center of the Universe.

The Newberry Library

could guess. I was struck with the utmost fear

and astonishment, and ran to hide myself in

the corn . . . I came to a part of the field where

the corn had been laid by the rain and wind:

here it was impossible for me to advance a ster

. . Being quite dispirited with toil, and

wholly overcome by grief and despair, I lay

down between two ridges, and heartily wished

ca. 450 B.C. The Odyssey the great seaman, leaning on his oar, ered all the night unsleeping, and his eyes ked out the Pleiades, the laggard Ploughman, and the Great Bear, that some have called the Wain, pivoting in the sky before Orion; of all the night's pure figures, she alone would never bathe or dip in the Ocean stream. These stars the beautiful Kalypso bade him hold on his left hand as he crossed the main.

journey from the Trojan War. Homer. The Odyssey. Translated by Robert Fitzgerald,

Homer: a Greek poet thought to have lived in the 8th century B.C.

The Odyssey depicts the wanderings of Odysseus on his homeward

Garden City, New York: Vintage Books, 1961, p. 83. 1387-92 The Canterbury Tales When April with his showers sweet with fruit The drought of March has pierced unto the root And bathed each vein with liquor that has power To generate therein and sire the flower; When Zephyr also has, with his sweet breath, Quickened again, in every holt and heath, The tender shoots and buds, and the young sun Into the Ram one half his course has run, . . . Then do folk long to go on pilgrimage, And palmers to go seeking out strange strands,

To distant shrines well known in sundry lands. And specially from every shire's end Of England they to Canterbury wend, The holy blessed martyr there to seek

Who helped them when they lay so ill and weak. Geoffrey Chaucer, ca. 1340-1400: A diplomat, civil servant, and poet, Chaucer wrote The Canterbury Tales in the 1390's. In it, a group of pilgrims gather at the Tabard Inn near London and agree to engage in a storytelling contest as they travel by horseback to the shrine of Thomas à Becket in Canterbury. Chaucer's knowledge of medieval astrology and how it influenced human behavior is reflected in the Tales.

Ptolemaic period. This sighting tool was used to establish right angles. Crown copyright: Courtesy of the Science Museum, London Chaucer, Geoffrey. The Canterbury Tales. New York: International Collector's Library, 1934, p.1.

1492 A journal of Christopher Columbus' voyage wish to affirm that it was land . . . After

Sunday 9 September

He made 15 leagues that day and he that rose and lifted up, which to few decided to report less than those actually seemed to be an indication of land. But traveled so in case the voyage were long the Admiral was certain that they were the men would not be frightened and lose near land, because of which when they

Monday 17 September and very often and it was vegetation from midnight the land appeared, from which rocks and it came from a westerly direction; they judged themselves to be near land. The pilots took the north, marking it, and found that the compasses northwested a full point [i.e., eleven and fearful and depressed and did not say why. The Admiral was aware of this and he ordered that the north again be marked when dawn came, and they found that the

compasses were correct.

signals that the Admiral had ordered. A sailor named Rodrigo de Triana saw this land first, although the Admiral, at the tenth hour of the night, while he was on the sterncastle, saw a light, although it was something so faint that he did not the Admiral said it, it was seen once or twice; and it was like a small wax candle

courage. In the night they made 120 miles recited the *Salve*, which sailors in their at ten miles per hour, which is 30 leagues. own way are accustomed to recite and The sailors steered badly, straying to the sing, all being present, the Admiral west by north and even to the half division entreated and admonished them to keep [i.e., west-northwest], because of which a good lookout on the forecastle and to the Admiral rebuked them many times. watch carefully for land; and that to the man who first told him that he saw land he would later give a silk jacket in addition He sailed on his route west and made, day to the other rewards that the sovereigns and night, somewhat more than 50 had promised, which were ten thousand leagues. He put down but 47. The current *maravedis* as an annuity to whoever was helping them. They saw much weed should see it first. At two hours after

they were about two leagues distant. Christopher Columbus, 1451-1506: Columbus was a Genoese sailor who convinced Spain's King Ferdinand and Queen Isabella to finance a mission to reach the Indies by sailing westward from one-quarter degrees]; and the sailors were

Indies was influenced by miscalculations of the of Christopher Columbus' First Voyage,

Europe. His estimate of the short distance to the Earth's diameter by Ptolemy, and by apocryphal Biblical accounts. Columbus made four voyages to the new world, in 1492, 1493, 1498, and 1502. Dunn, Oliver, and Kelley, James, ed. The Diario 1492-1493. Norman, Oklahoma: University of Oklahoma Press, 1989, pp. 29, 33, 63.

