

2 POWER AND POSITION

ON DINGOES AND CLASSIFICATION

The image of the Australian dingo has become something of a cultural and scientific flashpoint of late. In the United States, the dingo is perhaps most popularly associated with the phrase, *The dingo ate my baby!*, referring to a tragic moment in Australian history when a nine-week-old baby was reportedly killed by a dingo in the Uluru region while on a family camping trip. The baby's mother, Alice Lynne "Lindy" Chamberlain-Creighton, reportedly uttered a similar phrase to her husband, upon noting her child missing while also seeing a dingo fleeing their tent. The child's body was never found. Chamberlain-Creighton was initially convicted of the child's murder but was later released from prison upon a reevaluation of the evidence. Since this incident, many sources in US popular media, including *Seinfeld*, *Saturday Night Live*, and *The Simpsons*, have made light of this tragic situation. A film, *A Cry in the Dark*, also dramatized the circumstances.

The seriousness of this event and the prevalence of this vignette in popular culture have cast a shadow on the dingo, painting it as a social menace to be feared. In Australia, however, the dingo has a dual identity: as both a menace to farmers and a cultural and ecological icon for many indigenous groups. The overriding question is, should dingoes be protected, or killed as a pest to society? Do the farmers prevail, or the indigenous cultures that value the spiritual aspects of the organism? The conflict between these positions comes down to a simple (but actually not so simple) matter of categorization: Is the dingo an ancestor of a wild, untamed dog, or is it, in fact,

a feral domesticated dog that has been reintroduced into the wild (Ballard and Wilson 2019; Smith 2015)? The former designates it a bona fide species that merits saving, whereas the latter qualifies the animal as a menace.

The dingo has long been a target of the Australian government because of its risk to livestock, pets, and humans; they were declared pests in the 1885 Amendment to the Marsupials Destruction Act. Additionally, current proposed revisions to the Declared Animal Policy under section 10 (1)(b) of the Natural Resources Management Act 2004, “Wild dogs and dingoes,” allows for, and in many cases mandates, the controlled eradication of “the pest” through the use of baits, shooting, and trapping (Office of Parliamentary Counsel 2020). Most famously, however, is the Dingo Fence, built from the 1880s onward to keep dingoes out of fertile farmland (Allen and Fleming 2004; Allen and Sparkes 2001). In 2019, Western Australia’s minister for environment, Stephen Dawson, went so far as to threaten that he “will make an order that determines that the dingo is not fauna for the purposes of the Act” (Bamford 2018).

Oponents of this eradication campaign contest the law on multiple grounds. In an open letter to Tim Whetstone, then minister for primary industries and regional development for South Australia, numerous academics pushed against the region’s proposed revisions to the Natural Resources Management Act 2004 (Cairns et al. 2020). They rebut the decision based on multiple grounds, including that dingoes serve as an important member of the ecosystem, in that the species keeps the native kangaroo and fox populations in check. Poison baiting, they argue, also endangers legitimate working dogs and other nontarget species, further enhancing detrimental effects on the environment. On top of this—and most pertinent to the categorization issue at hand—is that there is no definitive scientific consensus on whether or not dingoes are “wild dogs” and thus not worthy of national conservation. In many areas, including Victoria, Australia, dingoes are classified as threatened and therefore protected under the Wildlife Act 1975.

This classification of the dingo is a story of (at least two) conflicting hypotheses (Ballard and Wilson 2019; Smith 2015). The first assumes that the dingo, introduced into Australia between 3,500 and 12,000 years before the present is not a feral wild dog, as indicated in legislation (Smith

2015). In line with this argument, the ecological niche dingoes filled upon entering Australia made them a unique species. Multiple points of evidence point to this fact, including skull morphological features and behavioral and breeding patterns, as well as genetic evidence (Smith 2015; Ballard and Wilson 2019). For the government to overlook this evidence means its policies are essentially endangering one of Australia's truly wild species. As outlined by Bradley Smith "As soon as the dingo arrived [in Australia], any influence of artificial selection ceased; it has undergone more than 4000 years of natural selection. If modern populations of dingoes were essentially the same as modern domestic dogs, that would suggest a rather remarkable lack of effect for natural selection shaping the dingo since its arrival in Australia" (2015, 74–75). This leads Smith to conclude that dingoes should be classed not as a feral dog (*Canis familiaris dingo*), as presently designated, but as a unique species reflected by the nomenclature *Canis lupus dingo*.

On the flip side of the coin we find proponents of the "wild feral dog" hypothesis. Under this assumption, the dingo began as a wild ancestor that was tamed in Southeast Asia before entering the ecology of Australia, where it was subsequently domesticated by human communities. This Asian domestication is the primary factor differentiating the second hypothesis from the first. Over time, domesticated dingoes strayed from human communities and began to live more self-sufficient lives in the wild as feral cousins to their tamed counterparts (Ballard and Wilson 2019, 4).

This dingo narrative is still very much in development in Australia, with little to no indication that the argument will be settled any time soon. In the meantime, however, the fate of the dingo as a biological, social, cultural, and natural object remains an open question. For the moment, they continue to be killed at increasing rates, which is unsettling on a number of levels given these disagreements. Irrespective of the eventual outcome of this debate, however, this story presents us with a series of complexities that are expounded throughout the course of this book: biological classifications have aesthetic, biological, cultural, and social forms of power. Multiple issues are at stake here, both ethical and economic, including whether we will "allow" an organism to exist in the world (that we have the power to make such a decision is sobering enough); whether tribal

communities have a right to maintain a sacred population of animals (as if we have the right to adjudicate religious belief); and, finally, whether the farming industry is sustainable in the heartland of Australia (do domestic animals have more essential rights to live than wild animals?).

In light of these complexities, in this chapter we define how power functions both epistemically and materially in relation to classification systems. We also begin the process of imagining how we can model the operationalization of this power over the social and natural worlds.

POWER IN GENERAL AND INFORMATION STUDIES

It is important to articulate straight away what we mean by power, especially given that the term is so widely used within the context of information studies (IS) and that the concept will frame our subsequent examination of biodiversity classifications. Power is a basic and essential attribute of classifications, in that power exists regardless of whether or not we intend for it to be present. That is, even if you wanted to, you could not create a biological classification system that didn't exert some level of control over the natural world it is intended to organize. Control is one of the core reasons we classify. As George Lakoff wrote, "without the ability to categorize, we could not function at all, either in the physical world or in our own social and intellectual lives" (2012, 30). To categorize is to iteratively gain a better understanding of the world—to navigate that world, and to manipulate that world to our benefit. Categorization also helps us situate ourselves in relation to the world around us. Yet, despite its use in the IS field—to positive means and ends—the definition of the term "power" remains provokingly unspecific.

