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A Planet By Any Other Name...

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THE PLUTO FILES: THE RISE AND FALL OF AMERICA'S FAVORITE PLANET. By *Neil deGrasse Tyson*. New York & London: W.W. Norton & Co. 2009. Pp. 194. $23.95.

INTRODUCTION

In case you haven't heard, Pluto isn't a planet anymore (and maybe it never was). In grade school, we all memorized the planets, giving little thought to what made something a planet besides revolving around the Sun and being part of some familiar mnemonic. However, scientific discoveries about Pluto and other parts of space led scientists to question Pluto's planetary status and ultimately, to strip Pluto of its standing among the planets. This leads to the inevitable question—what is a planet?—which turns out to be a more difficult and fascinating question than one might think.

The Pluto Files grapples with the question of what it is to be a *planet*. The book is as much a cultural study as an astrophysical one. "Gathered here in one place is a record of Pluto's rise and fall from planethood, given by way of media accounts, public forums, cartoons, and letters I received from disgruntled schoolchildren, their teachers, strongly opinionated adults, and colleagues" (p. xi). *The Pluto Files* thus presents the question of the meaning of *planet* not through rigorous argumentation but through the crosswinds of culture and science.

But why should lawyers care about Pluto? Because it is a prism through which we can understand how man interacts with the world by creating conceptual categories. Like scientific constructs, legal constructs may turn on the way the world "really is." A donor must be dead for an organ donation to be legal.[1] Like science, law must construct its own categories of meaning—for instance, criminal law's efforts to distinguish defenses as justifications and excuses. In addition, law must draw difficult lines. In our effort to treat like cases alike, we must categorize the world, lumping some items together while splitting others.[2] *The Pluto Files* is a fascinating prism through which to view all of these endeavors.

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1. Michael S. Moore, *A Natural Law Theory of Interpretation*, 58 S. CAL. L. REV. 277, 322 (1985).

2. *See* Richard J. Arneson, *Equality*, *in* THE BLACKWELL GUIDE TO SOCIAL AND POLITICAL PHILOSOPHY 85, 103–04 (Robert L. Simon ed., 2002) ("The question then arises, if I claim to have greater moral rights and moral standing than (for example) a gorilla, on the ground that I am much

It is not often that one encounters a book that meets so many different descriptions. It is the sort of fun, easy read that one can take on vacation. It makes you laugh out loud. You can use it to look smart at cocktail parties. Your children will be interested in what you are reading. And it gives you a new prism through which you can gain insights into your own profession and place in the world.

In this Review, I begin with *The Pluto Files*' detailing of Pluto's discovery through its downfall. The book is an extraordinary interweaving of the empirical, the conceptual, and *the social.* Not only does Tyson present the scientific case for demoting Pluto, but he also places it within the larger cultural text—including copies of the hate mail he received from school children, song lyrics, newspaper cartoons, and excerpts from *The Colbert Report.* The declassification of Pluto was an empirical and social phenomenon. In Part II, I systematize the debate, discussing how we might understand the Pluto problem as an instance of a purely stipulated "nominal" kind, a natural kind, or simply an inevitable line-drawing issue. In this Part, I push against an implicit theme in the book—that science, and not popular sentiment, could and should determine Pluto's status. In Part III, I turn to the lessons that law can draw from Pluto's demise, ranging from law's use of natural kinds, to law's need to understand its categories, to the consequences of legal classifications. *The Pluto Files* is not a tale of a giant ice ball in space; it is an accessible account of how man finds meaning in the world.

I. THE PLUTO FILES: THE BOOK ITSELF

The Pluto Files documents Pluto's discovery to its demotion. It is written by Neil deGrasse Tyson, an astrophysicist and director of the Hayden Planetarium at the American Museum of Natural History ("AMNH").[3] As Tyson characterizes it, "Pluto's demotion became a window on who and what we are as a culture, blending themes drawn from party politics, social protest, celebrity worship, economic indicators, academic dogma, education policy, social bigotry, and jingoism" (p. 135).

Although Tyson has a knack for writing accessible astrophysics for a popular audience, this book is also downright funny. This isn't your elementary school science book. For instance, Tyson hypothesizes that America's attachment to Pluto, the planet, comes from its attachment to Pluto, Mickey Mouse's pet. Tyson, sensitive to the treatment of species as a result of his work at the AMNH, then asks, "[H]ow [did] it c[o]me to be that Pluto is Mickey's dog, but Mickey is not Pluto's mouse[?]" (p. 15). He answers:

> I would later learn that if you are a Disney character who wears clothes, no matter what your species, you can then own pets, who themselves

smarter, why does not this same argument establish that (for example) Albert Einstein, who is much smarter than I, has greater moral rights and moral standing than that to which I am entitled?").

3. For Tyson's biography, see http://www.haydenplanetarium.org/tyson/ (last visited June 16, 2009).

> wear no clothes at all, except perhaps for a collar. Pluto runs around naked except for a collar that says "Pluto." Mickey runs around with yellow shoes, pants, white gloves, and the occasional bow tie; The haberdasheral hierarchy is clear. (p. 15)

The chapters proceed chronologically, detailing Pluto's story from discovery through its demotion. Pluto was discovered by Clyde Tombaugh on February 18, 1930, in Arizona (p. 3). It was found because scientists postulated a Planet X that explained perturbations in Neptune's orbit (pp. 3, 24–25). Pluto was named by Venetia Burney, an eleven-year-old girl in Oxford, England, whose grandfather was a retired librarian from Oxford University and was friends with many astronomers (p. 9). Prior to the planet's discovery, the only "Pluto" readily accessible to Americans was Pluto Water, a mineral water laxative (p. 7). In May 1931, Disney released "The Mouse Hunt" with Mickey's new pet, Pluto (p. 13), and Americans fell in love with both Plutos (p. 14).

As science marched on, empirical discoveries challenged Pluto's planetary status. Assumed at discovery to be about the same size as Neptune, eighteen times Earth's size (p. 25), Pluto's estimated size plummeted to less than one percent the mass of Earth by 1978 when Pluto's moon, Charon, was discovered (p. 27). As Pluto slowly disappeared, astronomers realized that it could not fulfill the role of Planet X, but by that time, scientific discoveries allowed the recalculation of orbits, ultimately leading to the conclusion that there was no Planet X in the first place (p. 28).

