

THE PLANET IN THE CORNFIELD

Out amid the cornfields of Iowa, my friend Chief built a monument to Pluto, the picked-on planet.

The red, oval-shaped plaque was smaller than a stop sign, with a pimple of polished steel sticking up from the surface to represent Pluto's size. It was mounted on a metal pole by the side of a blacktop road, four miles west of the town of Mount Vernon, population 3,628.

Chief, who got his nickname during childhood because he was part Native American, was one of my

best friends in high school. Now he works at the University of Iowa and has become an amateur astronomer of some repute. A few years ago, he and other volunteers started up a group called the Mount Vernon Solar Tourist Society and erected the plaques just for fun, to show how big and empty our solar system is.

You can't understand the distances that separate the planets just by looking at a schoolroom poster. They're usually displayed right next to each other like some kind of celestial police lineup, with pea-sized Pluto pictured right alongside his big brothers Uranus and Neptune.

To provide a better sense of scale, folks like Chief have laid out scores of mini-solar systems around the world. It's the best way to relate the size of the planets to the immense distances involved. For example, the scale model in Washington, D.C., has a five-inch-wide sun, and plaques depicting the planets are lined up along the National Mall for a third of a mile. Boston's planetary parade extends more than 9 miles, leading out from an eleven-foot-wide sun. And you'd have to drive more than 180 miles to get from Stockholm's solar stand-in (actually the round-domed Stockholm Globe Arena) to a five-inch-wide Pluto perched on a monument in Sweden's Dellen Lake district.

The Mount Vernon Solar Tourist Society set up a five-foot-wide sun at the city park, and planted plaques leading west along First Avenue, plus an "Asteroid Crossing" road sign next to Cornell College's campus to mark an imaginary asteroid belt. That sign shows up in a fair number of pictures on the

Internet, but few if any of the photographers have figured out that it's actually part of a set.

Each of the nine planetary plaques displays a list of facts about the world in question, and includes a scaled-down circle of bright steel to represent the planet's relative size. Pluto's circle was about as small as the artist could make it, as big around as a pebble that gets caught between your tires on a gravel road.

Even when the plaques were being put up, the society was having second thoughts about Pluto. One of the inscriptions on its plaque read, "If Pluto was discovered today, it would not be called a planet, but a minor planet."

Since then, Pluto has suffered putdowns galore. It was left out when New York's American Museum of Natural History remodeled its planetary exhibits. More and more worlds like Pluto were found on the solar system's rim, and in 2005 astronomers determined that one of them was actually bigger than Pluto.

If that newfound world—known at first as Xena (the Warrior Princess) and later named Eris (the Goddess of Discord)—had been accepted into the planetary clan, Chief might have had to add one more monument to the set. It would have been about seven miles out of town, by my calculation. And for a while, it looked as if things were heading in that direction.

A committee charged with settling the question drew up a proposal that would have boosted the solar system's official planet count to twelve, including Eris (née Xena), as well as Pluto's largest moon, Charon, and the asteroid Ceres.

But in 2006 when the proposal came up for a vote by the International Astronomical Union (IAU), the world body that deals with astronomical names and definitions, it was hooted down. Instead, a few hundred astronomers voted to throw Pluto and the other lesser worlds into a different class of celestial objects, known as “dwarf planets.”

That might not sound so bad. After all, a dwarf planet is still a planet, just as a dwarf galaxy is still a galaxy, and just as a dwarf star (like our sun) is still a star. Right?

Wrong.

When the IAU reclassified Pluto, it declared that dwarf planets weren’t actually real planets, but mere also-rans in the celestial scheme. That’s when things turned ugly.

Astronomers split into opposing camps. One said he had “nothing but ridicule” for the IAU’s decision.¹ Another said anyone who disagreed with the decision should be “stomped.”² Web sites were remade. Textbooks were rewritten. Pluto fans of all ages were heartbroken.

“My ten-year-old daughter is *furious* about this,” one parent wrote me.

Seventy-six-year-old Dorothy Timmerman was also hopping mad. “Pluto is my very own personal planet! It was discovered the year I was born!” she wrote. “They can’t take my planet away! I want my planet back!”³

It was obvious that little Pluto’s fate had sparked a huge battle—a battle that ranged far beyond conference halls and observatories, all the way to First Street in Mount Vernon, Iowa.

. . .

Chief brought me to the city park one night to have a look at the mini-sun, sitting upright on a stone pedestal like a red-orange snow saucer. Nine badges were mounted on the disk, naming each of the planets and their distances from the sun monument.