Generally, when we speak of power socially, we understand the existence of a dynamic in which Person A might have some advantage, control over, or privilege in relation to Person B. Metaphorically, one way to characterize having power is to imagine an individual having some authority, potential, or agency that is "over" or "beyond" some other person's authority, potential, or agency. In the realm of knowledge, a person might have access or be privy to knowledge in a way that puts them at an epistemic

advantage in relation to other people. Power can also extend beyond the individual, to groups and communities. Minoritized communities for example, can be said to lack power in many senses. That disadvantage may be of language, of civil structures working to favor white epistemic constituents, or perhaps of economic hardship. Power, according to Miranda Fricker, is the “capacity we have as social agents to influence how things go in the social world” (2009, 9). In the case of members of a minoritized community, perhaps they do not have access to libraries or other social institutions that provide access to civic information. Community members are therefore less able to participate in democratic processes and have less capacity for bettering their lived circumstance.

Power can also be understood structurally, as part of established social infrastructures, technologies, and systems. As posited by Gerhard Göhler, structure and agency often work alongside each other and are complementary. “Human agency produces structures which simultaneously serve as the conditions for [the] reproduction of human agency in a continuous process” (2009, 30). When power is structural, it is often diffuse and not easily locatable within a given part of a system. In the case of biodiversity classifications, for example, the dingo might be classified as a “feral dog,” but we may not have entrée into the processes that made this classification so. Policies and decisions for large systems are often made by many people and may involve following systemically derived processes and standards. Answering the seemingly simple question, “How did the dingo get classified this way?” can be far more complicated than it might seem. This makes power difficult to control and leverage in systems. Part of the function of this discussion is to expose where forms of power reside in classifications and how we might mitigate or enhance their influences.

We can ask this question, for example: Where do we put pressure on a classification to rebalance the distribution of powers to make it more just in relation to the wild dingo population? We might look to the forms of evidence used to delineate the taxon concept of the dingo, or whether it was properly articulated as a species taxon in relation to other organisms. We might also interrogate how much credibility the classification builder gave to indigenous forms of knowledge that hold the dingo as sacred.

Similarly, we can look to the governmental processes that facilitated the decision to use *this* classification of the dingo over any other. To make a classification more just, following the terms stated above, intervention is often required at multiple locations within the classification. Such change might require changing the attitudes of individuals (such as the particular scientist responsible for building this classification), or it might require more systemic changes that go above and beyond an individual, which might involve many actors (such as a reevaluation of governmental policy). Likewise, if we look to the consensus classification put together by the Catalogue of Life, we see that power is manifest in multiple locations: through decisions made by the executive editor; through a host of standards, policy documents, and partnership agreements; through the subsidiary policies of contributed taxonomies; through government regulations or scientific norms that dictate particular taxonomic needs; and so on.

Structural power also grows stronger the longer classifications exist, as they become more embedded in the social structures of our daily lives. In the case of the Catalogue of Life, the more databases that implement its management taxonomy as core data architecture, the more power it has over the biodiversity scientific environment. Species names, for example, are often embedded into governmental law, which makes changes to taxonomic names especially cumbersome. Let us take the case of the unassuming, tiny delta smelt and the surrounding battle over water rights in California (Savage 2015). Caleb Scoville's (2019) article, "Hydraulic Society and a 'Stupid Little Fish': Toward a Historical Ontology of Endangerment," outlines the complex interrelationship between the delta smelt (*Hypomesus transpacificus*), the Endangered Species Act, and the Metropolitan Water District of Southern California. A 2007 ruling by the US District Court of Eastern California impeded the rerouting of water from the Sacramento–San Joaquin Delta to Southern California based on the Endangered Species Act protection of *Hypomesus transpacificus*. The fact that the endangered species *Hypomesus transpacificus* exists at all was thanks to the increasing focus on the delta as an environment hot spot, which prompted an in-depth examination of the fish. Canadian ichthyologist Donald McAllister was responsible for distinguishing the pond smelt (*Hypomesus olidus*), which included

the species currently inhabiting the delta, from the new delta-specific species (*H. transpacificus*) based on minor morphological attributes. In legal terms, the species *H. transpacificus* holds particular protection, but any change to this taxonomic name in the future can have detrimental effects on the conservation of the species. In this way, classifications find stronger and stronger footing in embedded national and global systems over time.

Importantly, systemic power is not always explicitly active, but can be activated by its potential dispositional attributes. For example, Fricker (2009) notes how a traffic warden may have power over a certain driver by virtue of *potentially* fining them for illegal behavior. Legal regimes, then, control our actions by passively imposing a power over us. Michel Foucault's (1995) notion of obedience relies on this kind of power—the power of potential surveillance that is a primary mechanism of control and discipline. Or, for example, if we think about classifications specifically: a hypothetical classification that is good (one that is representationally accurate to world conditions and also just) has the potential to help us advance our position in society by providing knowledge sources that attend to our current needs. Even if we aren't using the classification at any given time, it has the *potential* to help us. This power can be viewed in a positive sense, as in, “I have the power to make myself more knowledgeable in the fields of *X*.” Or, “I am in the social position that allows me to pursue a graduate degree in luxury field *Y*.” Likewise, classifications have the potential to be detrimental to our being and health. For example, if I were a member of the LGBTQ+ community in the early 1960s, seeking out information about queerness would present me with the social reality that I was, in fact, experiencing a medical “disturbance” and participating in deviant and paraphilic behavior (Adler 2017; Drescher 2015).

Classically, in the domain of IS, we often discuss the power associated with, for example, the descriptions, aboutness statements, and classifications we apply to documents, books, or resources. A central text in this vein is Patrick Wilson's *Two Kinds of Power: An Essay on Bibliographical Control* (1968). In Wilson's view, the activities of organizing and describing documents are closely aligned with the concepts of power and control. Wilson emphasizes that power *over* documents influences one's epistemic

standing—a conclusion that becomes much more apparent in his later works on private and public knowledge (Wilson 1977, 1983). How adequately we describe the aboutness or content of documents is proportional to the quality, quantity, and usefulness of documents retrieved by some imagined individual. In this way, power over texts is power over knowledge. Knowledge-as-power, then, is power over cultural production and the ability to transmit that cultural identity from person to person and from moment to moment. Similarly, our goal when organizing concepts into classifications is, ostensibly, to take a world of entities (documents, organisms, digital images, and the like), to represent and relate them in some system, and then to provide bounded mechanisms for their retrieval. At each step we distill a world of chaos and fluidity into manageable webs of documentary simplicity. The process of distilling the complexity of the biodiversity world is to chronicle delicate fundamentally processual ecologies of organisms and to make sense of how each entity and group within that ecology relates, in some way, to another.