We've named and lost other planets. We started with seven "wanderers" (planet means "wanderer" in Greek): Mercury, Venus, Mars, Jupiter, Saturn, Sun, and Moon (p. 31). After Copernicus, our solar system dropped to six (losing the Sun and Moon, adding Earth) (p. 31). Ceres and Pallas, later deemed asteroids, were once planets until they simply became "too small" to count (pp. 28–30). At the time when asteroids were counted as planets, we had twenty-three planets in our solar system (p. 30 fig.2.4).

Pluto is different from the (other) planets in many respects. Its volume is mostly ice (p. 33). It is tiny, and its orbit is eccentric as it tilts more than seventeen degrees from the plane of the solar system (p. 34). Pluto's moon, Charon, is so large relative to Pluto that unlike (other) planets where the moon orbits the planet, Charon and Pluto orbit a fixed spot in free space (p. 34). Pluto's path is messy (p. 37). Some of these properties make Pluto more closely resemble comets and asteroids (p. 52).

Pluto's planetary status was questioned far before its demotion. In 1956, astronomer Gerard Kuiper proposed that an object cannot be a planet if it takes too long to rotate on its own axis—Pluto takes more than six days.[4] However, what science did not know was that Venus takes 243 days to spin once on its own axis (p. 61). In contrast, "Plutophiles," as Tyson dubs them, clung to Pluto's moon as indicia of Pluto's status (p. 51). This, too, was a problematic criterion. In 1994, astronomers discovered that the asteroid Ida

4. Pp. 60–61 (citing *Demoted Planet*, TIME, Feb. 20, 1956, *available at* http://www.time.com/time/magazine/article/0,9171,808181,00.html).

has an orbiting moon (p. 51). And more such discoveries have been made (p. 51).

As it turned out, Pluto is not unique. In 1992, astrophysicists discovered small objects, all with tipped orbits, in the "Kuiper belt" (pp. 53–55). With these discoveries, Clyde Tombaugh (still alive in the early 1990s) saw the writing on the wall and fought to keep Pluto as a planet (pp. 56–57). Pluto was in trouble.

Pluto's fall was hastened by the February 2000 opening of the Rose Center for Earth and Space, part of the AMNH. Tyson was appointed director of the Hayden Planetarium in 1996 and his appointment included serving as project scientist for the creation of the Rose Center (p. 61). Unwilling to spend funds on an unstable classification scheme, Tyson organized a panel debate on Pluto in 1999 (pp. 68–69). The panel—"[t]he right people at the right time and at the right place" (p. 70)—was comprised of Michael A'Hearn, a comet and asteroid specialist; David Levy, amateur astronomer and discoverer of dozens of comets and asteroids; Jane Luu, professor and codiscoverer of the first Kuiper belt object; Brian Marsden, comet and asteroid specialist and director of the International Astronomical Union's ("IAU's") Minor Planet Center; and Alan Stern, a specialist in small objects in the solar system (p. 69).

The panelists took various sides. Luu claimed Pluto was not a planet (pp. 70–71). It belonged with the "swarm" of similar tiny objects in the Kuiper belt (pp. 70–71). If the other Kuiper belt objects had been discovered simultaneously with Pluto (as the asteroids were), then none of them (Pluto included) would have been planets today (p. 71). Luu further maintained:

> If Pluto continues to be referred to as the ninth planet, it would only be due to tradition and sentimental reasons. People are fond of planets, because the idea of a planet conjures up notions of home, life, happy things, and astronomers are always looking to find more planets, not to lose them. So in the end, the question goes back to this: Should science be a democratic process, or should logic have something to do with it? (p. 71)

Luu also maintained, "I personally don't care one way or the other. Pluto just goes on the way it is, regardless of what you call it" (p. 71).

Stern was up next:

> Stern referred to the alleged problem of Pluto's small size by pointing out that nobody thinks a Chihuahua isn't a dog just because it's small—that there's "something innate" about a Chihuahua, "something doggy" that automatically puts it in the class of dog for any observer. By analogy, Pluto's roundness puts it in the class of planet. (p. 72)

In addition to proposing a quasi-scientific standard, Stern also proposed the "duh" test:

> Like the Supreme Court justice on [the definition of] pornography, when it comes to a planet I'm not sure I can give you an exact definition, but I know it when I see it. By the same token, give a fifth grader a picture of

> Pluto and ask him if it's a planet, and you get back: "Duh." (p. 73; alteration in original)

Marsden was pro-dual status, provided that Ceres and Pluto were treated the same (p. 73). A'Hearn argued that the reason scientists classify objects "is to try to find patterns that will help us to understand how things work or how they came to be" (p. 73). But this yielded dual status for Pluto. To understand how Pluto works is to think of it as a planet; whereas, to know how Pluto got to where it is in the solar system leads to its being a trans-Neptunian object (pp. 73–74).

Levy was pro-planethood. He argued that "Science, to me, is not just for scientists. Science, to me, is for everyone; it's for us" (p. 74). Tyson "ran a mental applause meter" and concluded that by the end of the evening, "Pluto fell from grace" (p. 75).

Although Tyson penned an article arguing for Pluto's demotion (p. 65) and ultimately became the central figure of the controversy, the Rose Center's treatment of Pluto was a group decision. The Rose Center separated the solar system by like properties, ultimately separately grouping the terrestrial planets and the Jovian planets (pp. xi–xii, 76). Pluto was left out in the cold, placed with other icy objects in the Kuiper belt (pp. xi, 76). The Rose Center took "nontraditional" cuts across the solar system, grouping objects by common properties such as storms, magnetic fields, and rings (p. 77). In addition, an exhibit called the "Scales of the Universe," which shows various relative sizes of different objects, displays the terrestrial planets, the Jovian planets, and the Sun, but not Pluto (p. 78).

The Rose Center opened on February 19, 2000. Almost one year later, Kenneth Chang, a reporter from the *New York Times*, was visiting the Center when he overheard a child ask his mother where Pluto was in the Scales of the Universe walkway (p. 80). The mother told the child, "Check again, you're not looking hard enough" (p. 80). The next day, the first page of the *New York Times* contained the headline "Pluto's Not a Planet? Only in New York."[5]

A media frenzy began (pp. 84–88). Meanwhile, scientists kept discovering more objects in the Kuiper belt. Quaoar was discovered in 2002; its diameter almost half the size of Pluto's and its orbit was more planetary (p. 90). This led to a *New York Times* editorial that noted, "[U]nless we want to add 10 more planets to the elementary-school curriculum, we would be wise to downgrade Pluto to the distant iceball it is."[6] Then, scientists found Sedna and Eris; the latter is larger than Pluto and has a moon of its own (pp. 91–92).

