PLUTO RIP, 1930 - 2006?

by Nick Kollerstrom

"Pluto is dead," announced Mike Brown, a planetary scientist at the California Institute of Technology, adding: "There are finally, officially, eight planets in the solar system." He was at the Prague meeting of the International Astronomical Union, which meets every three years, the world's biggest gathering of astronomers, and spoke with reporters via a teleconference while monitoring the vote, on Thursday 24th August. The vote was announced to the world at a press conference at 6pm Prague time.[1] [2]

Was Gustav Holst's 'The Planets' suite right all along, and are there indeed just eight planets? This IAU symposium had to choose between two options – either twelve or more planets, or just eight. That *eminence grise* of astronomy historians, Owen Gingerich at Harvard, had chaired a Commission which advocated that Ceres, Charon (Pluto's moon) and Eris (or UB_{313} as it was then known - usually way out beyond Pluto, but sometimes coming within Pluto's orbit) would be added on. That proposal was made right at the start on the Symposium, on the 16th, then finally overturned by a shock vote on the last day when most delegates had gone home! Only 423 voted on this issue (4% of the IAU membership), out of the couple of thousand who had earlier been present.

Jupiter at the announcement was standing on the Pluto 'discovery-chart' Moon and the Sun was conjunct its Neptune, while the Descendent was conjunct the north node of Pluto[3]. Pluto's orbit has a bigger tilt than any other planet, being inclined at 17° to the ecliptic, so that its nodes are especially important. Pluto was discovered in 1930 while crossing its node, i.e. it happened to be near to the ecliptic enabling it to be discovered, most other parts of its orbit it would have been way too far away for anyone to find it. From the astrological perspective, the debates about whether it was a real, proper planet have been much influenced by this steep angle, whereby it goes clean outside the zodiac for much of its orbit.

Let's look at the carefully-crafted definition presented at the opening of the IAU meeting:

> "A planet is a celestial body that (a) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape, and (b) is in orbit around a star, and is neither a star nor a satellite of a planet."

Very neat, but astronomers didn't like the way it would have led to the inclusion of loads of Kuiper-belt objects. There is a case for a brazenly

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[1] http://msnbc.msn.com/id/14489259/

[2] The resolution was announced as having been carried at 3:44 pm CED, which is UT 13:44 (Found by: Maggie Hyde). The Asc was then 14 Sagittarius, but, astronomically, Pluto was right on the horizon at Prague. It was also, we may note, drawing close to the Galactic Centre when demoted, and will be crossing over the GC in December, 2006.

[3] Pluto was discovered at Flagstaff, Arizona on 18th Feb 1930, by Clyde Tombaugh at 4.00 pm MST. Its north node is at 20° Cancer.

arbitrary decision here, that a planet has to be more than a thousand miles across! Or, that its gravity field be strong enough for someone to walk upon it – either of these would suffice to exclude Ceres.

Modern attempts to reach a definition tend to need three components, which go something like:

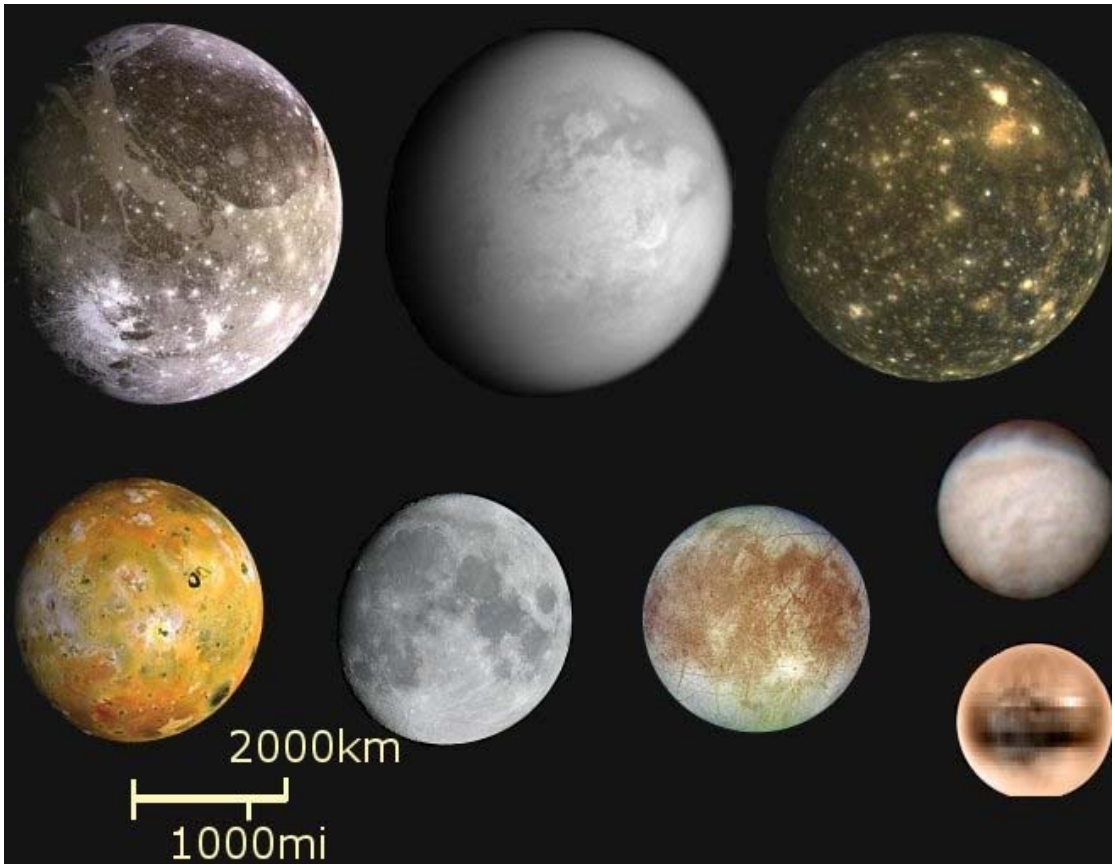
- It must orbit a Sun,
- It has to be large enough for gravity to make it spherical in shape,
- It must not be a star (i.e., not have any nuclear fusion reactions inside it).