Key in Wilson's text is that the power is not inherent in or born of the bibliographical system itself, but that the power is, in fact, a quality imposed or provided by the person that does the describing. That power is then transferred to a person who subsequently uses that particular retrieval instrument to access information. Power is quintessentially a social phenomenon that takes place between individuals that participate within the same social domain. As such, power is used here in two senses: the power *to do* and the power *over*. The relationship between the *power to do* something and the *power over* something is intricate and complex and can be traced directly to classificatory systems and the organizations that design and maintain them. As Göhler states, the traditional distinction in the political sciences can be described thus: "*Power over* means power over people, enforcement of one's own intentions over those of others, and is thus only conceivable in a social relation. *Power to*, on the other hand, is not related to other people. It is an ability to do or achieve something independent of others. It is not a social relation" (2009, 28; emphasis original). But as Göhler concedes, the categories of *power over* and *power to* are inextricably linked. In one sense we can think of *power to* (latent and potential in its

capacity and thus dispositional) as a precursor to *power over*. That is, one should first have the capability to perform some action (the knowledge and professional position to classify, for example) before any external relational power can be exerted. But the chicken and egg argument applies here, for a person with *power over* capabilities is afforded the *power to* by virtue of some social privilege or position.

In Wilson's terms, power is articulated from the perspective of both the user of bibliographical systems and the classification builder. A person can have what Wilson calls "descriptive control," which, as you might gather, relies on a document's applied descriptions (in a catalogue, for example) to concatenate documents according to some metric—say an author's name, a subject term, or title. On the other hand, a person can have "exploitative control," which is a mechanism of collocation that prioritizes only those documents best suited to a person's situational need (Wilson 1968, chap. 2). Wilson's *Two Kinds of Power* also serves as a kind of rule book on how to design bibliographical systems that are more just and effective for individuals. Wilson describes the power to distribute information adequately and equitably as a property of both an individual and a group of individuals (as in his hypothetical Supreme Bibliographical Council in chapter 9) (1968). What stands in the middle of these two extremes—the builder and the user—are bibliographical technologies that, in Wilson's hypothetically perfect world, would directly transfer justness through the seamless elaboration of descriptive and exploitative powers. Yet, we (and Wilson, I think) know full well that such mediative technologies live only in our imaginations; bibliographical and classificatory systems are far more complex than a direct line between builder and user. As described by Montoya and Leazer, "Wilson was generally deflationary and skeptical of the role of KO [knowledge organization] and whether it could accomplish its objectives[;] he did not analyze how KO could be effective for some people or some forms of knowledge, and ineffective for others, nor did he analyze similarly the constitutive components of KO as they relate to the differential effects on the use of knowledge" (2019, 162).

That the bibliographical system serves as a conduit for the power imbalances means that more critical examinations of the construction and

distribution of power of and by classifications are necessary. To this end, we need a theory of power distribution in classifications as well as a method to decipher where this power lies in waiting.

CLASSIFICATIONS: PURPOSEIVE AND DERIVATIVE POWERS

Classifications have material and epistemic powers that are active and purposive (as in, intentional on the part of the producer of classifications), as well as derivative (as in, consequences that cannot be foreseen by the creators affect an individual or group's identity-shaping capabilities). Even the list, the most basic form of classification, is a powerful cultural technology that wields a great deal of external influence. The position of an entity on a list—biological or otherwise—can have drastic ramifications for it in the material world. As Liam Cole Young notes, “Serious ethical and philosophical stakes emerge that demand investigation, particularly regarding the role of lists in controlling populations and subjecting human beings to power” (2017, 67). Thomas Mullaney's *Coming to Terms with the Nation* displays these stakes in great detail in terms of the classification of ethnicity in China as part of the country's 1954 Ethnic Classification project. Recent arguments for changing the Library of Congress subject terms for “alien” and “illegal alien” to “noncitizens” and “unauthorized immigration” also express these powers (Aguilera 2016).

Take, also, the IUCN Red List as a prime example, which iteratively lists the most threatened species on the planet. The scale spans species of least concern to those that are critically endangered and extinct (IUCN 2019). The Red List is intended to be used as “a straightforward way to factor biodiversity needs into decision-making processes” (IUCN 2020). The Red List establishes a baseline for better understanding how nature is being affected by humanity's actions, and thus places a focus on those species most at risk of extinction. The Red List ranking is also used as an agenda-setting rubric around which scientific studies are focused and by which conservation resource allocations are established (Barr and Wilson 2018). The presence of an organism on the list, such as our polarizing dingo, if ever included, can affect the actions that a government or a policy maker

can or cannot take in response to certain species. If a species should be on the list, but is not, the ecological ramifications can be severe and long-lasting. But a list is just the first step in the operationalization of power as it is expressed within the medium of an organizational schema.

Acknowledging that classifications are constructed and purposive with regard to their social impacts is now fairly common in the IS discipline (and certainly in the biodiversity taxonomic community as well). We can thank the likes of Hope Olson (2002), Jonathan Furner (2009a), Joseph Tennis (2012), Melissa Adler (2017), and Safiya Noble (2018), among many others, for critically unveiling the mechanisms that lead to bias and social harms through and by classifications. This said, however, there still seems to be a social disjunct between *knowing* that they are constructed and actually attending to and offsetting their biased ramifications in our daily life. Part of this difficulty lies in the fact that rules for a classification system don't make themselves readily apparent. Good classifications, as Bowker and Star (1999) explicated, are those that integrate seamlessly into our experiential and epistemic fabric. Good classifications make it seem like they just *are*, and that they somehow represent a natural order of things. One of the lasting contributions of Bowker and Star's analysis in *Sorting Things Out: Classification and Its Consequences* is the approach that they posit for revealing the mechanics of classifications that are otherwise obfuscated from our direct view. "Infrastructural inversion" (Bowker and Star 1999, chap. 1) is the process by which classifications are deconstructed by means of interrogating their component, material parts, as well as the social contexts that influenced their design, construction, implementation, and maintenance. Infrastructural inversion sees classifications as a complicated intermingling of standards and networks that are influenced by various political and knowledge regimes (1999, 34). A suite of themes that can facilitate this analysis are then identified by Bowker and Starr; they include examining a classification's ubiquity, materiality, and texture; examining the historical narratives that led to its construction; investigating the politics of standardization and universality; and examining how all of these aforementioned attributes converge in points of both conflict and harmony. In this way a narrative of classifications can emerge by examining its component parts and their interactions.