Pluto's potential demotion attracted national attention (Chapter Five). Scientists came down on all sides. Some scientists agreed that Pluto ought to be demoted; others protested that things ought to be left alone; and others

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5. P. 81 (citing Kenneth Chang, *Pluto's Not a Planet? Only in New York*, N.Y. TIMES, Jan. 22, 2001, at A1).

6. P. 90 (quoting Editorial, *Pluto's Plight*, N.Y. TIMES, Oct. 15, 2002, at A26).

advocated splitting the baby with dual citizenship (Chapter Five). David Jewitt, who codiscovered the Kuiper belt with Luu, defended the Rose Center in a chat group, stating, "They've done exactly the right thing. It's an emotional question. People just don't like the idea that you can change the number of planets. It's inevitable that other museums will come around, though. The Rose center is just slightly ahead of its time" (p. 99). Robert Staehle of the National Aeronautics and Space Administration ("NASA") noted that "neither Pluto nor anything else in the outer Solar System cares in the slightest what anybody on Earth labels it" (p. 104). And, in responding to a statement (made in jest, though unknown to the responder) that "Pluto is a true-blue American planet," a web publisher answered that "[s]uch romanticism has no place in science, a system which must never cease trying to determine the objective truth, a truth free of human prejudice and emotion" (p. 99).

Perhaps the most devastating critique of deferring to the popular will was the commentator who noted that people in Galileo's time might have resisted the sun-centered universe, given what they had learned in school (p. 101). This remark stands in profound contrast to the email that appears ten pages later from a fifty-nine-year old who argues, "I have seen many changes in my life[;] one thing I am sure of is that there are nine planets in the Solar System, and that the smallest and most distant is Pluto" (p. 111). For his signature line, the email writer states, "Leave it alone," before signing his name (p. 111).

Adults were invested in Pluto's status. One email writer argued, "Would you say a small child or midget wasn't a person? . . . By saying that Pluto is not a planet, [it] is like saying a midget or a small child is not a person" (p. 112). Tyson received another email pleading to "[g]randfather the little guy and get on with it" (p. 112).

The problem was that there was no definition of the word *planet* (p. 104). Ultimately, the IAU, the professional society for all the world's astrophysicists, formed an ad hoc Planet Definition Committee (p. 115). This committee ultimately recommended four criteria an object must meet to be deemed a planet, including that it "has cleared its orbit of wayward debris" (p. 118). Pluto failed this criterion (p. 118). On August 24, 2006, the IAU proclaimed, "Pluto is officially demoted to the status of 'dwarf planet' " (p. 119). "When the IAU voting results were released, a media frenzy followed, temporarily displacing new stories on terrorism, the Iraq War, genocide in Darfur, and global warming" (p. xii).

The emails and letters from schoolchildren poured in (pp. 120–24). One third grader (and future legal economist, if you ask me), noted the negative externalities of this classification decision: "You are going to have to take all of the book's [sic] away and change them" (p. 123 fig.6.3).[7] Of course, the argument was accompanied by a rather un-Posnerian drawing of Pluto and another planet crying (p. 123 fig.6.3).

7. *See also* p. 123 fig.6.4.

Tyson, our narrator, is troubled by all of this. Though he notes that the Rose Center did not rely on Pluto's classification (p. 127) and was thus unaffected, the IAU vote was unusual: "Science is not a democracy" (p. 127). And yet, it seemed that it was.

Tyson beautifully documents Pluto's fall from grace. Although he is clearly supportive of Pluto's demotion, his tone ranges from advocacy to ambivalence, the latter largely because he is ambivalent about the category of *planet* to begin with. Indeed, in the last pages of the book, Tyson advocates that "the rote exercise of planet counting rings hollow and impedes the inquiry of a vastly richer landscape drawn from all that populates our cosmic environment" (p. 153). Tyson's antagonists misunderstood him. He was never anti-Pluto. He was antiplanet.

The Pluto Files tells this tale interwoven with popular culture, complete with political cartoons, song lyrics, legislation, discussion on *The Colbert Report*, and letters from adults and children. Pluto's demotion was so far-reaching that sports fans used it to criticize the New York Knicks' status as a basketball team (the team ran around the court and hurled a ball but failed to exhibit the other properties of basketball teams, such as scoring points and winning games) (p. 144), and the American Dialect Society created the verb, "to pluto," as the "Word of the Year" for 2006 (p. 147). On March 8, 2007, New Mexico declared Pluto a planet within its state borders and made March 13, 2007, "Pluto Planet Day" (p. 136). Californians held a funeral for Pluto (p. 139). Astrophysics was never quite so accessible, nor quite so amusing. For many Americans, Pluto's rise and fall hit close to home.

II. Bringing Space Down to Earth

The book seems to center around the question, "what is a planet?" but the real question is the metaquestion: "What are the criteria for determining the elements of what a planet ought to be?" Tyson seems to agree with the result of Pluto's demotion, but he seems less committed to the path that got us there. And indeed, because Tyson does not truly endorse the concept of *planet*, the reader lacks confidence in the ultimate result, as she is unable to reconcile the competition between objective truth, scientific (but human) analysis, and socially constructed meaning. The book does not take a strong and consistent position on the metaquestion. Tyson reports, and occasionally endorses, but he does not fully harmonize the arguments.

Let me try to reassemble the pieces. Figuring out what determines Pluto's classification turns on how we understand the category of *planethood* and how we draw lines between our categories. For our purposes, we should first compare nominal and natural kinds. Nominal kinds depend wholly on human convention—for instance, what constitutes a particular street.[8] To grossly oversimplify, something (like water, tigers, and gold) is thought to be a natural kind when the term rigidly designates the "real" essence of the

8. *E.g.*, Michael S. Moore, Educating Oneself in Public: Critical Essays in Jurisprudence 311–12 (2000) (discussing natural, functional, and nominal kinds).

item.[9] We must also address questions of splitting and lumping. We might decide to group diamonds with other "jewels." Although grouping may itself be a natural-kind question—that is, some believe that natural kinds can be "property kinds," covering properties of items and relations between them—we should consider the questions that come into play when we conventionally group items (that are themselves natural or nominal kinds).