These might look fairly reasonable to you, but for a start they would include Ceres, which you might not like. For a while in the 19th century Ceres was viewed as a planet, but then it got demoted to being an asteroid. Would modern astronomers want to reverse that hard-won consensus? But also, the above definitions would include our Moon, and this might really give you the heebie-jeebies. Selene's sphere is always accelerating more strongly towards the Sun (i.e. falling towards the Sun), than it is towards the Earth. Its orbit is always concave towards the Sun, and astronomers have tended to view it as more a companion planet to Earth than a satellite for this reason. It's much too far away to be held properly within Earth's gravity field. Historically, the Moon has been regarded as one of the planets for far longer than it has been a satellite.

The modern crisis arrived in the late 1970s, when Pluto's true size was ascertained: its 'incredible shrinking act' meant that, over the decades since its discovery, estimates of its size had kept getting smaller until finally it was found to be smaller than our Moon[4] (see Figure 1 below). The huge 'Kuiper belt' composed of icy, space debris began to be discovered in the 1990s extending out beyond Neptune, and then an object larger than Pluto was finally discovered within this, in 2005 - Eris. Then the discovery of new 'exoplanets' around other suns began in 1995 and there are now hundreds of these.

[4] www.celestial-sphere.com/astronomy/pluto.html

Figure 1 – Pluto's size compared with the largest moons in the solar system. From top left:
Ganymede (Jupiter), Titan (Saturn) Callisto (Jupiter);
Io (Jupiter), Luna (Earth), Europa (Jupiter), Triton (Neptune);
Pluto.



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After a week of seething debate, the IAU *rejected* the advice of its Commission, and instead a new definition was cobbled together, based on the notion of 'dwarf planets.' Do we really need dwarf planets? This definition stipulated that a 'dwarf planet' was a 'round object' which "has not cleared the neighbourhood around its orbit"[5] This was supposed to include Ceres and Pluto, because these were inside the asteroid belt and Kuiper belt, respectively, and this meant that their 'neighbourhoods' had not been 'cleared.'[6] But, erm, does not the Kuiper belt reach in to Neptune? Gingerich was 'not at all pleased' by this language. The IAU resolution was tangled up in low-credibility semantics, as Gingerich complained: it demoted Pluto to a 'dwarf planet' like Chiron (the latter being the only 'dwarf planet' in the asteroid belt), but it was a 'confusing and unfortunate' definition because how in heaven's name could a 'dwarf planet' not be a planet? This was a 'curious linguistic contradiction' he said – restrained language, considering that all the work of his steering-group

[5] www.ianridpath.com/pluto.htm
[6] This whacks Pluto into the same class as Sedna, Quaoar, EL61 (www.gps.caltech.edu/~mbrown/2003EL61/) and Eris.

had just gone out of the window. 'In the future' Gingerich added, 'one would hope the IAU could do electronic balloting.' How did its ten thousand members feel about a tiny clique voting on the last day?