The same type of deconstruction needs to be applied in the case of biodiversity classifications, to examine how power is exerted through the mechanism of classification and its attendant social and political contexts. Foremost in this analysis is that builders of classifications do, in fact, actively design classifications with certain epistemic slants. And just as Emily Dickenson's "certain Slant of light . . . oppresses, like the Heft" (Dickinson and Johnson 1997, sec. 258), these design decisions contribute to the impact these systems have on the external world and how they instantiate representations that then radiate outward and *define* a certain class of objects or subjects. To construct a classification is to situate entities in the external world by way of specific procedures, assumptions, and epistemic commitments. Part of this analysis includes ways for better understanding the organizational contexts of biodiversity classifications, which, among other elements, can help us understand the bodies of influence that dictate the intention, approach, and distribution of a particular classificatory technology.

If one were to take a Foucauldian approach to these classificatory spaces, we would see them as a discursive mechanism that filters the uncategorized natural world and "permits the visibility of the animal or plant to pass over in its entirety into the discourse that receives it" (Foucault 2007, 135). And, given that nature is "brought into" the discourse of scientific and popular language, the result is that we maintain control over the natural world, discipline it within the confines of predetermined standards, and manage these standards by virtue of laws, policies, and other acts of governance. On purely scientific terms, biodiversity science is an endeavor of love and a passion to catalogue: to give a name to the unique bodies of nature and to satisfy the same innate curiosities that have driven scientists, biologists, and philosophers for centuries. This same sense of wonder for nature drove Alexander Von Humboldt to the far reaches of the rainforest to redefine what it meant to exist within the complex interrelated network of the natural world (Wulf 2015). On a practical level, classifications are constructed to manage our relationships to the natural and, in an ideal world, used to balance human interests with the needs of a larger ecosystem we are a part of.

On the other hand, outside of these intended outcomes (such as classifications that take a clear side on whether the dingo is or is not a unique species known as *Canis lupus dingo*), a number of affects that classifications trigger may be unforeseen by the builders of classifications. In this vein, classifications have what we might call *derivative and dispositional power properties*, which are properties of classifications that can be *potentially* exhibited under the correct conditions or in new social contexts. Of particular note, the derivative effects outline the possibilities for identity formation. In the structuration of Miranda Fricker's argument, power is a capacity and a *potential*: "Capacity persists through periods when it is not being realized, power exists even if it is not being realized in action" (Fricker 2009, 10). This derivative power of classifications is latent unless explicitly activated by means of some social activity or policy enactment. This is not to say that the constructors of classifications are free of ethical obligations to these derivative effects, only that these consequences of their design and capacity are not necessarily foreseen. A scientist fifty years ago may have, with good reason, believed dingoes to be a wild canine and not its own species, but now, the social stakes for the dingo are far greater than that scientist could ever have possibly imagined. As Safiya Noble (2018) describes in relation to race representation in search engines, just because Google did not initially expect for keywords such as "Jew" and "black girls" to present primarily anti-Semitic and racist content does not mean that they are not culpable for the ill effects the search engine algorithm has on society. In fact, the responsibility for the missteps of classifications lies mostly with those who build them. This fact makes it all the more essential for IS to attend to the power dynamics implicit in the classifications we build and to find mechanisms to intervene and locate technical levers to ameliorate any issues.

The ethics of classificatory technologies is one of our greatest information concerns of late, as the prevalence and comprehensiveness of classificatory regimes are growing more influential daily. The line between the correct choice and the ethical one is constantly blurred in the forum of biodiversity work and beyond. A scientist knows full well that how the dingo is classified can determine the fate of the entire species. To classify biodiversity is to implicitly enter the realm of political action and activity

(Youatt 2015a). The delta smelt showed us how this might occur. And while an ethical scientist should (and would) never let politics and government dictate the interpretation of taxonomic evidence, the ethical implications of this evidence-based work should not be overlooked. We will return to this issue in chapter 8 when we speak of Jonathan Furner's (2018) push for a veritistic turn in IS. That is, we should see classification as a tool for the delivery of information that is not only relevant, but also just. And this ethic should influence the way we build these systems. It is incumbent on scientists to intervene into conservationist spaces and help influence governmental policy. The ongoing tensions between governments and conservationists highlighted by the dingo and smelt scenarios are common. The importance of taxonomic classification goes far beyond the classificatory work at hand, and such derivative powers need to be of greater interest in the field.

CLASSIFICATIONS: EPISTEMIC POWER

Two distinct powers of classification are most pertinent to my broader argument: epistemic power and material power. To have epistemic power is to have the capacity to control how others think about, express, and situate themselves in the world and in relation to others. The backbone of this argument is that classifications help us conceptualize our relationship to the social and natural world, aid in the constructions of our individual and collective identities, and also dictate how our identities are *positioned* in contradistinction to other people, animals, plants, and objects. To be categorized as LGBTQ+, or disabled, for example, is to also experience daily reminders of one's minoritized and disadvantaged position in society. To be classed in these categories is to be limited in terms of both our epistemic potential and our material potential. In the material world, being transgender might impact our ability to use public restrooms in some states, not to mention the physical violence that people experience when expressing these identities faithfully to the world. In this circumstance, transgender individuals suffer from what Miranda Fricker calls an identity prejudice. An identity prejudice is "a label for prejudices against people *qua* social type" (2009, 4–5), which ultimately affects a person's ability to maintain

social powers more broadly speaking. Materially, classifications can inhibit us from certain infrastructural or organizational opportunities and dictate how we navigate the social world. If some states get their way, to be transgendered may mean you are unable to use the bathroom of your chosen gender, which a person should have the complete right to do. Such derivative effects are central to the powers of classifications.

