Mercury

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MERCURY

Ken Tapping, 8th April, 2014

On occasion, in the west after sunset or in the east before sunrise we see a brightish starlike object. Over a month or so it appears further out of the glare, then gradually sinks back into it, and vanishes. Some weeks later it then appears shyly in the other side of the sky, alternating its appearances between sunrise and sunset.

Our astronomical ancestors noticed this object, and lumped it in with the other starlike objects that appear in the sky and seem to move around among the fixed stars. The Greeks called these "planetes" or "planites", from which we get the modern word "planets". Because the planet mentioned here seems to scurry in and out of the Sun's glare at high speed, it was named after the Roman messenger of the gods, "Mercury".

Until spacecraft gave us a close look at it, everything we knew about Mercury came from ground based telescopes looking at an elusive world, hiding in the sunset or sunrise glow, through cloud and haze. Even worse was the turbulence in the atmosphere, which can be particularly bad around sunrise and sunset, and worse still when looking at objects close to the horizon.

They determined that Mercury is about 4,900 km in diameter, compared with our Moon's 3,500 km, and our Earth's 12,800 km. It lies about 40% of the Earth's distance from the Sun and completes an orbit around the Sun in only 88 days. Our Earth catches about 1400 watts of solar energy flow per square metre. It reflects about 40% of that back into space. The rest of it keeps us comfortable. Mercury, being closer, receives about 10,000 watts per square metre, and reflects only about 10% of that back to space. This makes the planet very hot, with a surface hot enough to melt lead and tin.

Our Moon is too small to hold onto an atmosphere. Even though Mercury is a little larger, with a stronger gravitational pull, it is also much hotter, which makes it even harder to hang onto an atmosphere, especially with a very strong solar wind constantly scrubbing it away. On this basis we could guess that Mercury would be a barren, almost airless world, covered with lava flows and craters, looking much like the Moon. Images taken from spacecraft showed this to be the case. There are some geological differences compared with our Moon, but on the whole those deductions have proved pretty good.

One thing we got wrong was an assumption that the tidal forces inflicted on Mercury by the Sun's gravity had slowed the planet's rotation to a point where the same side of Mercury faced the Sun all the time, with that side enjoying temperatures of hundreds of degrees Celsius while the other, perpetually dark, was very cold. It turns out that the Sun has not yet achieved that. At the moment Mercury rotates once every 59 days. So there is no permanently dark or light side. However, now the planet has been mapped, scientists have found, near Mercury's poles, places where the Sun never shines. It is very cold in those places and there is growing evidence of large accumulations of ice. With occasional comets and other icy objects hitting Mercury, there would be water vapour which would tend to accumulate in cold, shaded places. At least some of that ice would have arrived that way. However we do not know whether we are seeing all the ice present on the planet. It is unlikely we will be landing on Mercury any time soon, but we can use the Moon as an analogue. It too is an almost airless, dry world, with ice in permanently shaded craters near the pole. When we get people back on the Moon, it will be very interesting and useful to drill a deep hole to see if there are ice layers deep underground.

Jupiter lies high in the south at nightfall and sets around 2am. Mars and Saturn rise around 8pm and 9pm respectively. Venus lies low in the dawn twilight. Its brightness makes it fairly easy to spot. The Moon will be Full on the 14th.

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