



◈ ◉ ◊ ◉ SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

In either position all three bodies, earth, moon and sun, are in line, and the pull of the first two on the oceans is a maximum. At first or last quarter, the moon and sun are in directions at right angles, and the high tide from the sun coincides with the low tide from the moon, partially counteracting it. Thus, at new and full moon we have the "spring" tides, when there is the greatest difference between high and low. The "neap" tides, which occur at first and last quarter, have the least range.

Moon's Distance Important

Also, the distance of the moon has an important effect. When nearest, as on Sept. 22, it produces the greatest tidal effect, and if this happens, as it does then, to coincide with full moon, we have the highest tides of all. This is demonstrated by reference to tide tables for New York, as a typical example. Shortly after this coincidence of full moon and perigee, on Sept. 24, high tide at The Battery, at 8:45 a.m., will be 6.7 feet higher than the low tides before and after.

Back in February, when apogee came on the same day as full moon, the 28th, the subsequent spring tides showed a range of less than five feet between high and low. This is not much above the average tidal range at New York for all tides, which is slightly less than 4.5 feet.

Some of the smallest range of the year came about May 22, with a high only 2.6 feet above the preceding low. Then the moon was farthest the day after it was in the first quarter phase.

Celestial Time Table for September

Sept.	EST	
1	10:50 a.m.	Moon passes Jupiter.
4	10:23 p.m.	Moon passes Venus.
6	11:51 a.m.	Moon passes Mars.
8	2:47 a.m.	New moon.
9	11:00 a.m.	Moon farthest, distance 252,600 miles.
11	5:25 p.m.	Moon passes Saturn.
16	4:49 a.m.	Moon in first quarter.
22	11:00 p.m.	Moon nearest, distance 221,700 miles.
	11:15 p.m.	Full moon ("harvest moon").

- 23 3:07 a.m. Sun over equator — autumnal equinox (autumn commences in northern hemisphere).
 - 28 9:56 p.m. Moon passes Jupiter.
 - 29 4:51 p.m. Moon in last quarter.
- Science News Letter, August 29, 1953

GEOPHYSICS

Earth's Iron Heart Both Molten and Solid

➤ A SOLID inner core of iron is at the earth's center surrounded by the same metal in a molten state.

This is shown by new studies by Dr. J. A. Jacobs of the University of Toronto, Canada, reported in *Nature* (Aug. 15).

In the beginning the earth was completely molten. Now there is a layer of liquid metal that lies between the crust and a solid center. A mantle of rocky material extends to the surface. Below it, there is a region still so hot and under such pressure that it is liquid. At the center there is solid iron.

Solidification of the earth did not begin at the boundary of the iron core and the outside crust of rocky silicates. Instead, Dr. Jacobs' analysis shows that the iron began to become solid at the very center of the earth. This solid inner core continued to grow until the temperature at which loss and gain of heat was equaled—the adiabatic temperature—was the same as the melting point of the iron.

As the earth cooled still further, the rocky layers on the outside solidified, not from the top or surface of the earth, but at the bottom junction between the mantle and the iron core.

Thus, a liquid layer of iron was trapped essentially at its original temperature, insulated above by a rapidly thickening shell of silicates, and below by an already solid iron inner core.

Earthquake waves had indicated previously that at least part of the core of the earth is liquid because no transverse waves pass through the center of the earth. The inner solid iron core begins at a depth of approximately 5,000 kilometers (3,100 miles).

Science News Letter, August 29, 1953

HOW TO RETIRE SOONER

by earning a small income

Government figures prove you need much less money if you retire to the country, and now a new book shows over and over again how to make the money you do need, whether you retire with or without a lot of money in the bank.

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