WHAT DAY IS IT? (Part 1)

It was 9:00 on Monday morning, at the international airport in Samoa. “See you soon, boss”, said his mechanic, Bill, as Kurt strapped himself into the cockpit of the new hypersonic fighter, capable of flying at six times the speed of sound. He taxied out onto the runway for his record-breaking attempt, opened the throttles and afterburners, and took off towards the west. Rapidly gaining his cruising altitude of 100,000ft, he settled down to what would be the fastest circumnavigation of the earth by an aircraft. In less than five minutes, he crossed the International Date Line, from Monday into Tuesday. His flight was uneventful, and he landed back where he had started from, having circled the globe in the amazing time of just under six hours. Bill congratulated him—“It's only 3:00pm on Monday, and you have been around the world!", he said. “It's not Monday—it's Tuesday”, replied Kurt. “I crossed the Date Line!” “I can assure you it’s still Monday!”, replied Bill.

So, here is the problem—it changed from Monday to Tuesday as he crossed the International Date Line, but it had changed back again to Monday by the time he had returned. Where had it changed back? The answer is given in the second part of this article—‘What day is it? (Part 2)’—on page 10.

WHAT DAY IS IT? (Part 2)

If you have not already done so, please read 'What day is it? (Part 1)', on page 6, before reading this article.

The question asked in the story was, 'The day changed from Monday to Tuesday when Kurt crossed the International Date Line. However, it was still Monday when he arrived back at his starting point, so where did the day change back again, from Tuesday to Monday?'

As Kurt flew round the world, he moved from one time zone to the next, the 'clock time' getting progressively earlier, until he arrived at the place where it was midnight. At midnight, the day changed for Kurt, from Tuesday back to Monday. Hopefully, Fig 1 will make this clear. Thus, the answer to the question posed above is, 'the day changed at midnight, the same as it does for everybody!'

Figures 2 and 3 show what happens as the Date Line approaches the midnight line, and then passes it. In Fig 2, the time at the Date Line is 10:00pm, and only a small part of the earth is still in Monday. As the Date Line passes the midnight line, Monday disappears, and a thin slice of Wednesday appears. Fig 3 shows the position when it is 2:00am at the Date Line. Thus, as the Date Line sweeps around the earth, it eliminates the day in front, and generates a new day behind.