As I sketch these possibilities, I will attempt to make the case for sentiment in Pluto's quest for planethood. But any engagement with whether "Pluto really is a planet" takes us deep into difficult questions of realism within metaphysics and its connection to theories of meaning. Realism has two general aspects: that things actually exist and that their existence is independent of what people think of them.[10] One need not be a realist across the board, so one can reject that there "really are" numbers or morals, while maintaining that there are mountains and chairs.[11] We won't pretend Pluto doesn't exist. Rather, the question will be whether we want to reject the claim that "Pluto is a planet" is true independent of human construction. Admittedly, even a realist who believes that truth is prior to human knowledge (and thus prior to meaning) could grant that some human construction was involved in *planethood*. That is, a realist could take the view that *planet* is simply a nominal kind that may be constructed by man. But I think man's potential role in Pluto's demise extends beyond the possibility of *planet* being a nominal kind and perhaps permits greater insights into how man creates meaning in the world. My opposition is intended to be provocative, and I certainly can only gesture at these deep philosophical questions.

A. *Planet as Nominal Kind*

Consider the claim that *planet* is a nominal kind. "[A] nominal kind is *nominal* in the sense that as a kind its only nature is given by the common label attached to its various specimens."[12] *The Pluto Files* contains arguments along these lines. Jane Luu argues that Pluto's label is irrelevant. When Tyson's boss asked a leading authority for a second opinion about Pluto's treatment, Ostriker said, "Whatever Neil did is okay by me" (p. 84). Tyson summarizes Ostriker's reasoning:

> [T]he hoopla wasn't about a scientific question. The organization of the solar system, how the solar system came to be the way it is—those are genuine scientific questions. But the labels you give things—no. You're having an argument over something you generate rather than what is fundamental to the universe. (p. 85)

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9. *See* Alexander Bird & Emma Tobin, *Natural Kinds*, *in* THE STANFORD ENCYCLOPEDIA OF PHILOSOPHY (Edward N. Zalta ed., Spring 2009), http://plato.stanford.edu/entries/natural-kinds/ (last visited Sept. 26, 2009).

10. *See* Alexander Miller, *Realism*, *in* THE STANFORD ENCYCLOPEDIA OF PHILOSOPHY (Edward N. Zalta ed., Fall 2008), http://plato.stanford.edu/entries/realism/ (last visited Sept. 26, 2009).

11. *Id.*

12. MOORE, *supra* note 8, at 311.

Tyson himself thinks of *planet* as a distraction to our understanding of the universe (pp. 153–55). Indeed, he says that counting planets is "pedagogically and scientifically vacuous" (p. 76). He concludes the book with the hope that, in the future, one will have to search the archives of the IAU to learn the word *planet* (pp. 154–55). Under such a view, *planet* does not mean anything.

But then why the hoopla? If scientists think that *planet* doesn't do any meaningful work, then isn't that precisely why there is room for extra-scientific factors? Consider astronomy's greatest concession to politics. As we learn from Tyson, there is a standard convention for the naming of planets. But when British astronomer William Herschel discovered Uranus, he named it "Georgium Sidus" after his king (p. 8). Astronomers then named Uranus *Uranus*, but to appease the British people, Uranus's moons were named for Shakespearean characters, despite the convention to name moons after the Greek mythological characters related to the Roman god for whom the planet is named (pp. 8–9). There is certainly no meaning behind a name, but scientists were hard pressed to find meaning behind *planet*.

Indeed, at one point, Tyson makes an argument that proves too much. He argues that we don't have a good numerical count of countries because we do not have one definition of a country. Does one include Palestine? And if one goes by membership in the United Nations, then Switzerland wasn't a country until 2002 (pp. 76–77). All this, Tyson states, makes the case that "country" tells you much less than other ways of grouping, say, by population, or temperature, or per capita income (p. 77). Tyson claims we could also group the planets in this way, by atmosphere, or rings, or magnetic fields (p. 77). But once we recognize that the category of planet does not provide any function, one begins to wonder why astronomers had it in for Pluto. If the category "planet" does not tell us anything scientifically useful, then why tinker with it anyway? Just drop it.

If planet is a nominal kind, then the scientists' dismissals of sentimentality were misguided. Throughout the book we hear an explicit and implicit critique ringing that Pluto's status is not an "emotional" question (p. 99) or that clinging to planethood is "romanticism" (p. 99) or relies on "prejudices" (p. 105), and is embodied by pleas to "[g]randfather the little guy" (p. 112). If there is no coherent category to be had, then there is simply no reason not to leave things the way they are. Or add planets. Or do whatever we want. Indeed, then any question about whether to change the category would not be because of some *internal fact about planets*, but because of some external reason. Man, not Pluto, would get to determine what Pluto is.

B. *Realism and Natural Kinds*

The scientists, however, weren't happy with mere stipulation. It seems they implicitly believed that the category does work. The category of *planet* means something. Let us consider, then, the other end of the spectrum—the category of natural kinds.

What would it mean for *planet* to be a natural kind akin to *gold*, *water*, and *tiger*? Items are thought to be natural kinds when the meaning of the term is determined by what the item *really is*. As science progresses, and as we learn more, the meaning of the term does not change because it always refers to the world the way it is. Word connects to world unmediated by human conceptualization.

Although there is significant philosophical debate about the details, we should first note the plausibility of this view. Consider stars and the standard Kripke-Putnam view of natural kinds.[13] We look up in the sky and label those twinkling objects, *stars*. As we learn more, we discover that all of them have sufficient force of gravity to trigger fusion in their cores. This scientific discovery is the true meaning of *star*, despite the other associations we have with it—i.e., twinkling, fixed point of light, visible at night (what Putnam calls "stereotypes"). When we encounter a twinkling object in the sky, we may nevertheless conclude that it is not a star if it does not meet the scientific definition. Our mistake about Venus is the clearest example of science revealing that a popular conception was mistaken, but, as another example, consider what would happen if science discovered at some point that Rigel, a star within the constellation Orion, does not have fusion in its core: scientists would claim that we have always been mistaken in viewing Rigel as a star, despite its star-like twinkling appearance in a known constellation. The natural-kinds view, which links word to world, allows science to be the final arbiter of meaning.

