

Alignment Check

"Uncle" Bob Mead

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Recently there has been a profusion of reports that regard this month's alignment of the Moon, the Sun, and the five nearest planets, as cause for alarm. I put no stock in any of them. We have historical records that detail when and how these planetary alignments have occurred. We have the laws of science which allow us to calculate what, if anything, will be the impact of such a heavenly lineup. And we also have calm, competent law enforcement officials who, in the event of any panic, will know exactly how to maintain the peaceful order.

Gravity, Gas, and Grunts

"Andy, Andy, you gotta do somethin' quick! I tell ya, ya gotta nip this thing in the bud. Nip It In The Bud, I say."

"Now, now Barn'. Tike it easy and tell me wut's wrong."

"What's wrong?! Can you spell Mass Hysteria!? I'll tell ya what's wrong. I just come from Goober's. I pulled the patrol car around there to have him look at the front end."

"Wull, Barney, I don't see no cause for no panic so far."

"Andy, jus' wait'll I finish, will ya. I told Goober the squad car might need an alignment, and then Floyd, I don't know what Floyd was doin' there, but Floyd comes out with this bunch o' bunk about the planets all bein' aligned on May fifth, Y2K, and how it's all over town that that's gonna be it."

"It?"

"IT!! Ca-PUT. Armageddon. The Big Crunch. Gomer's Great 'Gah-LLEEE.' The Last Enchilada. You hear what I'm sayin'? The End of Earth as we know it!! The hoarders have already had a five-cart pileup at the Gas and Grunts, and there's a line outside the bank as long as all o' my string ties put to-GETHER. WE CAN'T LET THE CITIZEN'S SEE US IN A PANIC."

"Wull Barn', I'm awful glad to hear you say that."

"But Andy, is it true?" "Is wut true?" "Is it the END?"

"... Don't think so, but we can check. I got thuh World Almanac rye-cheer."

And so sheriff Andy and his deputy dug out the facts of the case. Andy reminded Barney about Isaac Newton and his Universal Law of Gravitation. In 1665, forced back

to his country home in Woolsthorpe, England, due to an outbreak of the plague at Cambridge University where he studied, Newton had a couple of years to contemplate the invisible force which the Earth seemed to exert on the Moon. He wondered if it could be the same force that kept objects, like falling apples and cannonballs, earth-bound. Galileo had said that this force seemed to dissipate as the square of the distance between earth and these objects increased. Newton estimated the distance to the Moon, assuming this property, and he was pleased with his result.

The story might have ended there. If Newton had been struck by a cannonball or a large Granny Smith at any time in the next twenty years, the Universal Law of Gravitation might have waited another hundred to be discovered. He was rather shy about reporting his major discoveries, but, with some arm twisting by astronomer Edmund Halley, Newton published *Principia Mathematica* in 1687. In it Newton posited that the Moon attracts the Earth as much as the other way around, and that this force can be calculated by dividing the product of the two masses by the square (second power) of the distance between them. In addition to Galileo, Newton credited Kepler, and proved Kepler's theories of planetary orbits, the first being that they are ovals and not perfect circles. The Sun is off-center at a point called the focus. This means that each orbit will have a near and far distance from the sun, called the perigee and the apogee, respectively.

Armed with just these facts, Andy and Barney looked up the average radius of the solar orbits of Mercury, Venus, Earth, Mars, Jupiter, Saturn, and the distance from Earth to the Moon. They knew from a diagram printed in the Mayberry Gazette that the planets (not perfectly aligned, mind you) are all on the far side of the Sun. So they added 93 million miles to the average radius of each to get an approximate distance from Earth. They also recorded the mass of each body relative to Earth. When they saw how puny all the planets were when compared to the Sun, they began to relax a little, but they still used Newton's formula to get a gravity number for all seven bodies pulling on Earth. For example, the Sun is a hefty 332,950 earth-masses. Multiply that by "one" earth-mass for Earth, and then divide by 93-squared, and you get a gravity number of 38.5 for the Earth-Sun tug of war. Jupiter, by comparison, is 318 earth-masses, and its distance from Earth, if you use its average radius to the Sun, and add 93 million miles more, is approximately 573 million miles. The formula gives us a disappointing 0.000968 for a gravity number relative to the others. As Andy remarked, "It's that the planets are so dangd far away, and then ya got that inverse skwarr law to boot."

Then Andy and Barney did some thinkin'. Earth gets a combined pull from the alignment of the Sun and Moon which occurs every "moonth." It's call New Moon. They wondered how much more pull the five planets would add....

“Wull Barney, it’s not somethin’ I’m gonna get Aint Bee outta bed to come see. The gravity of the Sun and Moon comes to 38.7093, and adding the five planets, 38.7104 is the grand total. Barney, get on down to the Gas and Grunts and tell those folks that a 200-pound man is gonna weigh one one-hundredth of an ounce less the day of May the fifth, but he’ll gain it all back that night when the pull comes from the far side of Earth.”

“Thanks Andy. I knew we had nothin’, that is, not A Thing tuh worry about,” he sniffed. “Sides... I kinda feel safer with all those planets over on the other side of the Sun, ... and I’m gonna give that Floyd a piece o’ my mind when I see him! We ain’t gonna let this here town get all scared over somethin’ that goes nick in the night. No sir!”