go there with three boats. And however 11th-16th century—Sun Stone. This 26-ton basalt stone from strongly we be sought him not to come, yet . Tenochtitlán, the Aztec capital, was a solar and astronomical calendar. at midnight we set forth, sixty men armed Courtesy of the Museo Nacional de Antropología, Mexico City

1519—Christopher Columbus. Portrait by Sebastiano del Piombo. Courtesy of the Metropolitan Museum of Art

And because the caravel *Pinta* was a better sailer and went ahead of twenty-eighth of November, one thousand five the Admiral it found land and made the hundred and twenty, we issued forth from the said strait and entered the Pacific Sea, where we remained three months and twenty days without taking on board provisions or any other refreshments, and we ate only old biscuit turned to powder, all full of worms and stinking of the urine which the rats had made on it, having eaten the good. And we drank water impure and yellow. We ate also ox hides which were very hard because of the sun, rain, and wind. And we left them . . . days in the sea, then laid them for a short time on embers, and so we ate them. And of the rats, which were sold for half an écu apiece,

charts, the map was glued

to a papier-mâché shell.

Facsimile globe

From the American

some of us could not get enough. Besides the aforesaid troubles, this malady [scurvy] was the worst, namely that the gums of most part of our men swelled above and met below so that they could not eat. And in this way they died, inasmuch as twenty-nine of us died But besides those who died, twentyfive or thirty fell sick of divers maladies, whether of the arms or of the legs and other parts of the body [also effects of scurvy], so that there remained very few healthy men. Yet by the grace of our Lord I had no illness. During these three months and twenty days, we sailed in a gulf where we made a good four thousand leagues across the Pacific Sea, which was rightly so named. For during this time we

1520 Magellan circumnavigates the globe

had no storm, and we saw no land except two small uninhabited islands, where we found only birds and trees. Wherefore we called them the Isles of Misfortune . . On Friday the twenty-sixth of April Zzula, lord of the aforesaid island of Mattan, sent one of his sons to present to the captain-general two goats, saying that he would keep all his promises to

> him, but because of the lord . . Cilapulapu (who refused to obey the ing of Spain) he had not been able ... And he begged that on the ollowing night he [Magellan] would end but one boat with some of his The captain-general resolved to

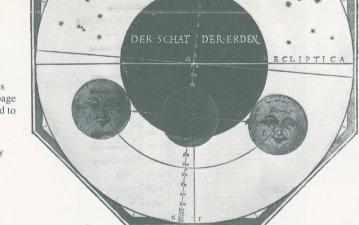
with corselets and helmets . . . and we so managed that we arrived at Mattan three hours before daylight. The captain would not fight at this hour, but sent. . . to tell the lord of the place [Cilapulapu] and his people that, if they agreed Christian king as their lord, and give us tribute, they should all be friends. But if they acted otherwise they should learn by experience how our lances pierced. They replied that they had

lances of bamboo hardened in the fire and stakes dried in the fire, and that we were to attack them Having thus reached land we attacked them. Those people had formed three divisions, of more than one thousand and fifty persons . . and thus we began to fight They fired at us so many arrows, and lances of bamboo tipped with iron, and pointed stakes hardened by fire, and stones, that we could hardly defend ourselves . . They came so furiously against us that they sent a poisoned arrow through the captain's leg. Wherefore he ordered us to withdraw slowly, but the men fled while six or eight of us remained with the captain as a good captain and a knight he still stood fast with some others, fighting thus for more than an hour. And as he refused to retire further, an Indian threw a

bamboo lance in his face, and the captain immediately killed him with his lance, leaving it in his body. Then, trying to lay hand on his sword, he could draw it out but halfway, because of a wound from a bamboo lance that he had in his arm. Which seeing, all those people threw themselves on him, and one of them with a large javelin . . . thrust it into his left leg, whereby he fell face downward. On this all at once rushed upon him with lances of iron and of bamboo and . . they slew our mirror, our light, our comfort, and our true guide. Ferdinand Magellan, 1480-1521: Sailing westward,

he sought to prove that the Spice Islands lay to the 1494, and thus could be claimed by Spain. After a harrowing passage through the straights at the southern tip of South America that now bear his name, Magellan traversed the Pacific. Although he lost his life in the Philippines, the expedition went on to become the first to circumnavigate the globe. Pigafetta, Antonio, journal, quoted in Skelton, R.A. Magellan's Voyage—A Narrative Account of the University Press, 1969, pp. 723, 733, 739, 742.

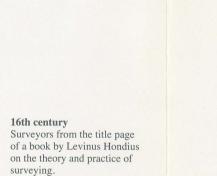
of the Sun and Moon. The page is a wheel that can be rotated predict eclipses.



○ 从 L#ZBEKSKAYA S.S.R.

