

Emptiness and Wholeness: Untangling the “Realities” of  
Tibetan Buddhism and Quantum Physics

by

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A combination of *acknow* (to come to know) and *knowledge* (to admit the existence of truth; to confess): a swell of gratitude zooming past the capacities of language. I intend this page not just as a list of names, but also as a process of expanding my confession/recognition, for the project before you surely does not belong to me alone. I confess my incalculable indebtedness in order to recognize and celebrate the relations that produced both this project, and me.

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## Preface

In the above section, I could easily have tacked on a traditional thank you to my advisor: something along the lines of, “This thesis wouldn’t have happened without her.” And of course, it would be true. Not just, however, because of her talent as a mentor and editor, but because this whole project began in her class my sophomore year. It was this course, “Worlding the World: Creation Myths from Ancient Greece to the Multiverse,” that introduced me to the entanglement of science and theology, started my study of Religion generally, and precipitated my engagement with Buddhism.

For at the same time we were reading modern scientific cosmology, I was doing some independent study of “Buddhism.” A couple generous friends had given me the Dalai Lama’s *The Universe in a Single Atom*, and Herman Hesse’s *Siddhartha*, both of which present Buddhism as highly amenable to a scientific and romantic mind like my own. Imagine my surprise and delight when in the course of a week, I came to Hesse’s magnificent river of realization, the Dalai Lama’s assertion of a new scientific Buddhism, and quantum physicist David Bohm’s “unbroken wholeness of the totality of existence as an undivided flowing movement without borders.” The damage was done. Quantum physics had proved Buddhism true, and Buddhism looked really good.

The combination of these three texts was so potent, it led me to a semester abroad in India with Antioch University Buddhist Studies in Bodh Gaya, Bihar. There, at the site of the Buddha’s enlightenment, I received a crash course in the

material-political humanness of the “religion” I threw myself into, and learned quite quickly that the “Buddhism” I brought with me to India didn’t quite match the dizzying variety of practices, dogmas, and communities that confronted me there. If not from the source, where had my Buddhism come from?

Over the next few semesters, I learned more about the Western academic construction of Buddhism (which produced the Hesse’s romantic vision of the Buddha’s enlightenment), the colonial-era roots of the Buddhism and science dialogue (which extend through the Dalai Lama’s work), and the modern physics community’s attempts to relate contemporary insights in quantum physics with ancient mystical truths (which led Bohm to conversations with the Dalai Lama). In many ways, this project is an excavation of the cross-cultural historical apparatuses that produced the phenomenon of a white, male, upper middle class undergraduate student convinced that modern physics was pointing towards the interconnectedness of all things. This thesis is, in part, my attempt to understand the ways of thinking I inherited; ways of thinking made me find the convergence of science and spirituality uniquely attractive. It is also, however, a call to question the value of sameness in cross-cultural dialogues and comparisons. From my perspective, the many realities of this multiplicitous world demand more complex modes of engagement than “us vs. them” groupings that ultimately absorb or reject. Insofar as I am able to share such methods, then, I hope that you find them compelling, or at least, engaging. For to paraphrase my advisor: this project is not about final answers, but providing ways of thinking to aid our collective becoming.

## Introduction: “Canonizing” the Dialogue

If scientific analysis were conclusively to demonstrate certain claims in Buddhism to be false, then we must accept the findings and abandon those claims.

This sentence, issued in a 21<sup>st</sup> century book on the convergence of science and spirituality, was not written by someone seeking to bolster the advance of scientific truth over the mystical and irrational assertions of religion. Nor was it penned by a Western Buddhist hoping to reconcile the animosity between science and religion for the sake of Buddhism in the West. This assertion comes from His Holiness the Dalai Lama: the Nobel prize-winning voice of Tibetan Buddhism and its spiritual and scholastic leader.<sup>1</sup>

It may seem strange to see the head of a religious tradition open its truth claims to falsification by science, a move that could threaten its very conceptual foundations. Considering the social authority modern science holds on determinations of objective reality, it is easy to imagine a weakened form of Tibetan Buddhism being forced into accord with scientific truth in order to maintain relevance in a secular world. Indeed, the Dalai Lama’s statement might even be read as Buddhism’s death knell: an invitation for it to be classified and abandoned as a pre-modern system of thought that doesn’t accord with scientific reality. Thus, an initial question: why would His Holiness ever take such a dangerous stance? The reasons are manifold, and shift dramatically depending on the angles of approach taken to answer it.

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<sup>1</sup> His Holiness the Dalai Lama, *The Universe in a Single Atom: The Convergence of Science and Spirituality*, (New York: Broadway Books, 2005), 3.

From a cynical perspective, the argument could be made that the Dalai Lama does not have much of a choice in the matter, and that his position is a crafty way of temporarily securing Tibetan Buddhism within the international marketplace of ideas. A little background: the Chinese invasion of Tibet forced the Dalai Lama and over a hundred thousand Tibetans into exile in 1959, and subsequently destroyed the vast majority of the monasteries in their homeland during the Cultural Revolution. After crossing the Himalayas into India, His Holiness and others were tasked with preserving the monastic tradition, culture, and governance of Tibetans in their new host country. Needless to say, this presented enormous challenges, many of which were overcome with financial and political support from Western nations.

At the same time, centuries of interest in mythical Tibet, or “Shangri-la,” produced many Westerners eager to learn from Tibetan Buddhist teachers and meditation masters, who were far more accessible in India than they had been in Tibet. Given that a scientific understanding of the world is common across such patrons, it makes sense that His Holiness would seek to ally science and Tibetan Buddhism to receive Westerners’ continued support. As a defensive measure, too, His Holiness has a vested interest in preserving Tibetan Buddhism as a “modern” religion: that is, one not opposed to the methods and findings of science. Basically, this view reads His Holiness’ stance on science as only a means of keeping Tibetan Buddhism alive in a world dominated by science.

It is important, however, to note the subtle currents of colonial thought that course through this way of understanding the Dalai Lama’s statement. In particular, focusing on Tibetan Buddhism’s attempts to secure its longevity in exile involves

tacit assumptions of frailty and dependence on Western ideological and financial support. This approach removes agency from Tibetan Buddhism by suggesting its adaptations are only defensive responses to the power of science. Indeed, this view may miss the extent to which His Holiness is actively seeking to strengthen contemporary Tibetan Buddhism through its engagement with a robust opponent. As of September 15<sup>th</sup>, 2013, the NGO Science for Monks cites the Dalai Lama on their home page: “I wanted to understand science because it gave me a new area to explore in my personal quest to understand the nature of reality. I also wanted to learn about it because I recognized in it a compelling way to communicate insights gleaned from my own spiritual tradition.”<sup>2</sup> Rather than hoping that Buddhism might be validated by science, His Holiness asserts that each discipline can be explored through the lens of the other to gain a more complete understanding of modern reality. His willingness to explore and express Buddhist ideas through scientific concepts emphasizes the confidence His Holiness has in the Dharma, seeing it as an ally of science, rather than an object of it—or, for that matter, a servant of it. From this partnership, the Dalai Lama expects a more complete vision of reality, as well as innovative combinations and alterations of both scientific and Buddhist modes of thought.

For as Buddhologist Donald Lopez notes, different strands of Buddhism have continually emerged out of diverse cultural milieus to produce new schools of thought and practice. Engagement with Brahmanism in India, Daoism in China, and Bön in Tibet gave rise to the Theravāda, Zen (Mahāyāna), and Vajrayāna schools,

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<sup>2</sup> “Science for Monks,” last modified 2014, <http://www.scienceformonks.org/>.



respectively: a diversity of “Buddhisms” still flourishing today.<sup>3</sup> A word of caution, however: one must not assume that some essential core of Buddhism has migrated over time and space to produce these various schools, for such a view posits an essential and abstract Buddhism that exists prior to and separate from its transformations. Rather, the teachings of Gautama Buddha (c. 5<sup>th</sup> century, B.C.E.) have been transported and modified by scholars, nuns, monks and laity through multiple cultural systems over a wide geographical and temporal span. Each confluence has produced a unique Buddhism that uses the language of the surrounding formations to assert its soteriological dominance over other schools of thought.

With this pattern in mind, Lopez adds a provocative question, “In order for Buddhism to establish itself in Europe and America, must the god of the West, the god of Science, also find its place in the Buddhist pantheon?”<sup>4</sup> From his perspective, Buddhism’s centuries old engagement with science represents the slow emergence of a new school of Buddhist thought. From 19<sup>th</sup> century Theravādins to 20<sup>th</sup> century Zen masters, Buddhism has been presented as the religion compatible with science. Finally, Tibetan Buddhism has become the center of the “Buddhism and science” debates, although in a different way than either Theravāda or Zen Buddhism has. Rather than merely asserting the “compatibility” of Buddhist doctrines and scientific truths, both scientists and Tibetan Buddhists are striving to critically engage the

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<sup>3</sup> Donald Lopez, *Buddhism & Science: A Guide for the Perplexed*, (Chicago: University of Chicago Press, 2008), 34.