When we speak about epistemic powers, we are generally speaking about the impact classifications have on *people* and, more specifically, how their knowledge of the world and themselves is shaped by classifications. Miranda Fricker articulates how power might relate, or contribute to, two primary modes of epistemic injustice: testimonial injustice and hermeneutical injustice. Testimonial injustice is a form of “injustice that a speaker suffers in receiving deflated credibility from the hearer owing to identity prejudice on the hearers part, as in the case where the police don’t believe someone because he is black” (2009, 4). To be categorized as a certain kind of person means that you are limited in terms of your epistemic potential, both internally and externally. In short, your opinion and knowledge are undervalued, and the result is that you are less able to enact social change or influence the actions of others or for yourself. To be subject to hermeneutical injustices is to be unable to apprehend social position by lacking the tools of “social interpretation” (Fricker 2009). As noted by Robert Montoya and Gregory Leazer, “Hermeneutical injustice creates the circumstances for the emergence of both epistemic marginalization and powerlessness. It also outlines the recipe for the continued marginalization of a group that remains unchecked unless other epistemic interventions are enacted” (2020, 32). In Fricker’s mind, social and identity powers are heightened when one’s epistemic injustices are ameliorated through active modes of systemic intervention and change.

Epistemic effects have to do with one’s knowledge and identity, whereas material effects happen in the realm of the social world by virtue of our relationship with subjects and objects. When we speak about the material effects of classifications, we are asserting that they affect how a person experiences, navigates, and relates with the external world. Jane Bennett, in *Vibrant Matter*, describes “thing-power,” a peculiar mental and phase shift

with regard to objects that moves them from the realm of “stationary, inert thing” to the realm of the affective (Bennett 2010, chap. 1). Things become agents in their own right as they interact with the multitude of objects and subjects around them. Classifications are unique simply because they have the capacity to name what otherwise had no name and to identify it as an object, subject to certain social affordances. In one moment, a group of giraffes might seem to be of one species, and the next, it might be revealed that there are, in fact, four different species (Bercovitch et al. 2017; Fennessy et al. 2016). In this way, classifications manage our expectations about what *can* be in the world and how those objects or subjects might change the way we experience and interpret our experience of the world.

CLASSIFICATIONS: SPACE

How does the space of a classification exert its impact on the space of the lived, social world? If we look back to the anecdote of the dingo that opened this chapter, we see how powerful classifications can be when thought of in practical, ecological terms. The placement or position of an organism in a taxonomy has direct implications for the negotiation of their occupied space in the external world. Our class determinations save or eradicate the lives of species, which, however we may feel about any species in particular, is never a power we should wield lightly. There is a direct, if unanticipated, connection between classification and our lived, physical space. In documentary or bibliographic classifications such as the Library of Congress Classification System or the Dewey Decimal System, classifications are intended to organize *all* knowledge into universal structures, which is itself a form of control and power. Organizational decisions such as what to exclude, how to label entities or concepts, and the overall intellectual architecture of the classification are all spatiotemporally contingent, based on what culturally makes sense at that time. We know, however, that once we start creating hierarchies in these systems, some concepts are obfuscated or excluded, while others are brought to the forefront and emphasized. Over time we see subjects come and go, depending on current social norms and ideologies, such as Tennis’s examination of the subject term for eugenics

(Tennis 2012) or the inclusion of homosexuality as a pathology in the Diagnostic and Statistical Manual of Mental Disorders–2 (Drescher 2015).

Melissa Adler also expands on this material reality in her book *Cruising the Library: Perversities in the Organization of Knowledge*, where the categorization of “perverse” terms in the Library of Congress confines and constrains how we access and contextualize information on these subjects. In this sense Adler rightly believes that classifications are a technology of power that can potentially imprison domains of knowledge in institutional regimes such as the Library of Congress Classification (2017, 152). Adler’s poetics of the body is enticing here, for in her examination, the body of literature and the constraints placed on it within classification technologies affect the way we interpret and experience our physical bodies. The line between the representational space of the classifications and the space of the experiential, “real,” and social world is erased—a fact made uncomfortably visible when thinking about the inevitable fate that dingoes in Australia seem to be up against. Ronald Day proposes a “user” model that “views subjects and objects as co-emergences mediated through co-determining, contextual (or ‘structural’) affordances and through in-common zones of mutual affects” (2011, 86). In this way, context remains paramount in understanding how the “user” might benefit or be affected by being classed in particular ways.

Rebutting the false impression that classificatory technologies are truly representative of some reality is an ongoing task of the information professional—particularly those working in classifications. Tim Hawkinson’s play on perspective in his sculpture *Shrink* is a useful place to investigate the connectivity between objects and their representations in classifications (Rinder et al. 2005, 152–153). The sculpture involves a wooden chair whereon microfilament strands are attached at regular intervals along the full outline of the chair (see figure 2.1). These microfilaments then meet at a “vanishing point” tethered in place by a stick emerging from the chair’s frame. Tiny pieces of wood from the chair were then carried along the microfilaments to this vanishing point, resulting in a miniature replica of the chair seemingly suspended in midair. The piece is evocative precisely because of, as Lawrence Rinder notes, its “self-reflexive insularity,



Figure 2.1

Shrink, by Tim Hawkinson (Rinder et al. 2005). © Tim Hawkinson, courtesy Pace Gallery. Used by permission.

turning back on [itself] in an echoing loop of signification” (2005, 19–21). On one hand, you’re struck by the beauty of the sculpture’s visual symmetry and the ease at which the chair can be “modelled” using classical Renaissance-esque visual techniques of mathematical precision. Yet, on the other, while the model is precise, the interdependence between the representation and the object are tenuous and fragile. The connection between the sign and the signified is put into question as minor imperfections in the small model chair present themselves over time (I first saw this sculpture at the Los Angeles County Museum of Art in 2005, and by that time the wood fragments making up the suspended miniature chair had already begun to slip, highlighting the fraught relationship between reality and simulation).

In many cases, the relationship between the “represented world” and the “representing world” is assumed to have some degree of congruence, truth, or consistency (Rosch, Lloyd, and Social Science Research Council 1978, chap. 9)—that the space *there* is representative of the space *here*—but this cannot be further from the truth. We see this equivocation at work constantly, especially when we think about how the natural world is organized into species taxon compartments that fit, ever so neatly, into an evolutionary hierarchy. The world is, in fact, messy and continuous, and certainly not situated to easily compartmentalize in any

“natural” or essential sense. And yet, the classificatory representations we produce display them as if they are. On the whole, this is not necessarily problematic—after all, scientists take great pains to make biological classifications accurate, base results on evidence, and go through peer review like any other discipline. And every biodiversity taxonomist understands that classifications are constructed—the problem lies in the fact that users do not always acknowledge the same. But cognitive dissonance at the point of use creates a circumstance in which, when classifications are not questioned for the power they wield, enormous social problems are sure to follow.