Still, the natural-kinds view is not one without controversy. Though I cannot even begin to do justice to the debates within metaphysics and philosophy of language, let me sketch out a few of the critical questions. Let us begin with Richard Rorty's pragmatism. Rorty rejects scientific realism, thus rejecting natural kinds. Rorty denies that the world would ever give us one right answer to the meaning of *planethood*. Of course, the starting point is that ice ball in space. It is what Rorty would call a "lump."[14] But that is as far as reality will get us.[15] The rest is up to us. There are no *planets* if there are no people. *Planet* is a word used by people to organize their conception of the universe. It cannot be that on Pluto we will find the magic scroll that says, "Yes, Virginia, I am indeed a planet." As Rorty notes, "[t]he notion that some one among the languages mankind has used to deal with the universe is the one the universe prefers—the one which cuts things at the joints—was a pretty conceit."[16] The lumps are there, however, which is why the child's letter bemoaning that if Pluto is not a planet then the "poeple [sic] who live there . . . won't exist" (p. 123 fig.6.4) is so touchingly confused. To Rorty,

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13. *See generally* SAUL A. KRIPKE, NAMING AND NECESSITY (1980); HILARY PUTNAM, MIND, LANGUAGE AND REALITY 215–71 (1975).

14. Richard Rorty, *Texts and Lumps*, 39 NEW LITERARY HIST. 53, 60 (2008).

15. Even Rorty does not think it is pragmatism all the way down. He notes that when Galileo saw the rings of Jupiter, the "impact on his retina was 'hard' in the relevant sense." *Id.* at 56.

16. *Id.* at 55.

there is no difference between science and literary criticism. Everything is just a story that we wish to tell.[17]

One might be skeptical with respect to planets (we might relegate them to nominal kinds) while still maintaining that there are right answers to other scientific questions, and thus, to the true nature of natural kinds. But there is reason for caution even here. Thomas Kuhn rejects the notion that scientific theories progress closer to getting to what is "really there," that is, to truth.[18] Other skeptics argue that our entire scientific artifice may itself be contingent.[19] We aren't just stipulating *planethood*; we are constructing quarks, say these theorists. So much for one true science.

Even retaining our faith in science, there are some questions to be asked. Who says that scientists get the final word on meaning?[20] Assume that we can get a drop of a clear liquid that we call "water." Recall that according to the Kripke-Putnam view, what we call "water" will be determined by our best scientific theory—that water is H_2O. Other things you associate with water—transparent, liquid, odorless—are just stereotypes; the *meaning* of *water* is determined by its extension—H_2O. You may have something clear and odorless that is indistinguishable from water to the average Joe, but if it is made of XYZ, it is not water.[21] Conversely, if you have something opaque, black, and soupy, that can still be water if it is made solely of H_2O. Scientists tell us the meaning of our natural-kinds terms; the characteristics we associate with natural kinds—the stereotypes of color, transparency, etc.—are not what the term means.

The Pluto debate asks the question of whether scientists do indeed own the meaning of natural kinds. A scientist would tell you that the liquid in your glass that you call "water" is not water.[22] After all, the glass is full of impurities. Additionally, even if scientists told us that something that looked and smelled like oil was really just H_2O, would we agree and call it water? As Dennis Patterson notes, we don't call onions and garlic *lilies*, but they belong to that family, nor do we call vultures *hawks* or butterflies a type of *moth*, and yet they are.[23] Conversely, Patterson notes that *tree,* a concept used daily, does not exist within scientific taxonomy.[24] When the public pushed back against Pluto's reclassification, the public was denying that

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17. *See id.* at 57–58.

18. *See* THOMAS S. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS 205–07 (3d ed. 1996).

19. *See* IAN HACKING, THE SOCIAL CONSTRUCTION OF WHAT? 63–99 (1999) (discussing these positions).

20. The sort of argument necessary to distinguish water, as a natural kind, from Coca-Cola (which isn't) may itself rely on the very pre-Kripke type of conceptual analysis discredited by Quine. *See* Jerry Fodor, *Water's water everywhere*, LONDON REV. BOOKS, Oct. 21, 2004, *available at* http://www.lrb.co.uk/v26/n20/fodo01_.html.

21. This is Putnam's "Twin Earth" example. *See* PUTNAM, *supra* note 13, at 231–35, 270.

22. *See* Dennis M. Patterson, *Dworkin on the Semantics of Legal and Political Concepts*, 26 OXFORD J. LEGAL STUD. 545, 551–52 (2006).

23. *Id.* at 552.

24. *Id.*

scientists had the authority to determine the meaning of *planet*. Science "is for everyone" (p. 74).

Finally, there are those who would deny that theories of reference are where the answers lie. Scientists have mistaken theories. When they discover the mistake, sometimes they give up the theory, and sometimes they change it. We have atoms and electricity; we don't have phlogiston or caloric fluid. But scientists were wildly mistaken about all four. What distinguishes the former group from the latter?

Stephen Stich argues that the answer may just be a bunch of extra-scientific factors. Stich spent years as an "eliminativist," arguing that neuroscience would reveal that beliefs *don't exist*—our folk psychology was just a bad theory. In 1996, he changed course. He realized that even if folk psychology is a bad theory, it does not mean that beliefs do not exist. He implicitly relied on an additional theory—a description-based account of a theory of reference, whereby theoretical terms don't exist if the theory that posits them is fundamentally misguided.[25] But other accounts of what a term means are far more promiscuous—so long as there is an appropriate causal chain from how the word was first introduced to now, the word can encompass that term.[26] Stich decided that adjudicating theories of reference was ultimately beside the point. Sometimes science keeps the term and sometimes it ditches it. He catalogues the adjudicating factors as (1) sometimes no one cares whether we keep the term or not; (2) sometimes there are implicit previous agreements about what the effect of a discovery will be; (3) sometimes there are social and political factors about the relevant science; and (4) sometimes there are broader social and political factors.[27]

Because lots of people (some even over nine years of age) cared about Pluto and because there clearly was no previous agreement, let us focus on the last two and their effect on Pluto's status. First, there are the internal politics of the scientific community.[28] What were we to say about the discovery of the Kuiper belt? Clearly, placing Pluto as its leader strengthened this new scientific finding. Conversely, it was hardly illegitimate for scientists to be concerned that it was hard to justify funding the New Horizons mission to travel to Pluto if it was just another trans-Neptunian object.