<sup>4</sup> Lopez, *Buddhism & Science*, 37.

philosophical and practical systems of the other.<sup>5</sup> By encouraging science education in monasteries and dialogues with physicists and neuroscientists, His Holiness is not just attempting to maintain an amicable relationship between science and Buddhism. Rather, he is seeking to assess rigorously what Tibetan Buddhism has to learn from scientific understanding, and vice versa. By advocating such a methodical and critical dialogue, the Dalai Lama is expressing faith in Buddhism's ability to withstand scientific analysis, and is generating what may prove to be a philosophical renaissance for Tibetan Buddhism in a scientific age. On the other side, engaging with Tibetan Buddhism has allowed physicists and neuroscientists the opportunity to challenge the metaphysical assumptions underlying their practices, and provided experimental subjects for the analysis of neural plasticity and augmentation of compassion through meditation.<sup>6</sup>

### **Methodological Concerns**

Predictions aside, it is important not to jump into an analysis of the dialogue between Tibetan Buddhism and science without a rigorous examination of the historical, social, and political forces that have shaped it. For the current conversation is directly connected to over two hundred years of assuming Buddhism is amenable to

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<sup>5</sup> For example, see HHDL's *Universe a Single Atom: The Convergence of Science and Spirituality* (2003), Matthieu Ricard's *The Quantum and the Lotus: A Journey to the Frontiers Where Science and Buddhism Meet* (2004), Vic Mansfield's *Tibetan Buddhism and Modern Physics: Towards a Union of Love and Knowledge* (2008), Pier Luigi Luisi's *Mind and Life: Discussions with the Dalai Lama on the Nature of Reality* (2010), not to mention the burgeoning literature on the relationship between Tibetan Buddhism and Neuroscience. For less academic assertions of compatibility between Buddhism and Science, simply Google search "Tibetan Buddhism and Quantum Physics" to find a host of websites asserting their compatible notions of "reality."

<sup>6</sup> For a trenchant critique of the ethics of such experimentation, see Cabézon 2003.

science: historical framings laced with tacit assumptions about the superiority of Western thought over all other systems of exploring and explaining reality. As Lopez notes, the establishment of the conversation between science and Buddhism is inseparable from the relationship between science, Buddhism, Christianity, and colonialism in the 19<sup>th</sup> century. He adds that because the scholars and political leaders of this time already assumed an equivalence between science and truth, “It is... perhaps unsurprising that Buddhist leaders in Asia would point to what they identified as the scientific aspects of Buddhism in an effort to trump the charges of idolatry and superstition leveled at them by Christian missionaries from across the Buddhist world.”<sup>7</sup> Indeed, the power dynamics present in the early stages of Buddhism’s relations with science highlight the extent to which sociopolitical concerns informed the modification and presentation of Buddhist thought. The dialogue between Buddhism and science today is not much different, as the precarious stance of Tibetan Buddhism in exile would be strengthened by a strong alliance with science and the powerful states that wield it.<sup>8</sup>

Thus the claim from physicist Fritjof Capra in his *Tao of Physics* (1975) that the mystical Buddhist “cosmic unity,” is in exact accord with the “revelations of modern physics,”<sup>9</sup> deserves careful scrutiny, so as to uncover exactly why Capra seeks such alignment, and whether or not his assertion is a viable one. Given also that Capra’s work set off the most recent wave of activity in the Buddhism and science dialogue,<sup>10</sup> his view merits special attention for this project, which for a variety of

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<sup>7</sup> Lopez, *Buddhism & Science*, 24.

<sup>8</sup> See Lopez, *Buddhism & Science*, 33.

<sup>9</sup> Fritjof Capra, *The Tao of Physics*, (Boston: Shambala Press, 2010), 131.

<sup>10</sup> Lopez, *Buddhism & Science*, 25.

methodological and philosophical reasons, finds his stance fundamentally untenable. For, as I argue, not only does Capra err in his understanding of Buddhist philosophy, he posits an abstract and essentialized “mystical” Buddhism that contemporary scholarship rejects outright.

Indeed, the varieties of philosophies and practices contained within the terms “Buddhism” and “science” are enormous, and have developed continually since the initial contact of natural science and Buddhism in the 19<sup>th</sup> century. It is therefore key to assess critically what exactly is meant when the two terms are put into a conversation of any kind, and to specify whose representation of each is being used in a given dialogue. Accordingly, a seemingly innocent assertion that “Buddhism and science seem to be saying the same things about the world” becomes extremely problematic. Buddhist studies scholar David McMahan comments,

For the historian of religion, to ask whether Buddhism and science are compatible would be to pose an unwieldy question, one that posits a monolithic ‘Buddhism’ as well as monolithic ‘science,’ reduces Buddhism to its highly philosophical elements abstracted from any living context, and further reduces these to ‘general principles’ that themselves have already been reinterpreted and rendered compatible with scientific principles.<sup>11</sup>

Here, McMahan indicates that without specifying exactly the vehicle, sect, and teaching within Buddhism and the particular experiment or theory in science to which it is being compared, it is easy to pretend that “Buddhism” and “science” are unified collectives of knowledge and practice. This is simply not the case for either: just as scientists disagree about the philosophical frameworks within which scientific theories operate, so Buddhists hold different views on the fundamental composition of reality. Furthermore, without respecting the plurality of diverse Buddhisms’

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<sup>11</sup> David McMahan, *The Making of Buddhist Modernism* (New York: Oxford University Press, 2008), 140.

worldviews, Westerners can construct a “Buddhism amenable to science” in order tautologically to prove its compatibility with science. In other words, without context, the meaning of different views and texts can be appropriated for a variety of misusages, including the construction of agreement between two entities discursively constructed to agree.

Therefore, an effective analysis of the interactions between “Tibetan Buddhism” and “science” will therefore require a high degree of specificity. There are pitfalls everywhere, insofar as “Tibetan Buddhism” itself exists as a diverse grouping of schools with differing philosophies and practices. In fact, core Tibetan texts have been propagated through differing commentarial traditions, and understood in different ways depending on the people reading and debating them. Thus, attempting to use a particular text, set of teachings, or practices to represent all of Tibetan Buddhism is simply impossible. Moreover, while it may be tempting to compare Buddhist philosophy directly with the experimental data and theories of contemporary physics, the context of both need to be taken into account so as not to misrepresent what the function of the other.<sup>12</sup> In other words, assuming that Buddhist philosophers at the start of the first millennium were undertaking intellectual labors similar to those of modern physicists misses the point that these sets of scholars are working with completely different tools, goals, and motivations. Early Buddhist philosophers, for example, were not striving for a unified theory that reconciles classical and quantum physics, or for an understanding of the particle manipulations that underlie the workings of atomic weaponry and modern telecommunications.

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<sup>12</sup> Just as one would not attempt a direct comparison between philosophy and experimental data, so this project seeks to put Buddhist philosophy and philosophy of science in conversation, rather than Buddhist thought and scientific practice.

Rather, they were exploring the composition of the inner and outer realities of the world in which they lived, and articulating different paths to liberation from and through the socio-political circumstances in which they lived. In short, it is important to distinguish the epistemological practices of science from the soteriological aims of Buddhism.<sup>13</sup>

### **Emptiness and Quantum Physics: A Brief Introduction**

For all its methodological dangers, however, this dialogue need not be condemned: there are good reasons for the lively engagement between scientists and Tibetan Buddhists. Apart from the opportunity for critical self-reflection, the conversation has unveiled a number of areas in which modern science and Tibetan Buddhism seem to be pointing in similar enough directions to merit close comparison and analysis. One prominent comparison is that between *śūnyatā* (emptiness), the Mahāyāna Buddhist teaching that all phenomena lack inherent self-existence, and quantum "indeterminacy," which show that particles do not hold the determinate properties that science purportedly measures.<sup>14</sup>

This unique feature of quantum experimentation is instantiated in the issue of "complementarity" examined by Neils Bohr. When electrons are fired at a detector, they behave either as particles or as waves, depending on the experimental set-up that

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<sup>13</sup> Which is not to say that there are not many vibrant Buddhist epistemological traditions, or that different Buddhisms are not concerned with knowledge of the external world.

<sup>14</sup> The doctrine of emptiness will be examined at length in subsequent chapters of this project, as will the "double-slit experiment" read through Niels Bohr's "complementarity" which points out that the "objects" of scientific experiments do not inherently exist as aspects of objective reality. The relationship between emptiness and indeterminacy will be examined in the final section of the project.

“measures” them. Because it is impossible for the same apparatus to produce particle behavior and wave behavior simultaneously, these traits are said to be “complementary,” or mutually exclusive. In *Meeting the Universe Halfway* philosopher-physicist Karen Barad explores the ontological stakes of this complementarity; in short, “*the nature of the observed phenomenon changes with corresponding changes in the apparatus.*”<sup>15</sup> In other words, different ways of examining the world produce different “answers” about it: light *is* particulate under certain conditions and *is* wavelike under others. For Barad, complementarity and other paradoxes of quantum physics reveal the extent to which different modes of measurement *form* the very objects with which they interact. Thus, she argues that there is no way to explore the quantum domain--which is to say the ground of modern physical reality--without acknowledging the role that human and non-human agents play in constituting reality as such.

Consequently, quantum physics has put a great deal of pressure on the position of “scientific realism.” Realists argue that science explores entities--themselves, that is, things that truly exist outside of human language and concepts. While quantum mechanics’ implications for realism will be explained later on, it is important to note that the contemporary physics community is currently divided between those who assert that scientific practices produce truth about a reality “out there,” and those who believe the only reality we have access to is the one we are a part of. For different reasons, realist and anti-realist positions likewise divided the early Buddhist philosophical schools of Abhidharma and Madhyamaka, respectively.

