

CHAPTER 2

WORLDVIEWS AND SCIENCE

HOW DOES GOD KEEP PLANETARY ORBITS STABLE?

Isaac Newton's discovery of the Law of Universal Gravitation was one of the greatest scientific achievements in history. By combining his theories with the experimental data gathered by other scientists such as Johannes Kepler, Newton showed that the motion of planets going around the Sun, moons orbiting around planets, and objects falling near the earth's surface was described by the same simple universal laws. Newton believed that the Law of Universal Gravitational Attraction was evidence for God's design.

While Newton's equations are simple to write down, their solution is not always simple. It's easy to solve Newton's equations when there are only two objects (e.g. the Sun and a single planet) gravitationally attracted to each other. They will orbit each other indefinitely in stable and predictable orbits. But as soon as you have three or more mutually interacting objects, it's almost always impossible to exactly solve Newton's equations. You have to approximate. It becomes difficult to calculate whether or not the planets' orbits will be stable indefinitely. When there are three or more objects, it is possible that their mutual interactions will cause one or more of the orbits to become unstable. Our solar system has one Sun, nine planets, and many moons and smaller objects all interacting with each other. [This excerpt was first published in 2003. In August 2006, the International Astronomical Union named Pluto a "dwarf planet." Officially, eight regular planets are recognized.] Are the orbits of all of the planets in our solar system stable over long periods of time, or does their mutual interaction make them unstable?

Newton struggled with this question for some time. He could not come to a definite conclusion, but he eventually came to believe that planetary orbits in our solar system were, in fact, unstable. Each time one planet's orbit brought it close to another planet, the two would perturb each other's orbits around the sun. Newton thought that after a few hundred or thousand years of these perturbations, some of the orbits would become unstable.

How did scientists get around this problem? One proposal was that God occasionally (every few decades or centuries) sent a comet through the solar system—a comet with just the right mass and just the right trajectory so that its gravitational attraction would "correct" the planetary orbits and keep them stable for another several centuries.

A generation after Newton, Pierre de Laplace built on Newton's work. He found better approximate solutions to Newton's equations. Laplace was able to prove that planetary orbits in our solar system really are stable for much, much longer periods of time—stable without the need for God to perform the occasional correction.

© 2011 by Faith Alive Christian Resources, 2850 Kalamazoo Ave. SE, Grand Rapids, MI 49560.

This article is part of a collection associated with the book *Origins: Christian Perspectives on Creation, Evolution, and Intelligent Design*.

www.faithaliveresources.org/origins

When Laplace presented his book on celestial mechanics to the Emperor Napoleon, it is said that Napoleon asked, “Monsieur Laplace, why wasn’t the Creator mentioned in your book on celestial mechanics?” To which Laplace is said to have replied, “Sir, I have no need for that hypothesis.”

Laplace’s cryptic statement has been interpreted in a variety of ways over the centuries. Perhaps he meant, “I don’t need God at all.” However, Laplace was a Roman Catholic, so that’s probably not what he meant. Or perhaps he meant, “I’m a better scientist than Newton.” He may have been pointing out that, whereas Newton needed God to send comets through the solar system to keep things stable, he had done a better scientific job and proved that such comets weren’t necessary. Or perhaps he meant something philosophically provocative, such as, “We don’t need God governing planetary motion now that we have a scientific explanation (the law of gravity) for it.” If that is what Laplace meant, then he would agree with the modern (but unbiblical) notion that God is uninvolved in events that have scientific explanations. Or perhaps Laplace meant something philosophically very tame, such as, “We don’t need to refer explicitly to ‘acts of God’ when calculating planetary motion.”

Whatever Laplace meant, this incident raises some interesting questions. Suppose Laplace’s results had come out differently. Suppose Newton’s hunch had been correct. Suppose God made the solar system in such a way that planetary orbits really are unstable, requiring a careful “correction” every few centuries. Would Christians consider that a good thing or a bad thing? Suppose you were alive in the time after Newton’s work was published and before Laplace’s. Suppose you were aware that the stability of planetary orbits was an unsolved scientific puzzle. Which way would you hope it would turn out? Would you hope that scientific advances would ultimately prove that planetary orbits were stable, or unstable?

The traditional answer of Christian theology is that God could have created the solar system however he wished. We are in no position to tell God which way is better or worse. Yet if we’re honest with ourselves, most of us would have to admit to having a personal preference. Planetary orbits that remain stable indefinitely look like good design. Planetary orbits that become unstable every few centuries seem, to some people, like inferior design. On the other hand, the timely arrival of comets with exactly the right mass and trajectory to correct those orbits would give a powerful argument for God’s existence and providential intervention.

The issue of planetary orbits has been settled. Laplace was correct: planetary orbits are stable over very long periods of time. Many more scientific issues are not yet settled. As we study cosmology, geology, and biology today, we are confronted with new scientific puzzles. How did the solar system form? How rare is the planet Earth as a suitable home for life? How did life begin on Earth? How did modern life forms come into existence? As we examine the scientific data brought to bear on these questions, and as we ponder the theological implications of their answers, we should be honest with ourselves. We come to these questions with our own biases, with our hopes for how the questions will ultimately be answered. We don’t even all agree on what those biases should be. Perhaps it is best to minimize the impact of our biases, first, by being aware that we have them, and second, by remembering this biblical teaching: God is just as sovereign over natural laws and natural processes as he is sovereign over miraculous breaks in natural processes.

—Loren Haarsma, “Does Science Exclude God? Natural Law, Chance, Miracles, and Scientific Practice,” *Perspectives on an Evolving Creation*; Keith Miller, ed. Wm. B. Eerdmans Publishing Company, 2003.