There was Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and . . . uh-oh. Pluto's badge was still there, but it was defaced with a black "X," drawn with a permanent marker over the lettering.

"Oh dear," Chief remarked. "Someone is too scientifically read up, I'm afraid."

We hopped into Chief's car and drove through Mount Vernon's solar system, checking each plaque. Mercury was a speck of polished metal, shining on a red plaque erected on the next block. Venus and Earth were two more shiny specks on plaques screwed onto brick buildings downtown, a couple of blocks farther west. Mars's speck was on a sign planted right outside the fire station.

We drove past the Asteroid Crossing sign and went half a mile more, to the edge of town. There, mounted on another oval plaque, was the shiny softball-sized disk of metal that stood for Jupiter. Saturn, a disk just slightly smaller, was displayed on a sign next to the old country schoolhouse, a mile out of town on Old Lincoln Highway. Baseball-sized Uranus was more than a mile farther, Neptune another mile and a quarter.

Then we slowed down, watching closely as the car's headlights illuminated the grassy roadside. We went a mile farther. Two miles. Three miles. Nothing.

We turned around and drove back toward town. “Maybe it’s just lost in the weeds,” Chief suggested hopefully. “I’ll go back and look tomorrow, when it’s light out.”

If Mount Vernon’s Pluto was X’d out, Chief didn’t think there’d be much sentiment for replacing it. “We can always say, ‘Well, there are only eight planets in the solar system,’” he said.

I didn’t take much consolation from that. Chief dropped me off at my car and headed home, but I drove down the blacktop again. I carefully counted off the tenths of a mile on the odometer, knowing full well that Pluto should be 1.07 miles beyond Neptune (or about a mile beyond the dead opossum in the middle of the road).

Sure enough, there it was: a flicker of red in the headlights, just beyond an intersection with a gravel road. I pulled off onto the gravel, shone the lights full on the plaque, and ran my finger over that pimple of steel.

Pluto’s monument was still the same, out amid the cornfields of Iowa. And Pluto is still the same, out in the celestial countryside—no matter what we say about it on our own somewhat bigger pimple of a planet.

What is it about Pluto that stirs up so much trouble, for its defenders as well as its detractors? What leads Pluto’s elementary school fans to write tear-stained letters to astronomers, protesting the snub? Why are some scientists so anxious to remake the solar system, while others leap to the barricades in Pluto’s defense?

In part it's because Pluto has always been the oddball of the solar system family. Even before the latest flap, astronomers knew it was totally unlike the other eight planets in the traditional lineup.

First, there's the question of size. When it comes to mass, Earth has 465 times as much as Pluto (and Jupiter has 318 times as much as Earth, by the way). When it comes to diameter, Pluto is smaller than some of the solar system's moons (as is Mercury, by the way).

Pluto's rotational axis is tipped so steeply that for part of its year, the sun rises in the (celestial) south and sets in the north. Its orbit is also tipped—17 degrees from the solar system's ecliptic plane, which would translate to more than a mile in altitude if you extended that angle for four and a half miles outside Mount Vernon. The orbit is so eccentric that Pluto comes closer to the sun than Neptune for twenty years at a time, and then careens out as much as 1.8 billion miles farther away.

The icy world's history is as eccentric as its orbit. Pluto was discovered by a high school graduate, who was following up on claims that turned out to be based on completely wrong assumptions, which were made by an astronomer who was also convinced he saw canals built on Mars. Once the faraway speck's existence was confirmed, the darn thing was named by an eleven-year-old girl, and the planet in turn lent its name to a Disney cartoon dog.

More recently, astronomers learned that Pluto has one moon that could well be considered a planet in its own right

(a planetoon?), plus two more mini-moons. They also learned that Pluto isn't your typical snowball: It appears to be covered with frozen nitrogen, carbon monoxide, methane, and ethane—a complex coating that gives rise to a thin atmosphere during Plutonian summer. That atmosphere may settle back down to the surface as frost during the long winter—or it may not. Astronomers are waiting to find out, because they haven't yet had a chance to study Pluto in winter.

All this alone is enough to make Pluto the embarrassing weird uncle of the solar system, wearing a leisure suit with a squirting flower in the lapel. But the most dramatic fall in Pluto's fortunes has come about in the past few years—ironically, because the fortunes of planet hunters have risen so dramatically.