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<sup>15</sup> Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham: Duke University Press, 2007), 106.

The Madhyamaka rejection of ultimate reality, however, became one of the metaphysical bedrocks of contemporary Tibetan Buddhism.<sup>16</sup> The arguments against a fixed, self-constituted, objective reality coming from quantum physics and Tibetan Buddhism are different in both content and context, but they seemingly align against what they both perceive as a misconception of reality, that is, “reality” as constituted by discrete, given subjects and objects. Thus, I will not assess, as Capra and others do, the compatibility of “reality” in Tibetan Buddhism and quantum physics. Rather, I will explore their respective rejections thereof, and assess the compatibility of their arguments against reality itself.<sup>17</sup>

This latter area of inquiry offers a unique analytic angle on the 20<sup>th</sup> and 21<sup>st</sup> century assertion that Tibetan Buddhism and quantum physics are saying “the same things” about the nature of reality: specifically, that reality is something like a transcendent unity underlying all things.<sup>18</sup> This position is not just simplistic, it is simply wrong. For Nāgārjuna explicitly rejects any such metaphysical claim as fatally flawed, for it presupposes that there is a “reality” out there that we can understand—however imperfectly. In concert, Barad also rejects philosophical appeals to a world that exists independently of human participation within it. Taken together, then, both Barad and Nāgārjuna reject the notion of any transcendent reality upon which Tibetan Buddhism and quantum physics could agree. This is to say that they are not giving us the same ultimate reality, for neither has an ultimate reality at all.

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<sup>16</sup> John Powers, *A Concise Introduction to Tibetan Buddhism*, (Ithica: Snow Lion Press, 2008), 104.

<sup>17</sup> This project, however, is certainly not the first to shift focus in such a direction. For an engaging assertion of such rejections as the “meeting point of science and the Madhyamaka,” see Bitbol, *A Cure for Metaphysical Illusions*.

<sup>18</sup> Capra, *The Tao*, 130.



At this point, however, it may be tempting to take this rejection as a more subtle form of compatibility between Tibetan Buddhism and quantum physics – that they are saying the same things about the impossibility of an ultimate reality. However, I argue that positing such a revised form of compatibility is as methodologically dangerous as it is philosophically untenable. I do not attempt to locate a point of equivalence, either positive or negative, between Tibetan Buddhism and quantum physics; rather, I call into question the desire for such sameness, and reject the possibility of articulating the two as identical.

### **A Brief Outline: What to Expect**

The first chapter of this project covers over two hundred years of conversation between different Buddhisms and sciences, in order to examine some of the reasons why contemporary scientists and Buddhists alike are claiming that they understand reality in the “same” ways. A historical survey will also help to introduce the roles that social, political and economic forces played in the early interactions of Buddhism and science in the context of Christian colonial missionary activity. For as will be shown, political, cultural, and economic interests shape the developments of the current dialogue as thoroughly as they have done in the past. Attending to such social circumstance will therefore allow us to analyze the philosophies in question more carefully than if we assume they somehow transcend these factors. For by highlighting the social dynamics within which such philosophies and comparisons are

interwoven, we can illuminate the problematic conflations, subordinations, and appropriations characteristic of historical and contemporary comparative studies.

The second chapter will introduce the writings of Nāgārjuna, the 3<sup>rd</sup> century C.E. architect of the Madhyamaka school of Mahāyāna Buddhist thought. Nāgārjuna's philosophy articulates the predominant metaphysic in Tibetan Buddhism, and is espoused by the Dalai Lama's sect, the Gélukpa tradition.<sup>19</sup> This project makes no claim to represent all of Tibetan Buddhist thought, as there are many non-Madhyamaka schools of Tibetan Buddhism. Because the Dalai Lama is the dominant voice of Tibetan Buddhism, and has been a prime mover of the Tibetan Buddhism and science dialogues, however, his philosophy is an appropriate focal point for this project. Thus, Nāgārjuna, as interpreted through the Gélukpa sect, will be used as a voice of Tibetan Buddhist thought on the nature of reality. Following a more detailed explanation of these methodological choices, Nāgārjuna's metaphysic will be examined in detail, so as to provide an understanding of how it rejects the existence of a reality separate from human interests and concerns.

In the third chapter, the philosophy-physics of Karen Barad will be examined to unsettle classically understood scientific realism. As with Tibetan Buddhism, quantum physics is not a unified system of thought, and attempting to represent in with the writings of one human is impossible. That being said, in *Meeting the Universe Halfway*, Barad explicates a reconfiguration of scientific realism based on the philosophy-physics of Neils Bohr that is gaining much attention from scholars of philosophy, feminist theory, science studies, and physics. For the purposes of this

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<sup>19</sup> John Powers, *A Concise Introduction to Tibetan Buddhism*, (Ithica: Snow Lion Press, 2008), 104.

thesis, then, her thought will be used to represent expert opinion in the quantum physics community. Further, I find her emphasis on the relationship between physics and philosophy particularly compelling, as well as useful for a project that places two specific philosophies side by side to sharpen the process of comparing and contrasting Tibetan Buddhism and quantum physics.

The fourth and final chapter will exist as a concerted effort to examine the relationship between Nāgārjuna and Barad's philosophies, emphasizing both their harmonies and dissonances. It is not an attempt to conflate their views; rather, it will show how, although they both write against related conceptions of ultimate reality, their projects differ greatly. Nāgārjuna rejects ultimate reality for soteriological reasons, and claims that while conventional reality is the only one to which we have access, it can at best point towards highest enlightenment. In contrast, Barad rejects scientific realism for ethical reasons, and asserts that her agential realism is the best framework in which to situate scientific theory and practice. *Centrally, then, while Nāgārjuna ultimately rejects reality, Barad ultimately secures it.*

Taken together, their philosophies illustrate the immense difficulty in attempting any successful conflation between views of reality in Tibetan Buddhism and quantum physics. Firstly, while each uses entirely different concepts and styles of argumentation, both Nāgārjuna and Barad argue that there is no such "reality" for them to agree upon in the first place. Secondly, while they *seem* to articulate identical rejections of transcendent reality, the "realities" that each one posits in contrast to the ones they reject *are also extremely different*. Thus, rather than asking what views of reality Tibetan Buddhism and quantum physics agree upon, as the historical dialogue

would have it, this project shifts focus to what views of reality “Tibetan Buddhism” and “quantum physics” reject, *and why*. Ultimately, this shift alleviates the pressure to conflate different philosophies, and gives each one the ability to speak in its own terms rather than do violence to the context from which they arise.

Finally, these reflections will be drawn back into conversation with the context from which they emerged: the contemporary dialogue between Tibetan Buddhism and quantum physics. By providing historical context for the conversation, I will help to relay some of the reasons why claims of compatibility continue to be made, and ways in which they can be critiqued. Furthermore, by providing critical comparative analysis of two representative thinkers within the dialogue, this project will allow for important reflections on the relationships between their worlds. In turn, these findings will help to uncover many problematic and flawed assumptions perpetuated in conversations by Buddhists and scientists alike, such as the existence of an ultimate reality towards which Buddhism and science strive. However, this is not a purely critical work for the sake of finger pointing: for I will also make use of Barad’s notion of “diffractive reading” to provide different approach to the conversation – one that involves reading different perspectives through one another, rather than holding them together or keeping them irrevocably apart. As will be shown, such an approach rejects disembodied objectivity in favor of context-specific perspectives, which prevent any ultimate validation of Buddhism by science, or vice versa.

## **Chapter One: Buddhism, Christianity, Science, and the Academy**

Then [the Buddha] pointed one hand toward heaven and the other down to earth and said that except for him, there was none holy, not in heaven nor in earth. Then he betook himself to the mountain recesses and there he instituted this abominable idolatry with Satan's help.

– Father Athanasius Kircher, 1602-1680

The religion of the future will be a cosmic religion. It should transcend a personal God and avoid dogmas and theology. Covering both the natural and the spiritual, it should be based on a religious sense arising from all things, natural and spiritual as a meaningful unity. If there is any religion that would cope with modern scientific needs, it would be Buddhism.

– Albert Einstein, 1879-1955

In order to understand the stakes of the contemporary dialogue between Buddhism and science, it is necessary to trace the multiple ways that Buddhism has been presented to and by the West over the last few centuries. The course of this study will weave together multiple narratives often analyzed separately: first, the creation of “Buddhism” as a textual construction of the Western academy; second, the engagement of Buddhist leaders and Christian missionaries; and third, the subsequent emergence of Buddhism as a “world religion” uniquely amenable to the modern West. Connecting these three progressions will allow a few common themes to reveal themselves, such as the relationship between power and definition, the political currents that underlie religious confluence, and the relationship between “science and truth.” In turn, this brief analysis will allow for some historical understanding of why Buddhism and science are so often presented as compatible, as well as why

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According to Lopez (2012, 9), it seems as though Einstein never actually made this claim.

disentangling them could allow for a more fruitful and less problematic dialogue between Buddhists and scientists.