1524-1528 Verrazzano enters New York harbor n space of 100 leagues sailing we found a very pleasant place, situated amongst certain little steep hills; from amidst the which hills there ran down into the sea a great stream of water, which within the mouth was very deep, and from the sea to the mouth of same, with the tide, which we found to rise 8 foot, any great vessel laden may pass up. . . . But because we rode at anchor in a place well fenced from the wind, we would not venture ourselves without knowledge of the place, and we passed up with our boat only into the said river, and saw the country very well peopled. The people are almost like unto the others, and clad with feathers of fowls of divers colors. They came towards us very cheerfully, making great shouts of admiration, showing us where we might come to land most safely with our boat. We entered up the said river into the land about half a league, where it made a most pleasant lake about 3 leagues in compass; on the which they rowed from the one side to the other, to the number of 30 of their small boats, wherein were many people, which passed from one shore to the other to come and see us. And behold, upon the sudden (as it is wont to fall out in sailing) a contrary flaw of wind coming from the sea, we were enforced to return to our ship, leaving this land, to our great discontentment for the great commodity and pleasantness thereof, which we suppose is not without some riches, all the hills showing

mineral matters in them. Giovanni da Verrazzano, 1485-1528: Verrazzano was an Italian navigator who, under the auspices of France's King Francis I, explored the northeast coast of North America from Cape Fear to New York harbor in 1524. Morison, S.E. The Great Explorers—The European Discovery of America. Oxford: Oxford University Press,



1669—Cross staff. Engraving

from an instructional text. Us

to measure location by aligning

AC with the sun and AB with

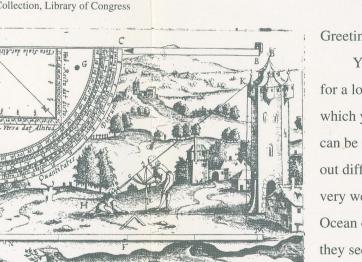
the horizon. The resulting angle

Courtesy of the National

Maritime Museum, London

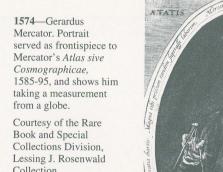
gave latitude.

Courtesy of the Rare Book and Special Collections Division,



Duisburg, 12 December 1580 Ever yours Gerard Mercator

[Addressed] To Master Abraham Ortelius, Cosmographer Royal, at Antwerp.



Lessing J. Rosenwald Collection, Library of Congress

ercator's letter to Ortelius

Greetings to Master Ortelius, the best of friends.

Your letter afforded me great pleasure, first because you have obtained what you have wanted for a long time about China, secondly because of the dispatch about the new English voyage, on which you had previously sent me a report through Rumold [Mercator]. I am persuaded that there can be no reason for so carefully concealing the course followed during this voyage, nor for putting out differing accounts of the route taken and the areas visited, other than that they must have found very wealthy regions never yet discovered by Europeans, not even by those who have sailed the Ocean on the Indies voyages. That huge treasure in silver and precious stones which they pretend hey secured through plunder is, in any case, an argument for me to suspect this I think that that fleet cannot have returned by any route except one via the north and west of Asia, for that strait which encloses the northern parts of America to within only a few degrees on a great circle westward from Greenland . . . is obstructed by many rocks. So it does not seem likely that Drake would have tried it, especially if he came back from Asia so loaded down with treasure.

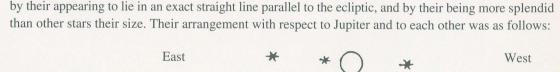
Gerardus Mercator, 1512-1594: Flemish cartographer whose maps and globes exhibited the best scientific knowledge of his time. Mercator, best known for his map projection, also invented the term "atlas" for a collection of maps. This letter, addressed to Abraham Ortel (also called Ortelius, 1527-1598) another Flemish cartographer, refers to the 1577-1580 circumnavigation of the Earth by the English admiral Sir Francis Drake. Kraus, Hans Peter. Sir Francis Drake—A Pictorial Biography. New York: H.P. Kraus, 1970, pp. 86, 88.

Observationey Japaiones .

1610—Galileo Galilei's

Courtesy of the Bibliote

The Galilean satellites of Jupiter On the seventh day of January in this present year 1610, at the first hour of night, when I was viewing the heavenly bodies with a telescope, Jupiter presented itself to me. And because I had prepared a very excellent instrument for myself, I perceived (as I had not done before on account of weakness or Though I believed them to belong to the host of fixed stars, they somewhat aroused my curiosity



That is, there were two stars on the easterly side and one to the west; the more easterly star and the western one looked larger than the other. I paid no attention to the separations between them and from Jupiter, since at the outset I thought them to be fixed stars, as said before. But returning to the same investigation on the eighth of January, led by I know not what, I found

At this time I did not yet turn my attention to the manner in which the starlets had gathered together, but I did begin to concern myself with the question how Jupiter could be east of all these stars when on the previous night it had been west of two of them. I commenced to wonder whether Jupiter might not be moving eastward at this time, contrary to the computations of astronomers, and had got in front of them by that motion . .