As for the broader political concerns, there were many here too. The pseudo-demotion of Pluto by the Rose Center was, well, downright ballsy. After all, the headline, "Pluto's Not a Planet? Only in New York" invited negative publicity about a site that needed to make money, not enemies. (On

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25. *See* STEPHEN P. STICH, DECONSTRUCTING THE MIND 31–37 (1996); *see also* David Lewis, *Psychophysical and Theoretical Identifications*, 50 AUSTRALASIAN J. PHIL. 249 (1972) (discussing description-based theory of theoretical terms).

26. *See* STICH, *supra* note 25, at 35; *see also* KRIPKE, *supra* note 13, at 91–97 (advancing causal theory of names).

27. *See* STICH, *supra* note 25, at 67–69.

28. *See id.* at 68; *see also* PATRICIA SMITH CHURCHLAND, NEUROPHILOSOPHY: TOWARD A UNIFIED SCIENCE OF THE MIND/BRAIN 283–84 (1986) (noting the social and political factors within the sciences that affect when theories are kept and discarded).

the other hand, maybe some tourists wanted to see the exhibit themselves after all the press.) And then there were all those defunct textbooks. This, too, may be seen as being motivated by an antiplanet, as opposed to anti-Pluto sentiment. It was an effort to change the discourse. *The Pluto Files* thus presents a compelling prism through which to question our commitments to realism and natural kinds.

C. *Lumping and Splitting*

Whether planets are natural kinds or nominal ones, at the end of the day, any classificatory system must lump and/or split. Students may be given pass/fail grades, or A's, B's, and C's . . . , or even A+'s, A's, A-'s, etc. Because we are always trying to group cases that are not exactly the same, the critical question becomes when to lump and when to split.

So, too, with Pluto. At first, before other Kuiper belt objects were discovered, the problem seemed to be that no one knew how to split Pluto. It was different from the other planets, but it was also different from everything else. Tyson cites scientific dogma that you can't have classes of one (p. 53), but for this reason, scientists were stuck. Pluto did not make sense.

But then other objects were discovered, and they clearly belonged with Pluto. Pluto now had a lump (not a Rortian lump, mind you) of its own. But the question was whether to lump the Kuiper belt objects with the terrestrial and Jovian planets. The problem was again that science could not tell them the answer. There was no set standard in science as to when to lump and when to split. The asteroids were split, thus lending support to splitting off Kuiper belt objects. But terrestrial and Jovian planets are lumped, so why not lump ice planets as well? Indeed, Bill Nye the Science Guy advocated just this—let Pluto and the other large Kuiper belt objects count as planets, and then use various adjectives to teach about their differences (p. 106). Although the scientists sought principled classification schemes, they seemed to lack the criteria necessary to determine when it was they would lump and when they would split. They needed to determine the purpose of the category to determine whether lumping or splitting made sense. Space couldn't give them the criteria for *planet*. Man had to pick a principle by which to classify the universe. Man had to decide.

Splitting or lumping Pluto had real repercussions. Funding for scientific projects turns on the importance of the question. The proponents of the New Horizons mission were invested in Pluto's planethood.

The categories also matter because of their ultimate effect on how we *perceive* our world. While we cognitively distance 119 pound (bantamweights) from 120 pound (featherweights), we cognitively group 120 pound featherweights with 125 pound featherweights.[29] The category of planet creates less distance between Pluto and Saturn than between Saturn and a moon (even one bigger than Pluto). This creates expensive distortions of our

29. Eviatar Zerubavel, *Lumping and Splitting: Notes on Social Classification*, 11 Soc. F. 421, 425 (1996).

universe. The drawings on the Pioneer 10 and Pioneer 11 space probes, although intended as maps of our solar system for aliens, are so inaccurate that "an actual alien who used this map in search of our solar system would surely pass us by, certain our map was for some other star system and not the Sun's" (p. 40 fig.3.6).

But before one thinks this is further support for Pluto's demotion, the new nomenclature of "dwarf planet" hardly solves the problem. "Dwarf planet" groups some Kuiper belt objects (including Pluto) with Ceres, the asteroid, leading us to further question what this nomenclature does except to arbitrarily mark size.[30] And Mercury remains a planet despite its being closer in size to Pluto than Jupiter. Ultimately, any decision was going to make a sharp distinction across a continuum of properties. We are trapped: we classify to understand the world, and those classifications affect our very understanding of it.[31]

III. WHAT LAW CAN LEARN FROM PLUTO'S DEMISE

Conceptualizing and categorizing is an inescapable human practice in both law and science. The troubles that plague *The Pluto Files* also resonate for legal theorists. Below, I sketch how *The Pluto Files* illuminates our legal discourse.

A. *Realism and Natural Kinds Reprised*

Law relies on our understanding of the world. This problem arises with respect to the question of legal determinacy: the question of whether there are unique right answers to even the most difficult legal disputes. Some theorists argue that these questions can be settled by a theory of reference—that is, by what these terms *really refer to*.[32] This is a view of discovered truths and natural kinds. Because people are more likely to be realists about science and conventionalists about other categories, let us stick with science. If there are problems with realism with science, then there are likely problems elsewhere.

Consider a will wherein the testator donates her organs to a hospital, and according to the applicable statute, "The gift becomes effective upon the death of the testator without waiting for probate."[33] It seems crucially important that the doctor only hands over the organs when the testator is dead. Michael Moore argues that *death* is a natural kind, and what we mean by *death* in a statute is what death "really is" as evidenced by our best scientific

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30. *Cf.* p. 132.

31. And with people, our understanding of ourselves. *See* HACKING, *supra* note 19, at 32 (explaining that classifications in social science are interactive as people learn they are classified in a certain way and then adjust their behavior accordingly).

32. *E.g.*, Moore, *supra* note 1.