### **The Construction of “Buddhism”**

Before the 19<sup>th</sup> century, the term “Buddhism” did not exist. In *The Invention of World Religions*, Tomoko Masuzawa writes that before the 19<sup>th</sup> century, neither Western observers nor indigenous practitioners conceived of a special “religious” category in which to place the diverse rituals, institutions, and lineages that now constitute Buddhism. She asserts, “In early modern times, then, there was no ‘Buddhism’ to consolidate disparate observations gathered in and about Asia.”<sup>21</sup> Without a category of its own, what later came to be recognized as Buddhism was instead dropped into the bucket of “idolatry”: the label used to describe anything not Christian, Jewish or “Mahomettan.” Masuzawa continues, “Everything that was to be recognized as Buddhism, therefore, was submerged in the vast sea of nondescript heathen idolatries, which, no matter how numerous and diversified, were considered in their essential natures everywhere to be the same; they were differentiated only by contingent local particularities.”<sup>22</sup> Here, Masuzawa’s language draws attention to the derision implied by the label of “idolatry,” and introduces the problem of academic essentialism. In this case, non-native observers wield definitional power to obliterate differences between diverse practices, consolidating them around their purported ideological core: idolatry, which is to say, not monotheism. This ability to categorize

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<sup>21</sup> Tomoko Masuzawa, *The Invention of World Religions*, (Chicago: University of Chicago Press, 2005), 122.

<sup>22</sup> Masuzawa, *The Invention*, 123.

and control based on constructed essences is particularly visible with the construction of Buddhism, and the ways in which texts were used to produce knowledge of its “essential” character.

In the 19<sup>th</sup> century, scholars of religion effectively formed Buddhism as an object of study. Masuzawa argues that, “In the first half of this century, this was largely a matter of coming to recognize the resemblances, links, and genealogical relations among some extremely varied and seemingly discrete instances of cult practices observed in a broad range of territories...”<sup>23</sup> The initial recognition of what would later be called “Buddhism” emerged as a means of connecting diverse practices together in complex lineages across a wide geographical span. Early scholars then began to connect this web to the historical founding figure of Gautama Buddha and the massive array of related texts produced and preserved in Asian languages after his death. However, it wasn’t until Sanskrit texts discovered in Nepal by the British East India Company were sent to French philologist Eugène Bernouf that “the historical Buddha” was linked with what came to be viewed as authoritative Buddhist scriptures. After seven years of careful study, Bernouf published his *Introduction à l’Histoire du Bouddhisme* in 1844. According to Bernouf’s pupil Max Müller, “It is this work that laid the foundation for a systematic study of the religion of the Buddha.”<sup>24</sup> With Bernouf’s publication, the origin of Buddhism was decisively located in India, and its authoritative language taken to be Sanskrit.

In other words, the systematic study of Buddhism began within the linking of a historical founding figure to texts that authorized that figure, and vice versa. The

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<sup>23</sup> Masuzawa, *The Invention*, 125.

<sup>24</sup> Masuzawa, *The Invention*, 125.

emphasis on a historical founder and scripture subsequently allowed European scholars to study and imagine what the “real Buddhism” must have been like in ancient India. With no Indian Buddhists to disagree with scholarly constructions at the time of their creation, academicians were basically given free reign to create what they took to be original, “pure” Buddhism. In the same way that early observers of Buddhism understood its various manifestations as outgrowths of a singular core of idolatry, so scholars began searching through texts for an ideological core linked to the founding figure of their newly “discovered” religion. Subsequently, “Once the singular essence of Buddhism was thus identified, the rich and varied manifestations of actual Buddhism observed throughout modern Asian nations came to be understood as so many derivative forms and latter-day innovations and corruptions.”<sup>25</sup> In this way, European intellectuals granted themselves the authority to construct and control “Buddhism” itself. The practices, philosophies, and texts of South, Southeast and East Asia that did not match with the scholastic Buddhism could be denigrated as perversions. One example of this aggressive application of Western Buddhism will be shown later in this chapter.

Such academic practices do not constitute scholarship for even-handed ideological exchange and understanding. Indeed, the analytical tropes employed in the construction of Buddhism – i.e. emphasis on a historical figure, texts, and internal truth – reveal the extent to which the scholars of the time were looking to understand Buddhism solely from the perspective of Protestant Christianity. In order to assert the dominance of their tradition, Christians were encoding rival perspectives through the

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<sup>25</sup> Masuzawa, *The Invention*, 126.



essential components of their own. Masuzawa writes that even those not actively engaged in Orientalist scholarship had an interest in the outcome of its studies, “...because the matter actually concerned Europeans’ own standing in the spiritual topography and chronology of the world, which seemed to have become increasingly uncertain.”<sup>26</sup> In the colonial era, when contact was being made with non-Christians who often appeared to outnumber their Christian counterparts, some scholars were working hard to prove that Christianity was indeed at the top of the religious order. Their practice was to recognize foreign traditions and encode them through direct comparison to Christianity, so they could be proved on its own terms to be inferior.

Thus, the study of Buddhism emerged in relation to Christianity’s assertion of dominance in a rapidly expanding world. Although it is difficult to prove that the academic construction of Buddhism was directly connected to the European colonial agenda,<sup>27</sup> Western concepts of “Buddhism” are inextricable from the hegemonic ideals of the society that produced it. Indeed, the form of scholarship through which Buddhism emerged was itself an exercise of power from the West. This approach, dubbed Orientalism, had profound effects upon Western understanding of Buddhism, and has been perpetuated for over a century.

In *Orientalism and Religion*, Richard King, like Masuzawa, argues that the “discovery” of Buddhism in the late 19<sup>th</sup> century allowed Western scholars to construct and thereby control their newfound object of study. He fashions his argument by means of Edward Said’s *Orientalism*, which critiques the ways in which Western studies of “the East” are implicated in colonial aggression and assertions of

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<sup>26</sup> Masuzawa, *The Invention*, 143.

<sup>27</sup> Donald Lopez, *Curators of the Buddha*, (Chicago: University of Chicago Press, 1995), 11-12.

ideological and political supremacy that end up producing “the East” as such. For Said, Orientalism refers to three interconnected phenomena: first, to “Orientalists” who study and claim expert knowledge of the Orient; second, to an assumed ontological and epistemological difference between East and West: that is, a distinction between Occident and Orient that splits the world firmly in two; and third, to the institution that asserts its authority over the East by defining it, constructing it, controlling it, “...in short, Orientalism as a Western style for dominating, restructuring and having authority over the Orient.”<sup>28</sup> In concert, these three phenomena reveal the extent to which intellectual endeavors can be profoundly implicated in exercises of political power. As Orientalist scholarship presumed intellectual domination over its objects of study, so Western political bodies enacted related forms of aggression.

Working through Said, King points out that the Orientalist control of its object of study constructs an Oriental Other against which the “West” can define itself. By rejecting its mystical or ancient attributes and assigned them to the “mythic” East, the post-Enlightenment West highlighted its own rationality and modernity.<sup>29</sup> King comments, “In this sense, as post-colonial critics from Edward Said onward have acknowledged, Orientalism is as concerned with the Occident and the preservation of Western cultural identity through the projection of an Oriental Other as it has been with the manipulation of the East”<sup>30</sup>. Here, King points out that the process of Othering is integral to the formation of a concrete in-group, in this case, the West. At

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<sup>28</sup> Edward Said, *Orientalism: Western Conceptions of the Orient*, (London: Penguin Press, 1991), 2-3.

<sup>29</sup> For a brilliant exposition of the gender dynamics implicit in such a dichotomy, see Richard King, *Orientalism and Religion*, (New York: Routledge, 1999), 13.

<sup>30</sup> King, *Orientalism*, 33.

the same time the West was asserting itself through colonial and academic endeavors, then, it was also strengthening its own identity by constructing a distant world it was destined to dominate. This is an essential point for this project, as it relates to a powerful tension in early studies of Buddhism: recognizing Buddhism through familiar Christian characteristics while simultaneously rejecting those same similarities in order to distance the two religions.

It is this context that produced “the historical Buddha” as a social reformer; indeed, this was the first of many ways Western thought worked to classify Buddhism as a “world religion.” In this presentation, the Buddha is said to have overthrown the Brahmanical hierarchy in ancient India in the same way that Martin Luther initiated the Protestant revolution in Medieval Europe. Masuzawa comments, “In other words, according to the prevailing scholarly opinion, the origin of Buddhism was an exemplary case of a great man heroically standing up to the faceless collective power of society and tradition, thus evoking an image that the modern West has come to champion and idolize.”<sup>31</sup> This example highlights the complexity of the forces at work in early scholarship: the religion being studied is itself a construction of those examining it, who draw connections between their own social milieus and the “historical” environs they “reveal” through textual analysis.

As King points out, however, this particular understanding of Buddhism waned in popularity for some as the end of the 19<sup>th</sup> century approached. “One reason for this, [Phillip] Almond suggests, was the fear that the apparent atheism of the Buddha might be perceived as early evidence of precisely those forms of socialism

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<sup>31</sup> Masuzawa, *The Invention*, 136.

that were seen by many as a threat to the structure of [industrial capitalist] English society from the 1880s onwards.”<sup>32</sup> However, anti-clerical Buddhist apologists would later advance this model of the Buddha to highlight Buddhism as a replacement for Christianity. Here is an excellent example of the recognition/rejection model of Buddhist studies mentioned earlier, where an initial resonance is cast aside once it doesn’t serve the political goals of those employing it.

