

Pluto's Requiem

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It's official. Pluto is not a red-blooded planet, as decreed in August by a vote of the General Assembly of the International Astronomical Union. Pluto is now a "dwarf."

At first the IAU seemed ready to defend Pluto. On August 16, the union's seven-member Planet Definition Committee released a draft Planet Definition Resolution, which stated that round objects in orbit around the Sun are planets. Pluto is a round object in orbit around the sun. Therefore Pluto is a planet. This definition would have given everyone the right to utter Pluto and Jupiter in the same breath, even though Jupiter is a quarter-million times larger. The draft resolution would also have opened the door to granting planet status to at least three objects that had, until recently, been considered unworthy.

Plutophiles had about a week to rejoice before the assembled IAU delegates voted. According to the final, amended IAU definition, a planet should still be round, but must also dominate the mass of its orbital zone. In other words, a full-fledged planet must not have competitors in its zone. Poor Pluto is crowded by thousands of other icy bodies in the outer solar system, some of which are bigger than Pluto itself, so it fails the test. To soothe Pluto's boosters, the IAU's elected to call it a "dwarf planet," without entirely quantifying what a dwarf is.

All this embarrassment stems from a simple problem. The term "planet" had not formally been defined since the times of ancient Greece, where the label originated. The word simply means "wanderer" and referred to the seven prominent celestial objects that moved against the background

of stars. They were Mercury, Venus, Mars, Jupiter, Saturn, the Sun, and the Moon. So influential were these celestial wanderers on classical culture that the names of our seven days of the week can be traced to them.

Life got more complicated in 1543, when Nicolaus Copernicus described a newfangled, heliocentric universe. Instead of remaining stationary in the middle, Earth moved around the Sun just like the others. From that moment onward, the term “planet” had no official meaning, and astronomers tacitly agreed that whatever orbits the Sun is a planet, and whatever orbits a planet is a moon.

Not a problem if cosmic discoveries had ended in 1543. But shortly thereafter, we learned that comets orbit the Sun too and are not, as long believed, local atmospheric phenomena. Comets are icy objects on elongated orbits that throw off a long tail of gases as they near the Sun. Are they planets too?

How about the craggy chunks of rock and metal that orbit the Sun in a region between Mars and Jupiter? When Ceres, the first of these objects, was sighted by Giuseppe Piazzi in 1801, everyone called it a planet. With the discovery of dozens of more, however, this new community of objects clearly deserved its own classification. Astronomers called them asteroids, and now have catalogued tens of thousands of them.

Even the traditional planets don't fit into one neat category. Mercury, Venus, Earth and Mars form a family because they are relatively small and rocky, while Jupiter, Saturn, Uranus, and Neptune are large, gaseous, have many moons, and bear rings.

The story took another twist in 1992, when David Jewitt and Jane Luu of the University of Hawaii began finding frozen objects on the solar system's fringes, out beyond Neptune. They had discovered a new swath of space traffic, akin to the discovery of the asteroid belt two centuries before. Known as the Kuiper belt, in honor of the Dutch-born American astronomer Gerard Kuiper who predicted its existence, this region of the solar system contains Pluto, one of its largest members. But Pluto has been called a planet since it was discovered in 1930. So should all Kuiper belt objects be called planets?

Without a consensus definition for the word planet, these questions provoked years of pointless debate among people for whom counting planets

matters. The geocentric universe contained seven planets. Then what became the heliocentric solar system contained six. With the discovery of Uranus in 1781, the figure rose to seven again. Then it jumped to 11 with the discovery of the four largest bodies in the zone between Mars and Jupiter. Then it dropped back to seven once again, after these four planets—and any others yet to turn up in the zone—were demoted to asteroids. Once Neptune was discovered in 1846, the total became eight.

After the discovery of Pluto, the tally rose to the now-familiar nine. Astronomer Clyde Tombaugh had found Pluto through a dogged search for a long-suspected “Planet X” beyond Neptune, and everyone initially assumed he had found something large. Refined measurements showed the object to be much, much smaller than originally thought, smaller in fact than six satellites in the solar system, including Earth’s moon.

Then, for that one week in August, there were 12 planets. The IAU’s roundness criterion added Ceres, the only gravitationally round asteroid; Pluto’s moon Charon, which is unnaturally large compared with Pluto; and 2003 UB313, temporarily but affectionately called Xena, after the leather-clad, medieval Warrior Princess from cable television. Now, officially, we are back to eight—the nine you memorized in grade school, minus Pluto.

If my overstuffed email inbox is any indication, this game of planetary enumeration remains a deep concern of elementary school students and the mainstream media. After all, counting planets is what allows you to invent clever mnemonics to remember them in sequence from the Sun, such as “My Very Educated Mother Just Served Us Nine Pizzas.” Or its likely successor: “My Very Educated Mother Just Served Us Nachos.”

But such exercises have stunted the curiosity of an entire generation of children by suggesting that memorizing a sequence of names is the path to understanding the solar system. The word planet seems to hold an irrational sway over our hearts and minds. That level of fascination made sense in the days before telescopes could observe details in planetary atmospheres; before space probes had explored Mars and bulldozed into a comet; before we understood the history of asteroid and comet collisions that links celestial bodies large and small. But today, the rote exercise of planet-counting rings hollow, and stands in the way of appreciating the full richness of our cosmic environment.

Suppose other properties are what matter to you. Interested in

cyclones? You might lump together the thick, dynamic atmospheres of Earth and Jupiter. Interested in the chemistry of life? Icy moons like Jupiter's Europa and Saturn's Enceladus may be the best extraterrestrial places to find liquid water, a crucial ingredient for biology. Or suppose instead you care about ring systems, or magnetic fields, or size, or mass, or composition, or proximity to the Sun, or formation history. And the discovery of planets around other stars has exposed entire new categories like "hot Jupiters" — giant, gassy worlds heated to near-incandescence by their astonishing proximity to their suns.

These classifications say much more about an object's identity than whether its self-gravity made it round, or whether it is the only one of its kind in the neighborhood. Why not rethink the solar system as multiple, overlapping families of objects? Then, the way you organize the properties is up to you. The fuss over Pluto doesn't have to play out as a death in the neighborhood. It could mark instead the birth of a whole new way of thinking about our cosmic backyard.

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