That is, there were but two of them, both easterly, the third (as I supposed) being hidden behind Jupiter. As at the beginning, they were in the same straight line with Jupiter and arranged exactly in the line of the zodiac. Noticing this, and knowing that there was no way in which such alterations could be attributed to Jupiter's motion [alone], yet being certain that these were still the same stars I had observed [before]—in fact, no other star was to be found along the line of the zodiac for a long distance on either side of Jupiter—my perplexity was now turned into amazement. Certain that the apparent changes belonged not to Jupiter but to the observed stars, I resolved to pursue this investigation with greater care and attention. And thus, on the eleventh of January, I saw the following disposition:

* + There were two stars, both to the east, the central one being three times as far from Jupiter as from the star farther east. The last-named star was nearly double the size of the other, whereas on the night

before they had appeared about equal. I now decided beyond all doubt that there existed in the heavens three stars wandering about Jupiter as do Venus and Mercury about the sun, and this became plainer than daylight from observations on the occasions that followed I measured the distances between [the starlets] by means of the telescope, using the method explained earlier. Moreover, I recorded the times of observations, especially when more than one was made on the same night; for the revolutions of these planets are

so swiftly completed that it is usually possible to note even their hourly changes. Galileo Galilei, 1564-1642: An Italian mathematician, astronomer, and physicist, Galileo was the first to use a telescope to study the skies. He amassed evidence that proved the Earth revolved around the Sun and was not the center of the universe. His observations of the positions of Jupiter's satellites were used to calculate longitude

Galileo Galilei, "The starry messenger," in Drake, Stillman. Telescopes, Tides, and Tactics. Chicago: University of Chicago Press, 1983, pp. 58-62.

1726 "A Voyage to Brobdingnag" from

world we were

Gulliver's Travels uring this storm . . . we were carried by my computation about five hundred leagues to the east, so that the oldest sailor on board could not tell in what part of the

as fast as he could: he waded not much deeper

than his knees, and took prodigious strides:

but our men had the start of him half a league,

and . . . the monster was not able to overtake

the boat. . . . [I] then climbed up a steep hill,

which gave me some prospect of the country.

I found it fully cultivated; but that which first

which in those grounds that seemed to be kept

was fenced in with a hedge of at least one

hundred and twenty foot high, and the trees

inhabitants in the next field advancing towards

saw in the sea pursuing our boat. He appeared

the stile, of the same size with him whom I

as tall as an ordinary spire-steeple; and took

about ten yards at every stride, as near as I

so lofty that I could make no computation of

their altitude I discovered one of the

surprized me was the length of the grass,

imperial fleet in my hand, and perform those other actions which will be recorded for On the 16th day of June 1703, a boy on ever in the chronicles of that empire, while the top-mast discovered land. On the 17th we posterity shall hardly believe them, although came in full view of a great island or continent attested by millions. I reflected what a .. [with] a creek too shallow to hold a ship mortification it must prove to me to appear of above one hundred tuns. We cast anchor as inconsiderable in this nation, as one within a league of this creek, and our captain single Lilliputian would be among us. But, sent a dozen of his men well armed in the long this I conceived was to be the least of my boat, with vessels for water, if any could be misfortunes: for, as human creatures are found. I desired his leave to go with them, observed to be more savage and cruel in that I might see the country, and make what proportion to their bulk; what could I expect discoveries I could. When we came to land but to be a morsel in the mouth of the first we saw no river or spring, nor any sign of among these enormous barbarians, who inhabitants I returned gently down should happen to seize me? Undoubtedly towards the creek; and the sea being in full philosophers are in the right when they tell us,

The Johns Hopkins University view, I saw our men already got into the boat, that nothing is great or little, otherwise than by and rowing for life to the ship I observed comparison: it might have pleased fortune to a huge creature walking after them in the sea,

let the Lilliputians find some nation, where the people were as diminutive with respect to them as they were to me. And who knows but that even this prodigious race of mortals might be equally overmatched in some distant part of the world, whereof we have

Jonathan Swift, 1667-1745: Swift, an Irish clergyman, was perhaps the foremost satirist in the English language. Gulliver's Travels, published in for hay, was above twenty foot high I was 1726, is a political satire purporting to detail the an hour walking to the end of this field; which travels of Lemuel Gulliver.

Swift, Jonathan. Gulliver's Travels. New York: Alfred A. Knopf, 1991, pp. 85-89.

I might there end my days In this terrible agitation of mind I could not forbear thinking

Courtesy of the Peabody Library