It is, in other words, the ideological instability and spiritual unrest of the European 19<sup>th</sup> century that produced such divergent representations of Buddhism. For some, Buddhism was an inspiringly “universalistic” religion; for others, it was nihilistic pseudo-philosophy.<sup>33</sup> Within each presentation, one can detect the hopes and fears of an architect: scholars seeking to buttress Christianity are more likely to denigrate and reject Buddhism, while post-Enlightenment thinkers might be drawn to Buddhism as an exciting new religion based on social justice, non-dogmatism, rationality, and empiricism. An important trend should be recognized at this point: particular representations of Buddhism have served particular individuals with specific goals.

All this emphasis on Western constructions of Buddhism might seem to indicate that the religion itself was simply the product of an active West subordinating a passive East. But this logic buys into the very same Orientalist expectations against which postcolonial studies strive. King is quick to note that the construction of Buddhism as a Western religious category has profound effects upon the self-conceptions of those on to which it was mapped. He writes, “It is not clear

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<sup>32</sup> King, *Orientalism*, 145.

<sup>33</sup> Masuzawa, *The Invention*, 131.

that the Tibetans, the Sinhalese, or the Chinese conceived of themselves as ‘Buddhists’ before they were so labeled by Westerners.”<sup>34</sup> That being established, King also draws attention to the dangers of assuming that the construction of Buddhism was entirely the product of Western imagination. This view fails to acknowledge the role that indigenous practitioners played in the construction of the categories built around them: as informants, proponents, or resisters. To grant agency to the purported objects of Orientalist study, King argues it is essential to acknowledge the phenomenon of “*intercultural mimesis* – a phrase denoting the cultural interchange that occurs between the native and the Orientalist in the construction of Western knowledge about ‘the Orient.’”<sup>35</sup> It is in this realm of exchange that indigenous experts crafted their presentations of Buddhism both for and against the presuppositions of the West, and fashioned the roots of contemporary Buddhism in the West.

Having examined the creation of Buddhism as a religious category controlled by Western scholars, this paper will now turn to how it was subsequently articulated to and by indigenous practitioners defending their traditions against the onslaughts of modernity. In doing so, it will begin to uncover the relationship between Buddhism and science, as the connection itself was forged in the initial contact of Christian missionaries and Buddhists. For in *The Scientific Buddha*, Lopez notes that Christian missionaries from the 16<sup>th</sup> through the 19<sup>th</sup> centuries often claimed that “primitive” Buddhism lacked true scientific knowledge. He continues, “The efforts by Buddhist elites of the late nineteenth and early twentieth centuries to counter these claims and

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<sup>34</sup> King, *Orientalism*, 144.

<sup>35</sup> King, *Orientalism*, 148.

to argue that, on the contrary, Buddhism is the truly scientific religion (an argument that they seem to have won) were directly precipitated by the Christian attacks.”<sup>36</sup>

From this statement, it becomes clear that science played a pivotal role in the articulation of Buddhism against and above Christianity: a role that has continued to advance Buddhism into the post-modern world. The rest of this chapter will explore the complex story of “Buddhism and science” by revealing the roles indigenous practitioners and Westerners sympathizers played in aligning Buddhism with science itself.

### **“Buddhism” and Science in the Colonies**

Lopez begins his *Buddhism & Science: A Guide for the Perplexed* by emphasizing how and why scholars Sanskrit texts to construct “the Buddha” as a social reformer who abolished the hierarchical caste system and empty rituals of his time. For these scholars, Buddhism “was a religion, if it was a religion at all, that required no dogma, no faith, no divinely inspired scriptures, no ritual, no worship of images, no God.”<sup>37</sup> Here, it is key to note again that Protestant Christian categories are constructing a Buddhism in tension with Protestant Christianity itself. Lopez reveals that this presentation of the Buddha was attractive to the anticlerical academics of the Victorian age, some of who were engaging in a search for a new religion compatible with natural laws rather than a divine Creator.

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<sup>36</sup> Donald Lopez, *The Scientific Buddha: His Short and Happy Life*, (New Haven: Yale University Press, 2012), 10.

<sup>37</sup> Donald Lopez, *Buddhism & Science: A Guide for the Perplexed* (Chicago: University of Chicago Press, 2008), 6.

As previously stated, Buddhism's construction took place in a time rife with ideological instability. Among other events, it coincided with the 1859 publication of Darwin's *Origin of Species*, and absorbed the tension Darwin's book created between Christianity and empirical science. In *The Making of Buddhist Modernism*, David McMahan describes engagement of Buddhism and science as driven by two crisis of legitimacy: a scientific attack on Christianity in the West, and a Christian assault on the Buddhist East.<sup>38</sup> Science was implicated in the onset of both: as a challenge to Christian doctrine in the West, and as Lopez notes, a weapon of Christian domination in the East. Interestingly enough, science itself would end up being used by Buddhist leaders to validate their own tradition in the face of Christianization, and to appeal to a Western audience looking for a religion compatible with science itself. As will be shown, a lineage of scientifically engaged sympathizers and practitioners of Buddhism stretching back into the 19th century drove this alignment of science and Buddhism. While other historical players were involved, this paper begins tracking the lineage with Henry Steel Olcott and Madame Helena Petrova Blavatsky.

In 1875, Olcott, a civil war veteran, and Blavatsky, a Russian émigré, founded their "Theosophical Society:" an organization that would have a tremendous impact in spreading the "wisdom of the East" to Western audiences. While initially interested in studying psychic phenomena with empirical methods, Blavatsky and Olcott ultimately pursued a search for a universal religion that could embrace the claims of modern science. The society was formed in the wake of Darwin's theory of natural selection, and sought to locate science within a religious framework Christianity

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<sup>38</sup> David McMahan, *The Making of Buddhist Modernism* (New York: Oxford University Press, 2008), 90.

could no longer provide. Lopez comments on the Theosophical approach to the division of science and Christianity, “Rather than seeking a refuge from science in religion, Blavatsky and Olcott attempted to found a scientific religion, one that accepted the new discoveries in geology and biology while proclaiming an ancient and esoteric system of spiritual evolution more far-reaching and profound than anything Darwin had described.”<sup>39</sup> In other words, Olcott and Blavatsky’s response to the crisis of faith provoked by Darwin was to construct a religion that could accommodate scientific findings within a frame of spiritual practices drawn from multiple “ancient” sources. This drive to align ancient spiritual truths with scientific practice is a key component of the relationship between Buddhism and science, both then and now.

It is important to emphasize that Olcott and Blavatsky were not searching for a universal religion: they were seeking to make one. However, they needed to look to the wisdom traditions of their world to find material for this “timeless” religion they hoped to engineer. According to McMahan, the Theosophical Society took a “perennialist” attitude in its approach to religion; that is, it strove to find a hidden core of universal truth behind the diverse appearances of various traditions. Finding this pure core was integral to the Theosophical project, and to Olcott and Blavatsky, Buddhism represented the closest thing to what they were looking for. McMahan comments, “Blavatsky said of Buddhism that is it was ‘incomparably higher, more noble, more philosophical and more scientific than the teaching of any other church or religion.’<sup>40</sup> Thus, the Theosophical society identified Buddhism as ideal raw

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<sup>39</sup> Lopez, *Buddhism & Science*, 10-11.

<sup>40</sup> McMahan, *The Making*, 98.



material for the universal spiritual tradition they sought to “discover.” It should come as no surprise that their “Buddhism” was the one produced by Western scholarship; crafted to highlight the non-dogmatic rationality that drew Olcott and Blavatsky to it in the first place. It is this allegedly pure form of Buddhism that Olcott and Blavatsky would bring with them to the lived Buddhist world.

After reading the account of a debate in 1873 between a Buddhist monk and Christian missionary in British Ceylon entitled *Buddhism and Christianity Face to Face*, Olcott and Blavatsky decided to sail East to help the Sinhalese Buddhists defend themselves against Christian missionary activities. In 1880, Olcott and Blavatsky both took the vows of lay Buddhists at a public ceremony in Ceylon, signifying their commitment to the Sinhalese cause. Lopez notes, “Olcott took it as his task to restore true Buddhism to Ceylon and to counter the efforts of the Christian missionaries on the island.”<sup>41</sup> Confident that his Buddhism was pure and true, Olcott set out to strengthen the Sinhalese Buddhist community by teaching *them* what Buddhism really was all about. This is striking instance of Orientalism in action: a Westerner decides to defend an indigenous tradition from a Western religion by teaching them the Western construction of their own doctrines.