33. 20 PA. CONS. STAT. ANN. § 8613(a) (West 2009).

theory of the time.[34] Meaning, therefore, does not "run out."[35] We will not be left "speechless" when we encounter something new, because meaning always refers to the way the world really is.[36] According to Moore:

> Statutes that prohibit murder, allow transplants of organs, regulate burial, regulate life support systems, and transmit property by will or by intestacy, are best applied when someone is really dead. . . . For we do not want (conventionally) "dead," but really alive, donors to lose their hearts or kidneys any more than we want the plug to be pulled or property to be taken from "dead" but alive persons . . . . We are hopelessly realist in our metaphysics so that it is easy to say that these results would be worse and their opposites better.[37]

Moore makes a compelling case that we are realists. But consider *The Pluto Files.* Should we have doubts? Moore presupposes that science does not rely on convention, but as we have just seen, that may not be the case. Additionally, critics argue that even if there is something that is what death "really is," we lack any epistemic access to it. We are always caught inside our world and our practices. The world cannot provide a check on our linguistic practices, as it cannot tell us what is *right.* Nor can we ask these questions without imposing human linguistic practices on the world.[38] Indeed, consider Hilary Putnam's argument for *internal realism.* As Putnam explains, to count "objects" in a room, one must determine—one must have a "convention"—as to whether we count only the tables, lamps and chairs, or whether we include the people, or whether we include the particles making up the people, tables, lamps, and chairs.[39] Then, once we have selected a convention, there is a correct answer.[40] These arguments dispute the realism that Moore presupposes.

Let us return to the example of death. At first, Moore seems to have the stronger argument here. Cutting someone up who can be revived does not seem to be a good idea, and it is not a good idea because our scientific knowledge tells us so. However, it is fair to assume that in the 1800s, we lacked the scientific knowledge that some individuals could be revived (assume that this isn't a matter of needing better equipment, just better knowledge). Should we say that those people *were not dead*? An antirealist, contra Moore, would claim that we cannot understand death independent of our minds and/or conventions.[41] Moore's realism, in contrast, mandates that the meaning of *death* never changed.

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34. Moore, *supra* note 1, at 294.

35. *Id.*

36. *Id.*

37. *Id.* at 326–27.

38. DENNIS PATTERSON, LAW AND TRUTH 48–49 (1996).

39. HILARY PUTNAM, REPRESENTATION AND REALITY 110–12 (1988).

40. *See* HILARY PUTNAM, THE MANY FACES OF REALISM 33 (1987).

41. *See* MOORE, *supra* note 8, at 344–45.

Although antirealists dispute that truth is unmediated by human conceptualization, Rorty's pragmatism takes this one step further. Was the person dead or not? To Rorty, there is no right answer. He rejects the possibility that there is a truth of the matter. Rorty is disputing that there is a correct metaphysical position, realist or antirealist, as he rejects the entire debate.[42] Notably, Rorty's argument is thus oddly self-defeating because one does not know what it would mean to accept Rorty's position as *true*, given that he rejects the very possibility.[43] To Rorty, our ability to determine the meaning of *planet* is equivalent to our ability to determine the meaning of *death*. Both must simply fit within the stories we want to tell.[44]

Even assuming that "what death really is" is a fact to be discovered, it does not follow that law should follow scientific meaning. That is, if a legislature thinks that a dolphin is a fish, then one may argue that deference to our legal system's construction of these terms require us to follow the legislature and treat dolphins as fish.[45] Certainly, it may be the case that a legislature *intends* to adopt the best scientific theory of the time, such that death's legal meaning will follow our best scientific theory about what death "really is," but that is not a given.[46] We may agree that our terms refer to what they "really are," but it is that agreement that determines what the meaning of the term will be for law.[47] Indeed, even in Moore's work, his arguments to follow reference depend on their consonance with rule of law values. For instance, Moore argues that "keeping legal meanings close to ordinary meanings enhances predictability in the application of law, and hence, liberty."[48] Law must ask not only what the scientific right answers are (if there are indeed such answers) but also whether it should follow science's lead or construct its own meanings.

B. *Charting the Legal Terrain*

Even for those who doubt *planet* is a natural kind, there is much to learn from the struggle to systematize the solar system. One might find Pluto's downfall to be most directly analogous to the way that theorists try to chart the legal terrain. Many categories in law are thought to serve a particular

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42. MOORE, *supra* note 8, at 365–70.

43. *See id.*

44. It is also worth noting that Rorty's pragmatism offers little to the critical left, who don't want their narratives to be incommensurable with the stories of the empowered elite, but rather to displace those of the empowered elite. Rorty's position, however, is that this is an unattainable (and uninteresting) goal. *See* William G. Weaver, Note, *Richard Rorty and the Radical Left*, 78 VA. L. REV. 729 (1992).

45. The example is Patterson's. *See* PATTERSON, *supra* note 38, at 56.

46. *See* Brian H. Bix, *Can Theories of Meaning and Reference Solve the Problem of Legal Determinacy?*, 16 RATIO JURIS 281, 288–90 (2003).

47. *See* Moore, *supra* note 1. Bix doubts that this can resolve all questions, particularly those instances in which the legislature intends to change the meaning of a term. Bix, *supra* note 46, at 291.

48. Moore, *supra* note 1, at 321.

function, just as *planethood* might mark a relevant distinction in astrophysics. For example, criminal law theorists attempt to categorize defenses into justifications and excuses. Many theorists argue that the distinction is valuable to send clear moral messages, provide theoretical consistency in criminal law, determine the liability of accomplices, tell third parties the permissibility of intervention, determine the retroactivity of a defense, and assist in the assignment of the burden of proof.[49] Although there is now abundant literature on the nature of justification, there is still no agreement as to what a *justification* is.[50]

This lack of agreement is problematic. Consider one legal question. Alice honestly and reasonably believes that Betty is attacking her so Alice shoots Betty. As it turns out, Betty was rehearsing for a play and did not pose any threat to Alice.[51] Criminal law theorists debate whether this case is an instance of justifiable self defense. Objectivists claim that self defense turns on the way the world really is so Alice is not justified; subjectivists argue that Alice did what a reasonable person would do and acted permissibly, and therefore justifiably; and dual theorists require both right deed and right reason and thus reject that Alice acted justifiably.[52]

We aren't getting anywhere in the debate over the nature of justification and the reason is that without consensus as to what the function of *justification* is supposed to be, we cannot achieve consensus as to the theory of the concept. The justification/excuse debate can be reasonably summarized as a debate among (1) those who believe that justifications should serve the function of conduct rules; (2) those who believe that justifications should serve the function of fairly labeling those who act in ways we deem permissible; and (3) those who believe that justifications serve the function of mirroring a conceptual relationship between offenses and defenses.[53] But if theorists expect their conceptual categories to do different work, they will never achieve any agreement on the content of the categories. We simply continue to talk past one another. One of the lingering questions with respect to Pluto is, "What work does this category planet do?" The same question applies for law.