Not all control is nefarious at its root, of course, particularly when we discuss those classifications produced in the taxonomic sciences. Taxonomists build classifications according to particular theories and methods, irrespective of their use. As Foucault discussed at length, the control of space within society is structurally embedded in the institutions built to discipline bodies, knowledge, and their attendant activities. Whether through the guise of a prison or of a school, space is used to situate people, dictate their movements, and manage their learning. Jeremy Bentham’s panoptic vision has now widened to include video surveillance, mobile tracking, and other locative media to further assess and direct the way we go about our daily lives. No doubt for good reason, surveillance in this sense evokes the negative connotations associated with *power over*. In *The Order of Things: An Archaeology of the Human Sciences*, life becomes the operationalization of what can be seen and nature becomes an *object* of knowledge that can then be transferred into language and inputted into a predetermined artificial system (Foucault 2007). This mechanism of control has to do with the establishment of order from chaos; to fix our gaze on singular objects that then become the seed for the study of natural history.

With all of this said, the compilation of lists such as the Catalogue of Life are scientific endeavors intended to both celebrate the diversity of nature *and* seek out the inherent natural relationships between species. But while the intentions are pure to the goal of advancing science, the act itself remains a means of control no less than in Foucault’s world—though the outcomes of biodiversity work may be far more beneficial than the dangers presented by unprecedented regimes of surveillance. What biodiversity

classification does do, however, is normalize nature into structural brackets that consist of standardization, temporal control, and mediated, carefully measured hierarchical arrangements. As Foucault states,

In short, the art of punishing, in the regime of disciplinary power, is aimed neither at expiation, nor even precisely at repression. It brings five quite distinct operations into play: it refers individual actions to a whole that is at once a field of comparison, a space of differentiation and the principle of a rule to be followed. It differentiates individuals from one another, in terms of the following overall rule: that the rule be made to function as a minimal threshold, as an average to be respected or as an optimum towards which one must move. It measures in quantitative terms and hierarchizes in terms of value the abilities, the level, the “nature” of individuals. (Foucault 1995, 182–183).

What is important to adopt from Foucault’s structure for our purposes is the nominational aspects of biodiversity work—the application of names, the delimitations of species taxa, the mediated and methodological approach of the work, and the production of relations through the application of particular metrics. Looking beyond Foucault, however, let us look to Henri Lefebvre and his thorough conceptualization of space to better understand how the representational space of the classification can be understood to relate to the lived experience of our natural world.

Henri Lefebvre is widely considered one of the major motivators for the “spatial turn” that transpired in the social sciences in the final decade of the twentieth century (Zieleniec 2018). One of Lefebvre’s contributions to twentieth-century philosophy is his assertion that space is the essential and foundational element on which all means of production exist and interact. According to Lefebvre, Marx understood “things” as embodying the “intersection of social relations and the forms of those relations” (2011, 81). Lefebvre also believed that space was defined by the interrelation of social actions, subjects, and objects. In *The Production of Space* (2011), Lefebvre tackles what he sees as one of the great problems in the philosophical field at that moment: until Lefebvre’s publication, philosophers had a fairly flat and underdeveloped concept of space as a theoretical field of inquiry.

According to Lefebvre, on the one hand, you have space in the Cartesian tradition, wherein space was an “object opposed to subject” (2011, 1)—an absolute space separate from the mind. As expounded by Chris Butler,

Accordingly, [Cartesian space] could be reduced to a set of “coordinates, lines and planes,” capable of quantitative measurement. This Cartesian account was supplemented and complicated by Kant’s understanding of space and time as *a priori* categories that theoretically placed space within the realm of consciousness. These two primary influences have established a dominant philosophy of space that ontologically treats it as an empty vessel existing prior to the matter that fills it. (2014, 38)

Kant’s notion of space is inherited by subsequent philosophers, juxtaposing a “mental thing” or “mental place” with the Cartesian notion of physical space (Lefebvre 2011, 3). But to Lefebvre, the definition of a “mental space” had not yet been clearly articulated, particularly as it related to social spaces. Because of this lack of clarity, the study of space became subsumed within studies of epistemology, where it grew stale and unattended, general and unarticulated. To Lefebvre, space within the mind was “fetishized and the mental realm comes to develop the social and physical” notions of space as well, flattening the nuances between the two domains (2011, 5). Because of this, the gulf grew between the mental and practical space (defined as both physical and social spaces), to the detriment of cultural ideologies. But, as noted by Christian Fuchs, Lefebvre believes that “space is neither subject nor object” (Fuchs 2019, 92, 135). Rather, space is a “social reality,” and “a set of relations and forms” (2019, 116) and encompasses both the generative potential and practical limitations of cultural and social production. Space *subsumes* products and their interrelations (Lefebvre 2011, 73). Lefebvre’s contribution, then, was to establish a model—“a science of space”—by which the realm of the physical and quantitative could be reconciled and brought into conversation with the mental and social realms of space. This move, then, can help us articulate one approach that shows how the representational space of classification relates to the space of the external, natural world.

Lefebvre’s philosophy of space is premised on a spatial triad that consists of three distinct yet interrelated concepts: spatial practice, representations

of space, and representational space (2011, 33). These three spaces roughly correspond to the three areas identified by Lefebvre as lacking unity: the physical (or perceived), the mental (or conceived), and the social (or lived) (Butler 2014, 41; Lefebvre 2011, 40). Spatial practice can be thought of as our daily patterns of physical movement. This is our perceived, “real” space and can be “evaluated empirically” (which is distinct from representational space, which is abstract and in the realm of memory and intelligence). Practice is the sum total of our mundane activities in space that maintain social life, bring individuals together, and form cohesive fabric of activity. A representation of space is “conceptualized space, the space of scientists, planners, urbanists . . . and social engineers . . . all of whom identify what is lived and what is perceived with what is conceived” (Lefebvre 2011, 33–34). It is the world of models, measurement, and precision that ostensibly act a mechanism to make sense of the many complex layers of the lived, embodied space. While physical space is infinite in its variety, representational space, as I understand Lefebvre’s perspective, must be delineated, planned, and digestible at a given moment. Classifications live in this space: they represent, nominate, and quantify the visible, and render our experience of nature into metaphoric, sensible apparatuses. Importantly, representations are tied to institutions (Butler 2014, 40), and given that Lefebvre highlights the sciences in this space, the focus is on the inherent power and politics in the artificial (yet careful) arrangements that define this space. Finally, there is representational space, or the space that transpires from processing the *lived* experience. This is where creativity, artistry, and “complex symbols are linked to hegemonic forms . . . and social resistance” (Butler 2014, 41). Representational space intellectualizes the lived and represented world as the space of memory, history, art, and belief. Representational space is where aesthetics is born and coded for communication. This space is dynamic and less ordered and linear than the physical spaces we encounter because it is not privy to the laws of the physical world (Lefebvre 2011, 39–44).

