediscovery of Ptolemy and the geography of the Greeks. Other factors contributing were the growing use of the compass "and the development of sailing vessels which could beat against the wind and didn't have to carry oarsmen," and, of course, this was the age of printing.

The Netherlands was to lead the world during this period, through their superiority in the art of line engraving, and through the possession of such men as Gerard Mercator and Abraham Ortelius. The former (remembered best for his projection—drummed into school geography classes) was for over 50 years the foremost map-maker of Europe, and did much to change the emphasis from pictorial art to scientific measurement.

On May 20, 1570, the first edition of a first modern book of maps was published in Antwerp. This was the *Theatrum Orbis Terrarum* (Theatre of the World), compiled by Ortelius, which was to go through some 28 edi-

tions before that cartographer's death. Though himself slowly accumulating data for his own book of maps, Mercator wrote to his friend, and technical rival, and commended him for the accuracy which he remarked was all too rare in those days.

Mercator's own work came out in three sections during the next 25 years. The second part was published first (in 1585); the third next (1590), and the first part last, a year after Mercator died (1595). His son Rumbold explained in the dedicatory epistle (it was dedicated to Queen Elizabeth) that the title of "Atlas" for the first part was his father's choice. This was the first use of a title which is now a commonplace. Of the persistence of his main contribution to map-making Mr McKenzie comments that the Mercator projection of the world is

"the one which I suppose four-fifths of our population regard as the way the world really looks."

About this same time, 1585, was published the first collection of marine maps, the *Spiegel der Zeevaart*, or *Mariners' Mirror*, which was destined to go through many editions and be translated into other languages. The title page reproduced here shows something of the magnificent decoration popular with the Dutch.

"The Dutch School declined towards the end of the 17th century, and with the coming of the 18th century 'Age of Reason' a new attitude to maps was developed in England and France." Of the French map makers Mr McKenzie says that they brought to their work that "cold light of reason which is perhaps the finest product of the French mind. Where they had no information they left their maps blank to show it. They had more accurate knowledge of latitude and longitude, and were already making instrumental surveys."

While the French were engaged in reforming land maps by surveys and careful analysis, the English preoccupa-

tion with the sea led them to tackle one of the most urgent of unsolved problems, the measurement of longitude at sea. The method of finding latitude by measurement of the altitude of the sun or a star had been in use since the days of the Greeks, and is still essentially the same in our own day; the measurement of longitude or distance east and west, however, was a vastly more difficult problem. For some two thousand years the problem had been shelved, the mariner relying on dead reckoning (the estimation of distance covered) to bring him safe to port.

"All sorts of suggestions had been made, from anchoring a row of ships across the Atlantic to the use of the delightful popular remedy called the 'powder of sympathy,' which was applied, not to the wound, but to the weapon which caused it. The idea was to take on board ship a wounded dog and leave on land the knife which wounded him. At Greenwich noon every day someone would dip the knife in the 'powder of sympathy,' whereupon the dog would yelp and the seaman know Greenwich time. Not a very accurate clock."

And what was needed was an accurate clock, one that would keep the time of some place of reference accurately, no matter how long the voyage. On the solution of this the whole matter rested, until the son of a Yorkshire carpenter,

one John Harrison (after a lifetime of work and frustration by authority) produced his fourth chronometer, the prototype of all the chronometers found on ships plying the seas today.

Harrison's chronometer No. 4 was five inches in diameter, beat five to the second, and ran thirty hours without rewinding. On a testing voyage to Jamaica and back its total error in distance calculated was under 30 miles, in time, a minute and a bit.

The world that Man thus slowly discovered and learned to map has spun a long way since then, and a circular map of the Middle Ages with Jerusalem in the middle and Mount Sinai drawn in as big as three Everests would look strange beside the modern American plastic model-maps whose hills and valleys pressed by machine into rigid relief, can be traced with the tip of a finger. This development and other modern developments in relief and model making will all be treated in later talks in *The Wonderful World of Maps*.

The series starts with "The Map Unrolls," to be heard from 4YA on Monday, May 20, at 7.15 p.m., and from 2YA the next day at 8.30 p.m. Other talks in the series are: "The Maps of the Greeks," "Maps in the Middle Ages," "Where Am I?" "All Maps are Liars," "The Camera Comes to Help," "Round Into Flat," and "Map and Model."



RIGHT: Title-page of the first sea-atlas, produced in the Netherlands. BELOW: Two of the founders of modern map-making, Ortelius (left) and Mercator. (The illustrations on this page are reproduced from "The Story of Maps," by Lloyd A. Brown; Cresset Press.)