Pluto's demotion also warns of clinging to categories past. First-year property students suffer through the intricacies of real covenants, promises concerning land that are enforceable only if numerous complicated elements

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49. JOSHUA DRESSLER, UNDERSTANDING CRIMINAL LAW § 17.05 (5th ed. 2009).

50. For a survey of the debate, see Kimberly Kessler Ferzan, *Justification and Excuse, in* OXFORD HANDBOOK ON THE PHILOSOPHY OF CRIMINAL LAW (David Dolinko & John Deigh eds., forthcoming 2010).

51. I am oversimplifying this hypothetical. I think "reasonableness" and "threat" are complicated assumptions. *See generally* Kimberly Kessler Ferzan, *Justifying Self-Defense*, 24 LAW & PHIL. 711 (2005). But this is sufficient for our purposes.

52. *See* Ferzan, *supra* note 50 (manuscript at 11–25, on file with author).

53. *See id.*

are met.[54] The complexities of real covenants gave rise to equitable servitudes.[55] Now, the American Law Institute, like the IAU, is stepping in with the Restatement (Third) of Property to replace this complicated taxonomy and better unify the practice of law with just one category of servitudes.[56] Here, we inherited from our predecessors a taxonomy that no longer works but is deeply entrenched and therefore hard to pry from current practice. Just as later scientific discoveries may render *planet* obsolete, so, too, may our progress in property. And, of course, this is just the tip of the defunct-category iceberg.

C. *Lumping and Splitting in Law*

Beyond the question of charting the terrain, there are the hard edges that come at the point at which we split the lumps. The business of law is to make distinctions, and sometimes we make distinctions between items along a continuum, where those distinctions have profound consequences.[57] One day matters for a statute of limitations. The difference between murder and manslaughter in terms of punishment may be significant, but given that manslaughter is causing a death recklessly and murder may be committed by causing a death extremely recklessly (depraved heart), this is a difference in degree and not in kind.[58] Even moral gradualists about abortion recognize the law must draw a bright line.[59] Tax law also faces inescapable line-drawing problems.[60]

The struggle over what it means to treat similar cases similarly exists throughout the law, as we determine what to include and what to exclude in the comparison. At times, it seems there is no principled reason to draw the line precisely at the point at which it is drawn, splitting on one side and lumping on the other. This is why some of the equality arguments in *The Pluto Files*—for instance, the political humor in the cartoon in which Pluto

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54. *E.g.*, Barner v. Chappell, 585 S.E.2d 590, 594 (Va. 2003) ("A restrictive covenant is enforceable if a landowner establishes: (1) horizontal privity; (2) vertical privity; (3) intent for the restriction to run with the land; (4) that the restriction touches and concerns the land; and (5) that the covenant is in writing.").

55. *E.g.*, Gambrell v. Nivens, 275 S.W.3d 429, 437 (Tenn. Ct. App. 2008) ("Covenants that fail the more exacting requirements for real covenants at law may still be enforced in equity as an equitable servitude.").

56. RESTATEMENT (THIRD) OF PROP.: SERVITUDES § 1.4 (2000).

57. *See generally* Larry Alexander, *Scalar Properties, Binary Judgments*, 25 J. APPLIED PHIL. 85 (2008); Leo Katz, Why the Law is Either/Or (2008) (unpublished manuscript, on file with author) (discussing the radical discontinuities in law and why they are inevitable).

58. Moore argues that drawing the line creates the need for a state that marks the distinction. He claims that law creates a *functional kind*. MOORE, *supra* note 8, at 348–49. By this analysis, *planet* and *justification* are functional kinds.

59. Margaret Olivia Little, *Abortion and the Margins of Personhood*, 39 RUTGERS L.J. 331, 346 (2008) (advocating a moral gradualist position but recognizing that law "is perforce crude").

60. *See* David A. Weisbach, *Line Drawing, Doctrine, and Efficiency in the Tax Law*, 84 CORNELL L. REV. 1627, 1679 (1999) (arguing that distinctions should be drawn not on the "platonic meaning" of the terms, but based on external considerations of efficiency).

alleges "mass-based discrimination" (p. 60 fig.4.4) and the joke headline, "Republicans Shrug off Glass Ceiling for Dwarfs, Asteroids" (p. 125)—somehow ring true.

Indeed, the challenges of categorizing Pluto resonate with fundamental questions about established doctrinal lines in law. As one final example, consider Jay Feinman's analysis of the tort/contract distinction.[61] Feinman discusses the problem of whether nonphysical injuries caused by defective products should be considered contract or tort cases. Feiman discusses a pair of irreconcilable cases: if a mobile home leaks, it is a contract case, complete with the Uniform Commercial Code's allowance of limits of liability, but if the rug padding is flammable and causes a fire, it is a strict liability tort case.[62] The classification problem, Feinman argues, is grounded in the problem with the tort/contract distinction itself. In place of tort and contract, Feinman offers suggestions including more narrow paradigms such as employment law or products, broader paradigms such as utility maximization, or relational paradigms that emphasize normative categories.[63] Just as Tyson thought that *planet* should give way to more meaningful categories of weather, density, or rings, so, too, Feinman argues that our most basic legal categories may be in need of reexamination. Categorization is an inescapable human endeavor.

CONCLUSION

Although we may be, as Moore claims, "hopelessly realist in our metaphysics,"[64] the battle over Pluto's classification is a fascinating prism through which to address the philosophical commitments that lie at the heart of science and law. Though we may simply reject that *planet* is anything more than a mere stipulation, the scientific resistance to Pluto's continuing status as a planet reveals that scientists thought that *planet* had a meaning that was to be discovered, not constructed. For some, then, there is one right answer to Pluto's status, whereas for others, Pluto's demotion is as attributable to the personal, social, and political factors as it is to any empirical fact. At the end of the day, whether Pluto is a planet or merely Mickey's pet dog, we on Earth must find a way to make sense of it. This struggle, to find and/or create meaning in the world, is as central to the practice of science as it is to the practice of law. Humans must often construct the categories they need and want.

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61. Jay M. Feinman, *The Jurisprudence of Classification*, 41 STAN. L. REV. 661 (1989).

62. *Id.* at 687.

63. *Id.* at 713–16.

64. Moore, *supra* note 1, at 327.