

Kepler's 400th birthday

by James Stokley

December marks a significant anniversary in astronomical history, the 400th birthday of Johannes Kepler, one of the greatest of all astronomers. He was born (two months prematurely) on Dec. 27, 1571, at Weil in the Duchy of Wurttemberg in southwest Germany. He died Nov. 15, 1630, at Regensburg in Bavaria.

In 1543 Nicolaus Copernicus, in Poland, had revived an old theory that the earth and other planets revolve around the sun. However, for many years after that, the Ptolemaic theory was generally accepted and taught. It held that the sun and other planets all revolved around the earth. Kepler became an ardent champion of Copernicus, and sought data to convince the skeptics.

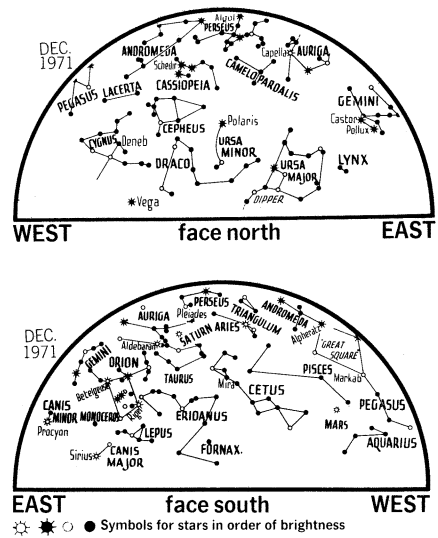
Because of poor health and vision Kepler wasn't outstanding as an observer but he was a fine theoretician who could take others' observations and build upon them a unified system. Fortunately, he was able to get such observational data from Tycho Brahe, a Danish astronomer who was probably the greatest of the pre-telescopic observers.

In 1609 Kepler's first two laws of planetary motion were published. The first states that the planets move in ellipses, with the sun at one focus. The second shows how they move most rapidly

when nearest the sun. In 1619, after he had moved to Linz, in Austria, he published his third law. It gives the relation between a planet's mean distance from the sun and its "year," the period of one orbital revolution.

These laws showed how the planets move but not why they do so. Isaac Newton, in England, explained that in 1687 with his law of universal gravitation. Under this, the planets must move in accordance with Kepler's laws. Newton once said that if he had accomplished anything it was because he stood upon the shoulders of giants. Kepler was one of these giants.

The maps show the sky as it looks about 10 p.m. local standard time on Dec. 1; about 9 p.m. on the 15th and 8 p.m. on the 31st. □



CELESTIAL TIMETABLE

Dec.	EST	
1	6:00 pm	Moon passes north of Saturn
2	2:48 am	Full moon
6	2:00 am	Algol at minimum brightness
8	10:50 pm	Algol at minimum
9	11:02 am	Moon in last quarter
	11:00 pm	Jupiter behind sun
11	7:40 pm	Algol at minimum
12	2:00 am	Moon farthest from earth, distance 251,700 miles
	4:00 pm	Mercury between earth and sun
17	2:03 pm	New moon
19	midnight	Moon passes north of Venus
22	7:24 am	Sun farthest south, winter begins in Northern Hemisphere
24	6:00 pm	Moon passes north of Mars
	8:35 pm	Moon in first quarter
27	midnight	Moon nearest, distance 228,300 miles
28	midnight	Moon passes north of Saturn
29	12:40 am	Algol at minimum
31	3:20 pm	Full moon

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