Olcott made efforts to reform Buddhism in Ceylon by founding the Buddhist Theosophical Society and the Young Man’s Buddhist Association (YMBA). Most importantly, in 1881 he published *A Buddhist Catechism*, a short book of core “Buddhist” doctrines modeled on Christian missionary texts. McMahan writes of Olcott’s *Catechism*, “His aim was to disentangle the ‘true’ teachings – by definition,

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<sup>41</sup> Lopez, *Buddhism & Science*, 11.

those that he saw as consonant with the modern, ‘scientific’ worldview mediated through Theosophy – from the weight of what he saw as accumulated cultural baggage.”<sup>42</sup> Thus, the initial presentation of “Buddhism” to a practicing community came loaded with presuppositions of compatibility between Buddhism and science. As will be shown, this presentation helped indigenous modernizers shape their defense against Christianization and their presentation to the West. The textual basis for this presentation, arranged in question-answer format, became immensely popular in Olcott’s time and *is still taught there today*.<sup>43</sup>

A word of caution: from its presentation in this paper, it may be again tempting to conceptualize the story in Ceylon as the movements of an active West over and through a passive East. However, this approach falls into the Orientalist trap of silencing the voices of Asian Buddhists. Again, the aim of this chapter is not to negate the role that Asian Buddhists played in the formation of the Buddhism and science discourse. As King notes, “To ignore the role played by Asians themselves in the construction of Orientalist discourse results not only in the myth of the passive Oriental but also perpetuates precisely the East-West dichotomy that is such a feature of Orientalist discourse.”<sup>44</sup> In other words, denying agency to the Sinhalese in telling this story echoes the stance that Olcott took when he took it upon himself to save Buddhism from Christianity. It is certainly important to note the role that Western ideologies played in the formation of the Sinhalese Buddhism, but it is also essential to explore the ways in which indigenous practitioners worked with and against the language of the West to serve their own goals. To this end, this paper now turns to

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<sup>42</sup> McMahan, *The Making*, 99.

<sup>43</sup> McMahan, *The Making*, 99.

<sup>44</sup> King, *Orientalism*, 158.

Anagarika Dharmapāla, a native of Ceylon and associate of Olcott's: the next key figure in the Buddhism & science lineage.

Born in 1864 as David Hewaviratne, Dharmapāla was raised by a middle class, English speaking family in Colombo, Sri Lanka, and received his education from Catholic and Anglican schools. In 1880, he met Olcott and Blavatsky during their first visit to Sri Lanka, and joined the Theosophical society four years later, taking the name Anagarika Dharmapāla – “Homeless Protector of the Dharma.” Dharmapāla became Olcott's closest associate and fellow defender of Buddhism, traveling with him to Japan in 1889 before representing Buddhism four years later at the World Parliament of Religions in Chicago.<sup>45</sup> It was there, at the turn of the 20<sup>th</sup> century, that the charismatic and articulate Dharmapāla presented the Buddhism of science to a Western audience.

### **Buddhism Returns to the West**

As part of the 1893 World's Fair, the World Parliament of Religions was ostensibly an effort to bring the many traditions of the world together in a spirit of fraternal connection.<sup>46</sup> According to Lopez, McMahan, Masuzawa and others, however, the Parliament might be best understood as an attempt to portray a liberal utopian vision of late 19<sup>th</sup> century America in contrast to the less civilized and “exotic” civilizations from around the world.<sup>47</sup> The physical space of the fair was

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<sup>45</sup> Lopez, *Buddhism & Science*, 14-15.

<sup>46</sup> Judith Snodgrass, *Presenting Japanese Buddhism to the West*, (Chapel Hill: University of North Carolina, 2003), 1.

<sup>47</sup> McMahan, *The Making*, 92.

divided between the “White City,” which celebrated the achievements of Christopher Columbus and modern American society, and the “Midway Plaisance,” which depicted the bizarre and barbaric civilizations of the “primitive” civilizations of the non-Western world. McMahan comments “The implicit ideology behind such representations was the evolutionary model of religions, according to which all world religions were stages along the way to the most highly evolved form of religion and society.”<sup>48</sup> It is interesting to note here the appropriation of the language of evolution in service of Christianity. Despite the ideological schisms between creationism and evolution, Darwin’s language was employed the World’s Fair to depict Western civilization, religion, and science as the apex of human development. Brilliantly, Dharmapāla appropriated the growing tension between Christianity and science to great effect.

Stemming from his experiences working with Olcott in Sri Lanka, Dharmapāla chose to highlight the correlations between science and Buddhism against Christianity. At the parliament, he argued against the existence of a “supreme Creator” by asserting that the Buddha instead accepted “the doctrine of evolution as the only true one, with its corollary, the law of cause and effect.”<sup>49</sup> This is an impressive move: Dharmapāla utilized his knowledge of science to align Buddhism with a fundamental law (cause and effect), and a radical new idea that was in process of completely altering the way humanity pictured itself (evolution). McMahan comments, “In claiming these concepts for Buddhism, he fused them with the doctrine that everything emerges from causes and conditions (*hetu-pratyaya*),

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<sup>48</sup> McMahan, *The Making*, 93.

<sup>49</sup> McMahan, *The Making*, 91.

dependent origination (*pratītya-samutpāda*) and the doctrine of karma.”<sup>50</sup>

Dharmapāla’s knowledge of both scientific and Buddhist concepts allowed him to make a powerful equation between the ancient wisdom of the Buddha and the most advanced scientific thinking of the time. Furthermore, this connection highlighted that science was in fact still working towards the original truths discovered by the Buddha 2,400 years earlier.

At a World’s Fair designed to spotlight the dominance of Christianity, Dharmapāla forged an alliance with Christianity’s complex counterpart: empirical science. It is no coincidence that the other Buddhist representative at the Parliament, Japanese Zen practitioner Shaku Sōen, also concentrated on the connection between the law of karma and that of cause and effect.<sup>51</sup> By subsuming the language of science under Buddhist discourse, Dharmapāla and Sōen were able to make the radical suggestion that the Buddha *already knew* what science was just beginning to discover. This, in turn, disrupted the religious taxonomy imposed upon them by the Western world by demonstrating that ancient Buddhist thought was actually far ahead of the West’s best thinking. McMahan concludes, “Employing scientific language to express, translate, and transform Buddhist ideas, these Buddhists were both stretching scientific vocabulary to fit emerging Buddhist agendas and attempting to subvert the dominant Western culture’s hegemonic ideology with its own language.”<sup>52</sup> In other words, Eastern practitioners were able to use the language imposed upon them by the West to fit their own goals. Dharmapāla used the “pure” Buddhism constructed by scholars and brought to Sri Lanka by Olcott to appeal to the scientific orientation of

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<sup>50</sup> McMahan, *The Making*, 92.

<sup>51</sup> Lopez, *Buddhism & Science*, 21.

<sup>52</sup> McMahan, *The Making*, 93.

the society that produced it, and thereby undermine the assertions of dominance from that very society. Through Olcott and Dharmapāla, Buddhism suddenly jumped from the bottom of the religious scale to the top. No longer could Christian missionaries so easily level charges of pre-scientific ignorance against the Buddhist world. With the help of other sympathetic Westerners, the connection between Buddhism and science would only grow stronger over the next century.

One final figure also present at the Parliament would have a tremendous impact on Western conceptions of the relationship between Buddhism and science.

His name was Paul Carus, editor of two periodicals and publisher of more than seventy books and hundreds of articles on philosophy, science and religion.<sup>53</sup>

Although he was raised as a conservative Christian, Carus went through a crisis of faith that led to an abandonment of Christianity in favor of science. Carus' own vitriolic talk at the Parliament centered on the conflict between science and Christianity, which from his perspective, would catalyze the demise of the Christian worldview. In his words, "You who preach such a religion, can you fathom the tortures of a faithful and God-loving soul, when confronted with ample scientific evidence of the untruth of his religious convictions?"<sup>54</sup> For Carus, the conflict between science and Christianity was clear: Christian dogmas could not be upheld in the light of new scientific truths. Furthermore, Carus' believed that the loss of Christian metaphysics would initiate the collapse of his society's moral and ethical systems. He writes of this predicted slide into nihilism, "The highest ideals have

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<sup>53</sup> McMahan, *The Making*, 101.

<sup>54</sup> Paul Carus, *The Dawn of a New Religious Era and Other Essays*, (Chicago and London: Open Court Press, 1916), 34.

become illusions: the purpose of life is gone, and desolation rules supreme.”<sup>55</sup> By projecting his own crisis of faith onto what he believed would befall society at large, Carus became invested in the search for a new religion grounded in scientific truth that would still give people purpose and ethical guidelines.

Like Olcott, who sought to construct a new universal religion in accord with science, Carus aimed to create a new tradition that would emerge through the rise of science and increased contact among the world’s religions of the time: a so-called “Religion of Science.”<sup>56</sup> Luckily for him, the already-modernized form of Buddhism presented at the conference by Dharmapāla and Sōen represented a useful precursor to what Carus was looking for: a religion translated through and compatible with the language of science itself. Carus’ high position in the literary world of the time allowed him to spread his newfound enthusiasm for Buddhism to a wide audience, and control the language with which it was presented. According to McMahan, Carus’ Buddhism was loaded with concepts from Enlightenment rationalism and 19<sup>th</sup> century science,

Karma was natural law translated into the ethical realm; rebirth anticipated the Darwinian understanding of species transforming themselves into other species; the detailed analysis of mind in Buddhist texts were found to be in fundamental agreement with modern psychology; the exhortation of the Buddha to be ‘lamps unto yourselves,’ not blindly believing but verifying his statements experientially, contained the quintessence of the scientific spirit.<sup>57</sup>

Thus with Carus, the “pure” and “scientific” Buddhism engineered in response to Christianity finally made its way back to a Westerner both ready and able to promote it to wide audience. The irony is that the very Buddhism that Carus “discovered” at

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<sup>55</sup> Carus, *The Dawn*, 35.