Table 1: Planetoid Sizes:

Planetoid	**Size relative to Earth's Moon**	**Diameter (miles)**
Mercury	1.4	3000
Moon	1	2160
Eris	0.9	1900
Pluto	0.7	1400
Quaoar	0.4	800
Ceres	0.3	560
Pallas	0.1	330
Vesta	0.1	310
Chiron[7]	0.05	110

A Stern Reply

Alan Stern, leader of NASA's New Horizons mission to Pluto, had a different view: "Less than 5 percent of the world's astronomers voted… This definition stinks, for technical reasons". "It won't stand," he added, "It's a farce." As regards 'clearing of neighbourhoods', "it's patently clear that Earth's zone is not cleared … Jupiter has 50,000 Trojan asteroids, which orbit in lockstep with the planet." A grass-roots petition was circulated objecting to this decision, swiftly signed up to by more top astronomers than had voted for the IAU's decision.[8] It declared:

> "We, as planetary scientists and astronomers, do not agree with the IAU's definition of a planet, nor will we use it. A better definition is needed."

It is being backed by members of the US Center for Space Exploration Policy Research and of the American Astronomical society. "This petition gives substantial weight to the argument that the IAU definition of planet does not meet fundamental scientific standards and should be set aside", stated petition organizer Dr. Mark Sykes, director of the Planetary Science Institute in Tucson, Arizona. Scientists have in the past vested the IAU with authority to name asteroids and other planetary objects, but there is a feeling here that it has over-reached itself.

Astronomers have supposed that they can define this concept without consulting astrologers – who use it just as much as they do. A good starting-point here would be a view earlier expressed by Mike Brown, the astronomer whose team discovered Eris:

> "Our culture has fully embraced the idea that Pluto is a planet and scientists have for the most part not yet realised that the term planet no longer belongs to them … From now on, everyone should ignore the distracting debates of the scientists. Planets in our solar system should be defined not by some attempt at forcing a scientific definition on a

[7] Chiron the Centaur, the smallest object ever to get into a horoscope, is presently used by three out of four astrologers, with only 10% not using it.
[8] www.ipetitions.com/petition/planetprotest

> thousands-of-years-old cultural term, but by simply embracing culture. Pluto is a planet because culture says it is."[9]

The planets form a neat set of nearly-circular orbits around the Sun, all going the same way and more or less in the same plane. The diverse exo-planets being found tend to have hugely eccentric orbits, and if another set of eight or nine nested, coplanar orbits are found I'll be rather surprised. This setup gives the time-honoured perception of the 'wanderers' across our night sky which move at relatively uniform speeds and along the same line through the sky. Many people, including Isaac Newton, have seen evidence for a wise Creator in the uniformity and so to speak harmony of this setup. Thus the near-circularity of their orbits is an important part of what we mean by a planet.

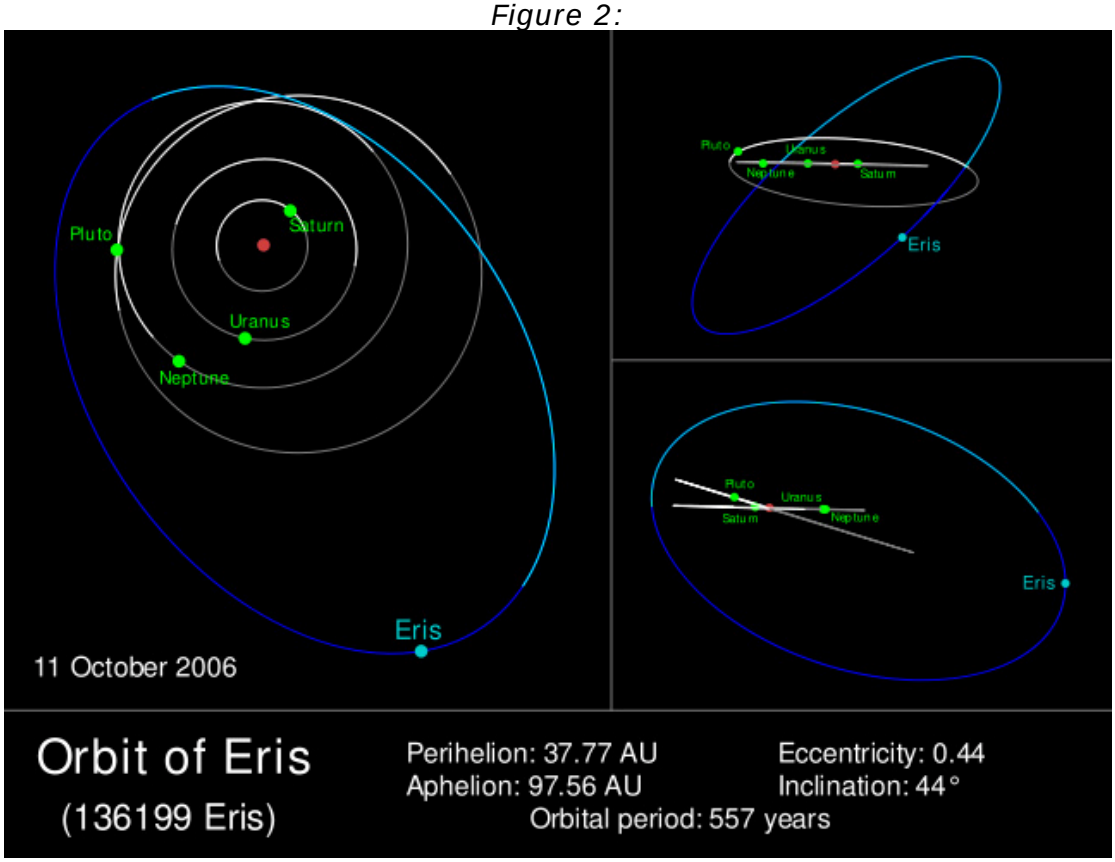
It is a concept imbued with archetypal meaning. Astronomers may suppose they can brush all that stuff away ('a victory of scientific reasoning over historic and cultural influences,' crowed one delegate). But, I suggest they could benefit from consulting (gasp) the astrologers. They need to do so, because they have for quite a long time been unable to say much of interest to the public. They no longer have Carl Sagan or Fred Hoyle, who could do that. I predict that the public will not take this decision very seriously, and indeed will mainly be interested in it as a polemic amongst a divided astronomical community. The message reaching the tabloids is merely, that astronomers no longer know what a planet is.

