The Fall and Rise of Pluto

The demotion of Pluto from the status of planet to that of dwarf planet remains a controversial one. This seems largely to be an emotional response to the loss of status of an object most of us have grown up believing was truly the ninth member of the family of 'classical' planets familiar from ancient times. Unfortunately, there is ample evidence from astronomers that Pluto is something more than a little different from the other planets and this is what brought about its reclassification.

I think most people, not just astronomers, would accept that Pluto is something intrinsically different, but balk at the term 'dwarf planet', and I share their discomfiture. I also feel it is a slight on Clyde Tombaugh, a childhood hero of mine, who discovered Pluto back in 1930. He thought until his dying day that he had discovered the ninth planet and was rightly proud of his discovery. On top of which, the photographs of Pluto returned by the New Horizons probe, revealed it to be an enchanting and beautiful world, which makes its demotion seem unduly harsh.

The convention that decided Pluto's fate went to some lengths to define what a planet actually is. The conclusion, in fairness, seems reasonable: a planet must possess a spherical shape, must gravitationally dominate its orbit and have 'swept it clean' of lesser objects - and so on. By these rules, Pluto became a dwarf planet, a term which accurately reflects its diminutive size, but wholly neglects its real significance. This is the aspect of the reclassification I most take issue with. For what it's worth, I present here my own thoughts on the matter and propose another approach. I don't expect to bring about change, but perhaps my observations may promote some thought in the reader and simultaneously provide some entertainment!

It seems to me the reclassification of Pluto is too entrenched in physics. It is all about mass, gravity, shape etc. It doesn't pay enough attention to the history of astronomy nor to origin – how the solar system has evolved from the cloud of gas and dust that proceeded it. When looked at from these addition perspectives, certain things become clearer.

To begin with, let us look at the classical planets: Mercury, Venus, Earth, Mars, Jupiter and Saturn. These share important orbital characteristics, such as occupying almost the same orbital plane and the same direction of travel around their orbits. The majority of them also share the same direction of spin. It is therefore evident that these objects have a similar origin and therefore constitute a family of some kind. If we also consider the historically later planets Uranus and Neptune, it is apparent that these too fall into the same family. I propose that these objects, and only these, be called planets. This is historically correct and is also meaningful in terms of origin. This evidently leaves out Pluto, but we shall come to this issue later.

What other solar system objects can we relate from the perspective of origin?

Well obviously, we have the plethora of objects that occupy the region between Mars and Jupiter. These are clearly all of a kind and we have historically always used the term 'asteroids' to describe them. We should continue to do so and not concern ourselves with which, if any of them, are spherical in shape or how large or small they are. Sphericity is an indication of mass, which has no bearing on the object's origin and therefore its classification.

A potential problem with the asteroid classification however, is that there are other asteriod-like bodies in the solar system that are not confined to the zone between Mars and Jupiter. However, if we consider origin as the important shared aspect of all asteroids, we must recognise many of these objects are indeed from the asteroid belt, but have been flung from their seat of origin by gravitational influence, particularly that of Jupiter. This should not disqualify them from being designated as asteroids, since they have the correct origin. In these cases and in others, there is no reason an additional adjective cannot be used to refine sub-classes of asteroid, such as 'oblate' (meaning spherical or near spherical) or 'sporadic', meaning it has an orbit that takes it outside of the asteroid belt. In this context the term Trojan can be (and is) used to specify those asteroids sharing the orbit of Jupiter - if it is accepted that they share their origin with those in the asteroid belt.

Two other categories of solar system object that can be identified today are the Kuiper belt and Oort cloud objects, which we now discuss. The Kuiper objects, of which Pluto is the first in the class, are characterised by somewhat eccentric orbits not in general confined to the plane of the planets. These are a plainly different class of object from the planets or the asteroids, the second of which they may at times resemble. The processes that created these objects seem to be different from those that created the planets. Their accretion into significant bodies shows they are less interdependent in their evolution than the planets, which is why their orbits are so different from each other. I propose we call such objects simply 'kuipers'. That Pluto is the first of the class, restores Tombaugh's status as the discoverer of a new class of object.

Lastly, there are the 'oorts', a term which defines the bodies of the Oort cloud. It would seem, based on present knowledge, that these are structurally similar to the kuipers, but their orbits about the Sun are more distant and more randomly distributed about the central star. The distinction between the kuipers and the oorts is currently largely theoretical. It might be argued that kuipers are objects that were born in the region of the planets but were subsequently thrown into strange orbits by gravitational influences. This distinguishes them from oorts, which are bodies remaining where they have always been - in the outer limits of the solar system. However, it is undeniably difficult to distinguish between oorts and kuipers, particularly when the latter venture far towards the outer regions or have orbits tilted greatly from the plane of the planets. Nevertheless, since it appears that, as we go outwards from the Sun, the orbits of the bodies found there become more and more disordered, it is possible that a working distinction between kuipers and oorts may be drawn based on distance from the Sun and orbital tilt. In the long run

it may come down to the chemical constitution of each objects to properly distinguish between them. This could take a while to emerge, but until then an arbitrary distinction based on orbital characteristics may be the best option.

On the face of it, my proposed classification does not offer much change from what was previously used, but that is largely my point. The historical approach to the issue properly reflected the question of the origin of the bodies concerned, whether or not this was intended. This is something that has been lost in the new scheme of things because of its pursuit of what a planet actually is. I argue that what matters is the origin of the object in question, since that is more informative, astronomically speaking. True the planetary status of Pluto remains lost in this classification, but it rises again as the exemplar of a new class of object. Hopefully this finds approval with traditionalists like myself, who hold past astronomers in high regard.

My last thought is where does this leave the discovery and study of extrasolar planets? Well, if the laws of physics are universal, there is the hope, perhaps even the expectation, that planetary evolution around other stars will mirror what has happened around the Sun. Wouldn't it be surprising if there were no planets, asteroids, kuipers or oorts out there? So there, the classification might well be universal after all!