<sup>56</sup> McMahan, *The Making*, 103.

<sup>57</sup> McMahan, *The Making*, 103.

the Parliament was already loaded with exactly what he was looking for in a “Religion of Science”. Thus Carus was able to promote the Buddha as a “Prophet of the Religion of Science,” and help establish the Western construction of Buddhism as an ancient tradition that predicted scientific truths.

Here, it will be useful to examine some of the similarities between Olcott and Carus’ approaches to Buddhism. Though each had different motivations and trajectories with respect to Buddhism, both were working out of disenchantment with Christianity at a time when it was being challenged both by the rise of science and a proliferation of conflicting worldviews brought into focus via colonial encounters. Although neither was hoping to defend Christianity against rival traditions, both Olcott and Carus, like others of their time, were struggling to make sense of truth claims coming simultaneously from many sources. McMahan comments, “For some, including Carus and Olcott, the solution to this problem lay in a universalist interpretation of religion in which the conflicting claims of various philosophies and religions could be reconciled by their own self-transcendence.”<sup>58</sup> By claiming that every historical tradition has some manifestation of the hidden, transcendent Truth that animates them all, Carus and Olcott could use bits and pieces of each to construct a purportedly universal religion. This is what allowed each of them to utilize Buddhism for his own ideological projects. For Olcott, Buddhism was the primary esoteric tradition at the heart of all religions, waiting to be synchronized with the truths of the scientific worldview. For Carus, Buddhism was the harbinger of the Religion of Science, pointing the way to a universal religion that would discard its

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<sup>58</sup> McMahan, *The Making*, 109.



historical particularities to form a universally valid religious scientism. For both, the emphasis on universalism subsumed Buddhism within a larger project, a move that would instigate a break between Olcott and Dharmapāla.

Unlike Olcott and Carus, who were responding to the Victorian crisis of faith in the West, Dharmapāla's presentation of Buddhism was related to the crisis of colonialism and Christianization in his native Ceylon. Because Dharmapāla was interested in using the language of science to convey the superiority of Buddhism over both Christianity and science, he came to take great issue with Olcott's relegation of Buddhism to a status lower than Olcott's Theosophy. Furthermore, Dharmapāla disagreed with the fundamental orientation of Olcott's project, rejecting the idea of assimilation into Western notions of universal truth. In Dharmapāla's own words, "To say that all religions have a common foundation only shows the ignorance of the speaker... Dharma alone is supreme to the Buddhist."<sup>59</sup> For Dharmapāla, using science to emphasize the enduring truth of Buddhism was integral to his project of defending his homeland against Western hegemony and Christianization, a project threatened by the religious universalism of Olcott and Carus. Thus, despite common ground in the scientific language of Buddhism used by Carus and Olcott on one hand, and Dharmapāla on the other, the motivations of each reveals a break between what McMahan refers to as the "universalist" and "indigenous modernist" approaches to the discourse of science and Buddhism.<sup>60</sup>

The divide between these two approaches is a useful aspect to track through the engagement of science and Buddhism, as it helps reveal power dynamics

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<sup>59</sup> Anagarika Dharmapāla, *Return to Righteousness: A Collection of Speeches, Essays and Letters of Anagarika Dharmapāla* (Ceylon: Government Press, 1965), 172.

<sup>60</sup> McMahan, *The Making*, 113.

perpetuated in and by the dialogue itself. Lopez is quick to note similarities between 19<sup>th</sup> and early 20<sup>th</sup> century presentations of Buddhism by Asian Buddhist leaders, writing, “Although each offered a somewhat different view from the other, together they regard Buddhism as that religion most compatible with Science, although they also hold that Buddhism offers access to states of wisdom that Science alone can never attain.”<sup>61</sup> Claiming that Buddhism not only predicts but also actually surpasses the truth claims of science allowed Asian Buddhist leaders to appeal to a scientifically minded West without subsuming their tradition within its worldview. Indeed, it has been and continues to be important for proponents of Buddhism to assert their epistemic authority against that of empirical science, for as King points out, the very framing of the question, “How scientific is Buddhism?” privileges scientific knowing over that of Buddhism by making the latter accountable to the former.<sup>62</sup> To a surprising degree, the imbalance of power and the patterns of universalist and indigenous modernist thought examined in the early discourse of science and Buddhism are still prevalent to this day.

### **“Mystical” Buddhism and the Tao of Physics**

After the initial flurry of activity presented so far in this chapter, Lopez notes that the discourse of Buddhism and science was largely silent until the 1960’s and 70’s, which marked the publication of physicist Fritjof Capra’s *The Tao of Physics*:

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<sup>61</sup> Lopez, *Buddhism & Science*, 24.

<sup>62</sup> King, *Orientalism and*, 151.

*An Exploration of the Parallels between Modern Physics and Eastern Mysticism.*<sup>63</sup> In his book, Capra presents a view of modern physics that purportedly resonates with the underlying truth of *every* mystical philosophical tradition. He claims, “The argument of this book could therefore be phrased more generally, by saying that modern physics leads us to a view of the world which is similar to the views held by mystics of all ages and traditions.”<sup>64</sup> The author’s language is telling here, as the singular (authoritative) worldview of modern physics leads to the “timeless” views of mystics across the globe and well into the past. Lopez comments, “Like the Theosophists of the 19<sup>th</sup> century, Capra sees a deep foundation from which all mystical traditions arise, a tradition that both anticipates and is confirmed by what he calls ‘The New Physics,’”<sup>65</sup>. In other words, Capra is claiming that the mystical traditions of the East have known for millennia what quantum physics is beginning to reveal: “The basic oneness of the universe.”<sup>66</sup> In order to align Buddhism and *every other* Eastern mystical tradition with a somewhat idiosyncratic interpretation of quantum physics, however, Capra must do some intellectual gymnastics.

Capra’s short chapter on the essentially “psychological” Buddhism is sandwiched between the “imaginative, metaphysical, and transcendental” Hinduism on one side, and the “practical, pragmatic, and socially minded” Chinese thought on the other.<sup>67</sup> It is interesting to note that Capra’s presentation of Buddhism centers primarily on Nāgārjuna’s concept of “emptiness,” which Capra understands to

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<sup>63</sup> Note here that even in the title of Capra’s book, a binary operates between the modern scientific West and the (tacitly) ancient and spiritual East.

<sup>64</sup> Fritjof Capra, *The Tao of Physics: An Exploration of the Parallels between Modern Physics and Eastern Mysticism* (Boston: Shambala Press, 2010), 19.

<sup>65</sup> Lopez, *Buddhism & Science*, 26.

<sup>66</sup> Capra. *The Tao*, 131.

<sup>67</sup> Capra, *The Tao*, 99.

represent a underlying interconnectivity behind all things: an essential “unity and interrelation” that is ungraspable by concepts. As will be shown, this problematic and incorrect appropriation of Nāgārjuna allows Capra to argue that Buddhism is just another Eastern tradition articulating a metaphysic of cosmic unity. By crafting a Buddhism that excludes the philosophy of other streams of non-Mahāyāna Buddhism, Capra is also forced to mangle the complexity of Nāgārjuna’s thought to make it say what he needs it to. By seeking equation rather than comparison between “Buddhism” and “quantum physics,” Capra is forced to do conceptual violence to both.

Furthermore, it important to note that Capra’s classificatory scheme presupposes on unchanging mystical essence behind all three “traditions,” even though some of them, like Buddhism, are presented as inherently more scientific than the others. With the help of McMahan, it becomes clear that Capra is writing in the universalist vein, where Buddhism is just one of many historical traditions with partial claim to the truth behind all “mystical” traditions. By positing a relationship between this enduring truth and the discoveries of modern physics, Capra suggests that Buddhism shows physics is on the right track towards ultimate reality.

The reality envisioned by Capra is what he refers to as the “most important characteristic of the Eastern worldview:” the recognition of basic oneness connecting all things. He writes of this unity, “All things are seen as interdependent and inseparable parts of this cosmic whole; as different manifestations of the same ultimate reality.”<sup>68</sup> Here, King’s writing on Orientalism is useful to reveal the way in which Capra lays claim to “Eastern” understanding of reality, and sets it in

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<sup>68</sup> Capra, *The Tao*, 130.

conversation with “Western” physics. This move both grants the power of knowing to the West, and differentiates Occident and Orient within a binary of modern and ancient truth. Capra’s ability to collapse different traditions into a singular “universal truth” designed to resonate with modern physics is what allows him to write of the “joy” and “inspiration” that comes from recognizing the similarities between them, “...that the principal theories and models of modern physics leads to a view of the world which is internally consistent and in perfect harmony with the views of Eastern mysticism.”<sup>69</sup> This language of harmony and compatibility between modern physics and mystical truths helped to generate an assumption of similarity between quantum physics and Buddhism that deserves to be both contextualized and refuted.