Had they consulted an astrologer, the first comment would surely have been, don't try to make a final decision on a contentious issue almost bound to split the astronomical community, with the Sun right over the Neptune of the discovery chart. A second comment would probably be, that it is in the nature of Pluto as underworld deity to be somewhat invisible and that this grand controversy is very much part of that script, i.e. this seething debate does *mean* something. Pluto and its moon orbit around a common centre of gravity, so there is pure nothingess at the exact point in space where, so to speak, its co-ordinates lie. Astronomers should have let a bit of time go by after this struggle to affix their labels, and not presume to exert some dictatorial power over public opinion.

As for Eris, at over twice Pluto's distance, its orbit is very eccentric and it's tilted at no less than 44° to the ecliptic (see Figure 2, below). That's rather too high a celestial latitude to include in a horoscope, I would have thought. Also, size does matter, and astrologers here need to be guided by the notion of spherical shape imposed by gravity. An irregular lump of rock wandering through space, may not have the divine potentiality to feature in a horoscope. That imposes a threshold, of exclusion.

[9] http://news.bbc.co.uk/1/hi/magazine/4737647.stm

Figure 2:



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Pluto has three moons, the biggest of which is Charon. Charon and Pluto are locked into ever facing each other. Let's quote Dava Sobell here:

> "The uniqueness of their orbital engagement has recast Pluto and Charon as the first known example of a true 'double' or 'binary' planet"[10]

To count these as two separate planets, as Owen Gingerich's Commission wanted to do, misses this rather vital point. Pluto has a bit of a methane atmosphere, and when things get extra-cold this methane is believed to condense and falls like snow upon the ground. Astronomers like the idea of something happening on a planet, e.g. tectonic activity. Astrologers like the idea of harmony, e.g. the orbit periods of Uranus, Neptune and Pluto being in a 1:2:3 ratio. Also, let's note that Pluto occupies a decent Bode's Law orbit-position, at its 39 AU mean radius of orbit.[11] (For the outer planets, this 'law'doubles the radius: thus Saturn at 9.5, Uranus at 19 and Pluto at 39 AU - only Neptune doesn't manage it)

Neptune and Pluto have exact discovery-times, plus dramas or interesting stories concerning how they were found, and the names which astronomers chose for them seem highly appropriate (Uranus lacks any such discovery time, because it took months after Herschel had spotted it

[10] Dava Sobell, *The Planets*, 2005, p.224. Dava Sobell sat on the IAU's Commission.
[11] That is, the next Bode-law position out after Uranus at 19 AU: Neptune is the only planet not occupying such a position.

before people realised it was a new planet). These stories are an important part of our experience of the *being* of these spheres.

The IAU has now had some quite public failures. It's now time for astrologers to have a go. Are there nine planets, or if not how many are there? One suspects they would prefer to phrase the question differently, as inclining towards a more pluralistic position, in which different approaches are equally valid. "I think a great move forward will happen when astronomy and astrology link up again" said Rupert Sheldrake[12]. Hear hear! Astrology is based on the hard facts of inner experience. As Gary Zukav wrote: '*There is not one planet that lacks a level of active consciousness, some of which is akin to our human form, and some of which does not come close to our form, but remains consciousness as we understand it*[13].'

Will the Lord of the Underworld stage a comeback? Are reports of his demise premature?

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[12] *The Evolutionary mind, Trialogues at the Edge of the Unthinkable*, Rupert Sheldrake, Terence McKenna & Ralph Abraham, CA 1998 p.146.
[13] Gary Zukav, *The Seat of the Soul,* Rider 1990 p.182.