Each space in Lefebvre’s triad works in tandem and recursively with one another. How we move in space has been dictated by the plans of architects and planners, and so too has our physical and represented space

been integral to the way in which we make sense of our surrounding and coalesce our experience into meaningful narratives. How the sciences deconstruct and model our world and how we imagine our world related to these models dictates our personal motivations, our politics, and our individual and collective sense of identity. Directly connecting the space of practice and the space of representation is important for our purposes, particularly because it shows that classification is a material concern in our social lives: “Classificatory space is social, and perhaps more importantly, *produced* by way of the interactions of variety of social structures, policies, laws, and actions” (Lefebvre 2011; emphasis original).

BIFURCATION

It is important to note that, for the purposes of this narrative, the space of “society” and the space of “nature” are one and the same. As organisms ourselves—socialized as we are—we must shift our consciousness of humanity in ways that see us in concert with our natural surroundings, rather than apart from it. Classifications, however, at least partly because of the limitations of graphical spaces, will often support the unintended bifurcation of the two. Alfred Whitehead pushed against this bifurcation in his famous *The Concept of Nature* (1920). Although power is, indeed, enacted by an individual person, group of people, or system (which is, ultimately, created by people), the recipient of its affects can be human or nonhuman—and, in particular, can be the flora and fauna that subsist and depend on societal actions in the “natural” surround. The reality is that nature in its purest sense—that domain of the world that is not humanity-dominated as cities, towns, and the like—does not really exist “outside of human social impacts” (Burke and Fishel 2019, 87). The discourse within IS regarding the exertion of informational and classificatory power should not exclude the very natural environment within which we are embedded. There is room for organismic and environmental justice discourse in the discipline to better orient classifications as spaces of social and natural import. As Burke and Fishel emphasize, many elaborations on the concept of power—especially those in political theory, global politics, and

international relations—fail to attend to these human/nonhuman relationships (2019). As Bruno Latour indicates, when we treat ecosystems and the natural world as something separate from the human we are essentially “proposing . . . that an arbitrary portion of the actors will be *stripped of all action* and that another portion . . . will be *endowed with souls* (or consciousness)” (2017, 49–58; emphasis original). The very act of bifurcating nature from society is an act of will to power that implicitly places the power in the hands of humanity, over and above the realm of nature. In this scheme, the human realm supersedes the natural category in terms of agency, importance, and priority.

In this light, if we think of Lefebvre’s triad, the production of social space is, in fact, *also* the production of natural space. As Lefebvre states, “But today, nature is drawing away from us, to say the least. It is becoming impossible to escape the notion that nature is being murdered by ‘anti-nature’—by abstraction, by signs and images, by discourse, as also by labour and its products” (Lefebvre 2011, 70–71). Even the very act of protecting nature through the establishment of national parks and reserves filters nature through the discourse of our social, political, and conservatory actions—and thus nature has no choice but to exist *within* our control rather than apart from it. On top of this, our spaces of classificatory representation allow us to minimize and compartmentalize nature, take hold of it, and carry it around in the guise of maps, guidebooks, and catalogues of species. As Susan Sontag said in relation to photography, “To photograph is to appropriate the thing photographed. It means putting oneself into a certain relation to the world that feels like knowledge—and, therefore, like power” (2001, 4). The mere act of representation is to relate to the represented on social terms and often within an imbalanced relationship with respect to power.

DERIVATIVE POSITIONALITY

It is not enough to establish that the spaces within and without classification are mutually constituted; it is also important to ask the question: What does it mean to stand in *this* space, or to be represented in *that* space? That

is, how is one's positionality in the social world affected by their derivative position in represented space? One of the most consequential impacts of classification systems is the extent to which they *position* representations and codify them in particular contexts and at a given point in time. Positionality is a central concept in Wilson's *Two Kinds of Power* (1968). Wilson discusses the production of subject terms as a defining descriptive point required to identify situationally appropriate content within documents via bibliographical systems. For example, if we wish to find books on the subject of dingoes, we would be wise to search for books with a subject term "dingo," a term inclusive of both *Canis familiaris* and *Canis lupus familiaris*—both possible taxonomic names for the dingo depending on whether one believes it to be a specific species of dog or a subspecies of the wolf (Library of Congress 2020). For a truly comprehensive search, one may also need to seek out the "dog" heading, given that some cataloguers may not have applied the more specific "dingo" moniker. Examples such as these are everywhere, particularly because applying subject terms to documents—essentially establishing the *aboutness* of the text—is notoriously one of the most difficult ways of "assigning positions" within an "organizational scheme" (Wilson 1968). One must assess what the content of a document might be *about*, while also simultaneously assessing how a user might enter the catalogue and search for the document. Importantly, Wilson chose to title his chapter "Subjects and the *Sense* of Position," and I'd like to highlight in particular his use of the word "sense." To "sense" position is to interpret, to provide meaning where it might not otherwise reside, and evokes a notion of inwardness, sensing, and "feeling" as if something should be classed in *this* position or *that*. As discussed above in the context of Lefebvre's triad, if we think about the tight connection between lived space and representational space, we can see there is a connection between how we think about positions in the space of classifications and how these positions interplay with and affect positions in the space of society.