Telescopes have come a long way since 1930, when twenty-four-year-old Clyde Tombaugh discovered Pluto by poring over photographic plates at Arizona's Lowell Observatory. Beginning in the early 1990s, astronomers have picked up the glitter of other specks on the solar system's edge. It soon became widely accepted that, over the course of billions of years, the planet formation process had laid down a ring of icy bits beyond the orbit of Neptune.

Pluto came to be regarded as not only the smallest planet, but also the largest of those icy bits on the edge. And many astronomers said it would be only a matter of time before they found objects way out there that were bigger than Pluto.

That prediction came true in 2005, when Caltech astronomer Mike Brown reported the discovery of Eris, which has

an orbit that's even farther away, more eccentric, and more tipped than Pluto's. There's no theoretical reason why other objects bigger than Pluto, or even bigger than Earth, couldn't be lurking out amid the solar system's nether regions.

Pluto turned out to be not quite as special as astronomers originally thought. And a lot of those astronomers thought an object had to be very, very special in order to be called a planet. It wouldn't do to have a list of tens, or even hundreds, of planets to remember.

That's why the IAU pushed through a resolution that required something to be a real standout in order to be dubbed a real planet: It had to "clear the neighborhood of its orbit"—that is, it had to be the biggest thing by far in its orbital space.

Some astronomers supposed that the matter was settled merely because an international body had passed a resolution. "Pluto is dead," Mike Brown told reporters just after the IAU decision. "There are finally, officially, eight planets in the solar system."⁴

Such suppositions turned out to be wrong on several counts. Far from resolving the issue on scientific grounds, the decision sparked a whole series of arguments; first of all over the definition (should specialness be the determining factor?) and the semantics (isn't a dwarf planet still a planet?).

Other arguments suggest that it's still way too early to pigeonhole planets, dwarf or otherwise. One space probe is

heading for Pluto, while another is on its way to a dwarf planet closer to home, known as Ceres. Both are due to arrive at their destinations in the year 2015, and they're both expected to reveal that those little worlds are far more complex than scientists think.

At the same time, more worlds are being discovered every month—not just in our own solar system, but also in star systems light-years away. Astronomers have found “hot Jupiters” that are bigger than our own Jupiter, but circle their own suns in orbits that are tighter than that of Mercury, the closest-in of our solar system's planets. They are watching an infant planet still shrouded in gas and dust.⁵ They've even spotted alien asteroid belts and ice rings.⁶

In the midst of this revolution in our understanding of how stars and planets are built—a revolution that is revealing a greater diversity of celestial wonders—does it really make sense to lay down a definition of planethood that excludes more than it includes? It might make better sense to widen our perspective and keep an eye out for the seemingly insignificant worlds that just might end up telling us more about the origins of the universe—and perhaps the origins of life as well.

The battle lines in the case for Pluto go far beyond planetary science, to take in some of society's sensitive topics: Are scientific questions decided by a single vote or a resolution, or does it take years of claims and challenges for the answer to emerge? How long do you have to wait? How much weight

do you give to the pull of history and culture? Will scientific dogma turn out to be just another type of belief system, where authorities dictate the terminology and the truth? These bigger questions apply not just to Pluto and planethood, but also to issues closer at hand, such as climate change and the skirmishes between religious believers and scientific skeptics.

Then there's Pluto's emotional pull. Some people see the situation as a classic underdog-versus-establishment struggle, or a fight to defend the "first American planet" from foreigners. For kids, Pluto ranks right up there with the little engine that could. "Children love that little planet," Patsy Tombaugh, the widow of Pluto's discoverer, once said.⁷

For others, Pluto's weird plight became the punch line for a string of jokes about life's disappointments—and a reminder that anyone or anything that doesn't live up to expectations can be struck off the A-list, just like that!

"If Pluto can be downgraded, why not demote Duke football to 'dwarf team'?" sports columnist Frank Deford asked.⁸

"An international group of scientists who demoted the planet Pluto to dwarf status . . . met in Oslo, Norway, today and reclassified the Bush White House as a dwarf presidency," humorist Andy Borowitz joked.⁹

We're not strictly talking about science here. But Pluto's story is about more than just science. It's also about the personalities and politics, the parodies and pop culture. You can't leave out those parts of the story if you're going to make the case for Pluto.

When you get right down to it, the case for Pluto doesn't have all that much to do with the fate of Pluto itself. That pimple of a planet won't be affected by any resolution or petition issued back here on Earth. But the debate *does* have everything to do with how we see the universe around us—even if your vantage point is out amid the cornfields of Iowa.