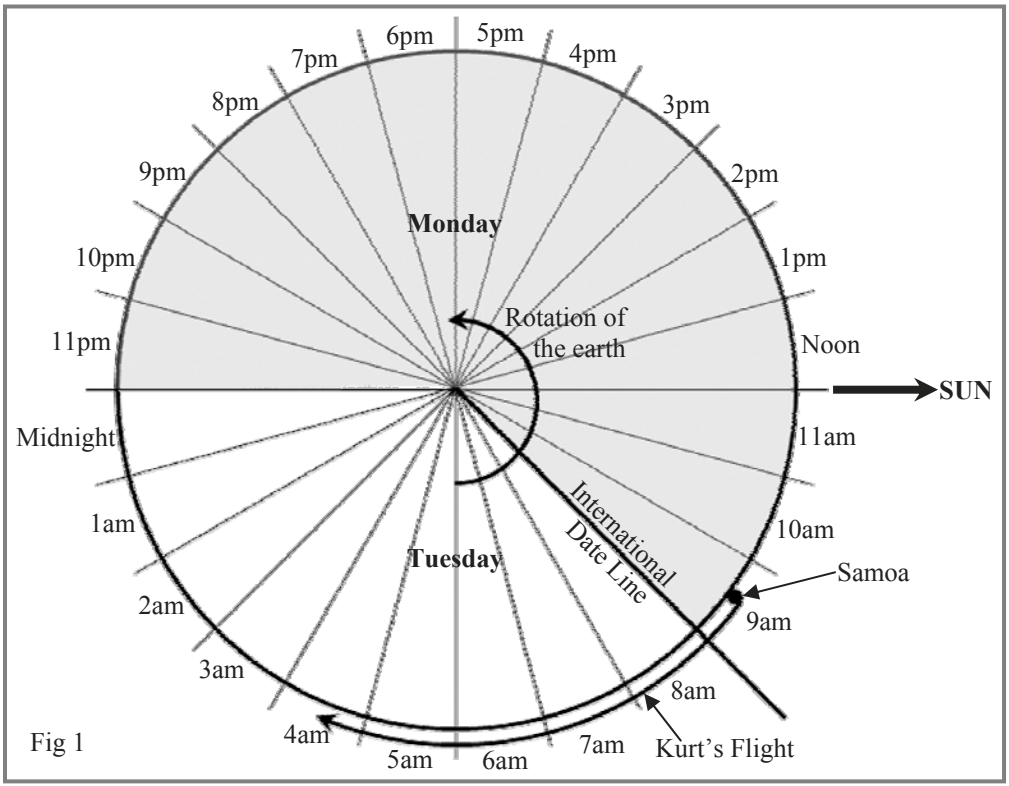

Fig 1

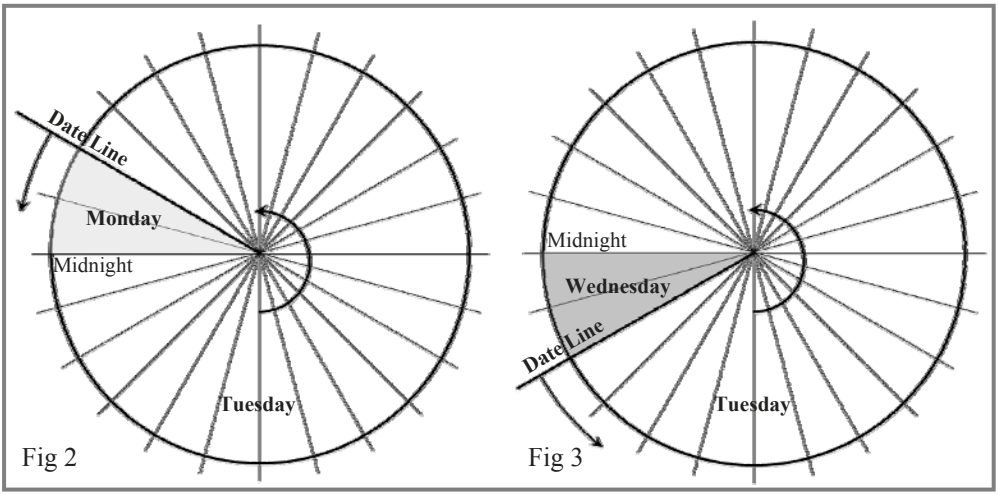

Fig 2 Fig 3

By long-established tradition, noon is the time at which the sun reaches its highest point in the sky. Since this happens at different times in different places, everywhere has its own 'local noon'. Ships establish their longitude by measuring the difference between their local noon and Greenwich Mean Time. Until Victorian times, towns established their own local time, based on the movement of the sun. This practice lives on in Oxford, where the Christ Church bell, 'Old Tom', rings every day at 9:05pm GMT, which is 9:00pm local Oxford time. This discrepancy between the local times in different towns didn't matter until the coming of the railways, when it prevented the production of accurate timetables. This led to the invention of time zones, where everywhere in a particular area keeps to the same time.

In theory, since there are 360 degrees of latitude and 24 hours in the day, each time zone is 360/24 = 15 degrees wide. In practice, time zones boundaries are adjusted to suit local convenience. The time zone used in the British Isles is centered on the Greenwich meridian (zero degrees longitude) and extends for 7½ degrees on either side. Most countries adopt one or more time zones a whole number of hours before or after Greenwich Mean Time, although a few have time zones which differ from their neighbours by half an hour. Until 1916, Ireland used 'Dublin Standard Time', which was 25 minutes behind Greenwich!

An alternative to having time zones would be for the whole earth to use the same time. If you lived in Singapore, you would get used to having lunch at 0500, whereas in Los Angeles you would eat at 2000. However, this idea has never caught on for 'civil' time, although it is used by the military—on television programmes you may have seen things like 'Fort Pendleton: 1235 Zulu'. Zulu is Greenwich Mean Time, also known as Coordinated Universal Time. The closest approach to a single time zone in the non-military world is in China, which is large enough to have five time zones, but uses only one.

If you have been to the Greenwich Observatory, you have probably stood on the Greenwich Meridian—zero degrees longitude—which is marked by a metal strip set in the ground. What actually defines the meridian is the crosswire in the eyepiece of a telescope, known as a 'transit', used for measuring the passage of stars across the sky. Greenwich was only adopted as the prime meridian of the world after a bitter battle, in which a number of countries (but especially France) fought for the adoption of their own meridian!

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