One's complex identity in the lived, social world is significantly affected by the intersectionality of their many representations in the classificatory, represented world. The argument here is not new, of course; we can look to a core text in IS such as *Indexing It All* (2014), by Ronald

Day, which, at least in part, unpacks the ways documentary technologies (library information systems, social computing intermediators, database indexes, algorithms, and the like) impact our social and lived identities by way of fragmented indexical systems. Information systems, sociotechnical apparatuses that they are, act as “constructing infrastructures for both producing subjects and objects” through the indexical relationship of users and objects, and their representations (2014, 41). These systems have become so pervasive in our social and political economies that they have become our primary social mediators, which, in turn, define both our individual identities (our subject-ness), and our relations to other people (subject-to-subject interactions). Further, these indexical realities play a far greater role than our embodied activities in social space. Returning to our opening example, any one dingo in the wild, for example, is affected by its classification (its representation) *far more* than it is affected by the sum total of its individual attributes. Our descriptions in classifications are spatiotemporally unrestricted, while our physical being is defined by the opposite. In some senses, these representations are also normative in scope, which has implications in terms of the magnitude of their influence. Normative because, if the dingo is classified in such-and-such a way, then the impact is not on one or a few, but on *all* the external natural entities that fall within that descriptive category of the species taxon concept. Through this radiant normativity we can better understand how derivative representations are also artifacts with materialities and affects in their own right. This is to say that representations-qua-classifications have *agency* within the world to a degree that is often not acknowledged in the course of our daily lives. They situate natural objects among each other, and inform our social, economic, and political relationships with particular species.

This is the way derivative effects should be understood within the space of classification systems, given that they, too, are documentary, indexical systems in their own right. Building on this, the goal is to further define how our classificatory identities are equally complex intersectional concepts, much in the way our lived, social identities are positioned at the intersection of many socially prescribed systems that coalesce to produce

a seemingly coherent identity whole. I adopt the term *derivative positionality* here to highlight that representations within classifications are not only representational extensions of the physical (“real,” external) objects and beings they classify. They are material and affectual structures in that they help form our epistemic understanding of our lived, social position. One’s positionality (qua representation) in classifications supports and solidifies one’s actual positionality in the social world. This kind of positionality is derivative in that it is primarily representational, but such representations nevertheless remain tethered to the identity, fate, and position of what is being represented. One’s representations work recursively in that, as classifications change, our ability to negotiate the world and construct our identities are affected and also change. And, as our existence and identities evolve, so too do the positions of our representations in classifications. This is a prime example of Ian Hacking’s “looping effect” (2007). If we create a new species, for example, that species is now a legitimate entity in the realm of policy, conservation, and the like. And, with a name, it can now subsist within a broader index of species taxa that bring to bear individuated consequences.

Of course, the distribution of power in social spaces is a relatively familiar and easy way to understand how our position in society is dependent on our individual, constructed social identity. Our privilege, mobility, and eventual success can be measured by the ease with which we can move from one social position to another, presumably more advantageous and beneficial, social position. In social spaces, variables such as education, social networks, inherited financial capital, ethnicity, and gender allow us to inhabit a specific position with respect to other individuals. This position, then, opens us up to, or restricts us from, a variety of social opportunities or benefits. Melissa Adler’s (2017) argument illustrates how classifications discipline bodies of knowledge by positioning certain concepts in ways that degrade or bias a certain subject-identity (whether that subject term be paraphilia, sexual perversion, or homosexuality). A central power of these positioned representations is that they are more mobile, delicate, radiant, and accessible to the actions of others than are the individuals they represent. Derivative representations can “live” many places

at once, and each is privy to different online or material contexts, which illustrates the strength of derivative forces as they function to construct the identity of what they represent.

Many may note that the term positionality is not often used in the context of classifications in IS literature. The term has a strong scholarly context in, for example, identity, feminist, queer, and indigenous studies, and is associated with standpoint theory epistemology. This more socially contextualized definition of positionality is equally as pertinent in this narrative, as it relates to how positions in classification also function in relation to our lived experience. The interpretation and methodological implementation of standpoint theory varies widely depending disciplinary context, but, as Elizabeth Anderson explains,

Classically, standpoint theory claims that the standpoint of the subordinated is advantaged (1) in revealing fundamental social regularities; (2) in exposing social arrangements as contingent and susceptible to change through concerted action; and (3) in representing the social world in relation to universal human interests. By contrast, dominant group standpoints represent only surface social regularities in relation to dominant group interests, and misrepresent them as necessary, natural, or universally advantageous. (2020, Section 2)

In this vein, one's individual perspective, social position, and historical context not only influence but also define their epistemic stance and authority. It is a means of empowerment. To adopt standpoint theory is to position yourself in contradistinction to the material and external modes of power that subject us to distributive, representative, and other forms of social inequalities. One flavor of feminist standpoint exalts individual perspective in the face of “androcentric, economically disadvantaged, racist, Eurocentric, and heterosexist conceptual frameworks” that “ensured systematic ignorance and error about not only the lives of the oppressed, but also the lives of their oppressors and this about how nature and social relations in general worked” (Harding 2004, 5). In *Disciplining the Savages: Savaging the Disciplines* (2007), author Martin Nakata notes how the power and strength of an individual epistemic stance—one that may be generally viewed as underrepresented or disenfranchised—is constructed by way of

many cultural and social elements that “interface” with lived experiences, historical memories, and individual historicities. Power dynamics between a colonial past and a Western future merge in Nakata’s own identity as they do for other Torres Strait Islanders—the indigenous population in Queensland, Australia. Islanders “operate on a daily basis in a space that is commonly understood as the intersection between two different cultures—the Islander and the non-Islander, the latter expressed as Australian, Western, mainstream of whatever” (Nakata 2007, 322). In this space, standpoint theory is a way to recapture the power that mainstream society has taken away.

And this is the case in classification spaces too. By invoking the concept of positionality with reference to our indexed identities in classifications, we co-opt these spaces as ones that should necessarily empower us, and support and engender a sense of well-being in the world for each and every one of us. Classifications are just one part of the intersectionality that defines our lived reality. Evoking positionality is a move that can, hopefully, facilitate the liberation of these spaces and make them more representative, just, and participatory (Mathiesen 2016). Though organisms other than humans do not experience identity production in quite the same way, this move gives classification builders entrée into the general identity-producing mechanisms of these systems. Animals and botanicals do have certain rights to exist cooperatively in this world. Thus, we now turn our attention to the global nature of biodiversity classifications. Bit by bit, we will deconstruct and critique these digital ecologies such that we can get a sense of how we might approach the production of classifications that are mutually beneficial for all members of our social and natural worlds.

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Power of Position

Classification and the Biodiversity Sciences

By: Robert D. Montoya

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