

Doomsday Forecast

Curing a Non-Existent Malady

By J V NARLIKAR

IN my regular correspondence of question-answer with school-children, a question has begun cropping up recently: Is the end of the world due to take place on May 5, 2000 AD? I was surprised by the question since it obviously was planted in the children's minds by some news item. After some searching, I found out the source of information, or rather, misinformation, as I will shortly demonstrate.

The event to take place on the fateful day is the alignment of six planets, the Earth on one side of the Sun and Mercury, Venus, Mars, Jupiter and Saturn on the other. The doomsday forecast is that because of the combined gravitational pull of all these planets on the Earth, there will be tremendous disturbances there including earthquakes, tidal waves and shifts of the continental plates.

On the face of it, this sounds pretty fearful an occurrence. Imagine that you are holding a rope, which is pulled by five persons all in one direction. Wouldn't you be dragged along by their combined force? We will return to this persuasive argument after looking at what exactly this force of gravitation really does.

Persuasive Argument

Take the case of the Earth and the Moon. Both attract each other as per Newton's law of gravitation. The Earth being much more massive than the Moon, it is the latter that is seen to orbit round the former. However, the Moon's gravitational effect on the Earth, though small, is noticeable through the tides in the seas and oceans. The effect can be understood easily as follows.

Imagine the Earth facing the Moon. The force of gravitation diminishes in intensity with distance and so the part of the Earth nearest to the Moon is attracted more strongly than the part away from the Moon. Relative to the centre of the Earth, therefore, the attraction towards the Moon is more for the near part and less for the remote part. Hence both the near part and the far part have a tendency to move away from the centre, with

the result that the Earth tends to get stretched outwards along the Earth-Moon line. As the solid parts of the Earth are very rigid, they do not yield to this tension, whereas the liquid parts do. Which is why the oceans 'jump up' and we see tides.

The force causing tides is similarly exerted by the Sun on the Earth; but being much farther from the Earth, the Sun's effect is much less. The two effects are synchronised when both the Sun and the Moon lie in the same line with the Earth, which happens at Full or New Moon times. On those occasions, the tides are at their maximum strength.

Two Effects

Now let us get back to the so-called catastrophe caused by five planets coming all on the same line. By the analogy of the large tidal effect when the Sun and the Moon are aligned with respect to the Earth, one may think that the tides due to all five innermost planets aligned would be tremendous.

However, this is one of those cases when qualitative arguments fail when one puts into them quantitative details. What I have so far not mentioned is that the tidal effect falls very rapidly with distance. For example, if the distance of the perturbing mass is increased ten times, its tidal effect diminishes a thousand-fold. The planets are much farther from us than the Moon. The more massive planets Jupiter and Saturn are much further from the Earth than even the Sun.

So when you put in the actual figures into the mathematical formula for the tidal gravitational influence of all the aligned planets, you discover that compared to the Moon's tidal effect, that exerted by all these planets is around two parts in a million. Hardly the kind of force to cause the claimed disasters on Earth.

In case you cannot visualise the smallness of this effect, the University of Pittsburgh relativist Ted Newman has given a comparison which is readily understandable. When you sit down on the ground

from a standing position your centre of gravity moves closer to the Earth's centre, maybe by a metre or so. Because of this change of distance, the Earth's attraction on you increases and you acquire a slightly greater weight. That is, you weigh more when you sit down than when you stand. The effect is extremely minute; you don't feel it at all, nor can it be detected by very accurate weighing scales. If all aligned planets pull you together, their combined influence on your weight will be even less than this.

Newman gave this comparison in the early eighties when a similar planetary alignment had occurred and dire forecasts had been made for the well-being of our planet. That doomsday was March 10, 1982 and a lot of publicity had been given to it under the so-called 'Jupiter Effect'. Another similar incident had occurred on February 5, 1962, two decades earlier. On neither occasion, of course, did anything sinister happen. I understand that Jawaharlal Nehru had been advised not to travel on that day, but just to debunk the belief, made it a point to travel by air.

An Extra Twist

But our mindset is such that we don't learn from history and instead prefer cleverly worded but unsubstantiated arguments to hard evidence and scientific reasoning. Already a website has appeared abroad, claiming dire consequences on May 5, 2000, and offering books on sale, presumably to help survival.

In the Indian scenario, the situation acquires an extra twist. As the fateful day draws closer, there will be offers to perform religious rites to avert the catastrophe. So that when the day has passed, with nothing catastrophic having taken place, there will be claims that because of these timely rituals the Earth was saved.

For those hoping to promote a scientific temper in this country, this is another no-win situation wherein a superstitious act is justified as a cure for a non-existent malady.