Besides pointing out the problems with Capra’s language of unity, Lopez is also quick to interrogate Capra’s desire for discoveries in modern physics to be resonant with ancient wisdom. Lopez comments, “One can only assume he finds a deep comfort in the knowledge that what is newly known was once know long ago.”<sup>70</sup> However, Lopez is also quick to note that the “ancient” Buddhism wisdom on which Capra draws in the *Tao of Physics* is primarily drawn from modern Buddhist apologists such as D.T Suzuki, who was taught by the same Shaku Sōen that presented with Dharmapāla to Paul Carus at the World Parliament of Religions.<sup>71</sup> Similarly to how Carus found in the construction of scientific Buddhism an ideal candidate for his new Religion of Science, so Capra saw in the Buddhism of D.T. Suzuki an “ancient” wisdom that was remarkably compatible with science. This is to say that there have been, and continue to be, presentations of Buddhism that are

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<sup>69</sup> Capra, *The Tao*, 303.

<sup>70</sup> Lopez, *Buddhism & Science*, 28.

<sup>71</sup> Lopez, *Buddhism & Science*, 28.

*designed to appeal to those within a scientific worldview.* Thus, to claim compatibility between these Buddhisms and science is often to state a tautology that often misses the reasons why the conflation is possible in the first place.

Thus, a critical task in the contemporary discourse of science and Buddhism is to analyze what exactly is meant by the terms “science” and “Buddhism,” as well as how and why they are used in conversation. This chapter has already exposed the power dynamics entrenched in the dialogue between the two, as well as the complex process of intercultural mimesis in colonized nations that entangled currents of Western thought within Buddhism, thereby allowing Western society to recognize and champion itself within the Buddhisms presented by indigenous modernizers. Thus, focusing the dialogue between Buddhism and science only on those forms of Buddhism that have been designed to be compatible with science represents an exercise in Occidental narcissism. Besides, as McMahan points out, “Both Buddhism and science are too complex and internally variegated for such reductions to be useful.”<sup>72</sup>

In other words, the question itself of whether or not Buddhism and science are compatible presupposes the monoliths “Buddhism” and “science” that simply do not exist. As Lopez has shown, both “Buddhism” and “science” have referred to a diversity of schools, concepts and philosophies over their century of engagement, and yet the claims for compatibility between them have remained largely the same. He continues, “And in each case, in order for the claim to be made, each term must be radically restricted.”<sup>73</sup> Thus, scholars in the late 20<sup>th</sup> century has come to argue that

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<sup>72</sup> McMahan, *The Making*, 114.

<sup>73</sup> Lopez, *Buddhism & Science*, 32.

the “dialogue” between “Buddhism” and “science” is often more of a discrete set of comparisons from particular places and times, largely driven by trends in Western thought. Somehow, claims of compatibility continued through the transition from classical to quantum physics in the early 20<sup>th</sup> century, although the Buddhism they referred to changed dramatically depending on the science of the time.

Thankfully, as appreciation for the complexity and dissonances between various traditions of Buddhism and science has increased, so the dialogues between scientists and Buddhists have shifted into more and more specific areas of inquiry.<sup>74</sup> At the same time, recognition of how Buddhist leaders have appropriated scientific concepts has shifted attention from questions of how scientific “Buddhism” is, to how different Buddhisms are transforming themselves via their engagement with science. McMahan concludes, “Rather than telling us what Buddhism ‘is,’ the discourse of scientific Buddhism itself is constitutive of novel forms of Buddhism, with shifting epistemic structures and criteria for authority and legitimacy.”<sup>75</sup> Here, McMahan is pointing out that as different traditions of Buddhism articulate themselves through the language of science, they simultaneously enter into a complex epistemological relationship with a system of world making that has a powerful hold on “truth” in the modern world. For instance, Dharmapāla was careful to use the language of science to assert the supremacy of Buddhist truths, for they both anticipated and confirmed scientific findings. In contrast, both Carus and Olcott used the language of science to

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<sup>74</sup> Such as comparing specific philosophical schools and Buddhist thinkers rather than attempting to analyze “Buddhist thought,” as if it was a systemic whole; or studying the neurological effects of particular meditative practices, rather than the physiological impact of “meditation” entire. See Cabézon, “Buddhism and Science: On the Nature of the Dialogue” in *Buddhism and Science: Breaking New Ground*, ed. B. Alan Wallace, (New York: Columbia University Press) 2003, 57.

<sup>75</sup> McMahan, *The Making*, 115.

validate Buddhism over Christianity, but still emphasized that *science* validated the Buddhist truths useful for their universal religions. Both approaches establish different levels of authority for Buddhism and science respectively, and it is easy to imagine which of them dominated the Western imagination.

### **Contemporary Implications**

With these reflections in place, it is time to introduce the most recent and dominant figure in the story of Buddhism and science: the Dalai Lama. Lopez describes His Holiness as one of the most visible and influential figures in the discourse of science and Buddhism, mostly because of his position of authority as spiritual and temporal leader of Tibet.<sup>76</sup> Following the invasion of Tibet by Chinese in 1950 and the subsequent failed Tibetan uprising in 1959, the Dalai Lama has lived in exile, working to preserve his culture in times of massive upheaval. Part of his project has been to secure a foothold for Tibetan Buddhism in the modern age through dialogue with science. Remembering from the introduction that the Dalai Lama has opened up claims of Buddhism to falsification by empirically justified scientific practice<sup>77</sup>, it seems as though he has rejected the Buddhist authority espoused by Dharmapāla and others, leaving Buddhist truths at the mercy of scientific facts.

However, Lopez notes that the Dalai Lama, while subjecting Buddhist doctrine to scientific validation in the conceptual sphere, maintains that Buddhist practice still is the only path to the liberation of realizing ultimate truth. This

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<sup>76</sup> Lopez, *Buddhism & Science*, 28.

<sup>77</sup> Dalai Lama, *The Universe in a Single Atom: The Convergence of Science and Spirituality*, (New York: Broadway Books, 2005), 3.



bifurcation of truth into a conceptually “relative” and soteriologically “ultimate” sphere allows for Tibetan Buddhism to strengthen itself through debate with science in the conceptual realm, while protecting its soteriological system from invalidation in the ultimate. Lopez continues, “And where the line between the ultimate and conceptual must be drawn is a question that Buddhist thinkers have pondered, and contested, for two millennia.”<sup>78</sup> Thus, rather than leaving Buddhism at the mercy of science, the Dalai Lama has actually managed to pull science itself into the two-truths system of Buddhism. This is a fascinating example of what McMahan highlights as shifting epistemological authority and the transformation of Buddhism through engagement with science.

Hence, the Dalai Lama doesn’t fit cleanly into McMahan’s category of “universalist” or “indigenous modernizer,” for while ceding authority to science in the conceptual realm, he maintains Buddhist superiority in the ultimate. For indeed, he believes that “spirituality and science are different but complementary investigative approaches with the same greater goal, of seeking the truth.”<sup>79</sup> Such a bifurcation of Buddhism’s and science’s respective domains relates in part to what José Cabézon dubs the “complementarity” model of interaction between Buddhism and science, where Buddhism is seen to offer *transformative* knowledge of the interior world, and science *factual* knowledge of the external.<sup>80</sup> The resonance with quantum mechanics is not accidental here, for Cabézon understands the complementary approach as a framing of Buddhism and science into mutually exclusive, or complementary, spheres.

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<sup>78</sup> Lopez, *Buddhism & Science*, 34-35.

<sup>79</sup> Dalai Lama, *The Universe*, 4.

<sup>80</sup> Cabézon, “Buddhism and Science,” 49.

Specifically, the complementarity approach constructs mutually exclusive domains of knowledge for science and Buddhism respectively: matter/mind, rationalist/experiential, quantitative/qualitative, conventional/contemplative, material/spiritual.<sup>81</sup> In each case, constructed differences between Buddhism and science are mobilized to highlight how they complement one another in the exploration of a common object: reality itself. The implication is that although Buddhism and science are not dependent upon one another, humanity needs both – what Capra sees as “a dynamic interplay between mystical intuition and scientific analysis,” towards an enduring ultimate reality.<sup>82</sup> Here, Capra constructs a division between intuitional (feminine) Buddhism and analytical (masculine) science, a gendered dichotomy that serves to keep the two well separated.

As Cabézon rightly points out, the complementarity approach to science and Buddhism often ends up preventing real dialogue between them. He writes, “Dialogue can be stunted by a dichotomizing logic of strict complementarity that is taken too literally, and applied too strongly, by a structuralist logic of binary opposition creating impermeable categories that cease to operate as metaphors and come to be believed as real.”<sup>83</sup> Within this binary system, “Buddhism” is seen to refer only to the study of the mind and ethics, while “science” is supposed to concern itself with only the external and material. Hence, the structuring of the relationship between the two creates non-overlapping spheres into which “Buddhism” and “science” must

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<sup>81</sup> Cabézon, “Buddhism and Science,” 50. The Dalai Lama, however, eschews such clean binaries in favor of a more complex mode of engagement, where Buddhist ontologies can and should be compared to scientific ones.

<sup>82</sup> Capra, *The Tao*, 297. As will be shown, it is unclear that the Dalai Lama would accept the existence of such a reality.

<sup>83</sup> Cabézon, “Buddhism and Science,” 58.

neatly fit.<sup>84</sup> This division, of course, misses the extent to which certain Buddhists concern themselves with analysis of the matter and the world, and scientists with the study of mind and meaning. In short, it constructs a binary that silences Buddhists on matters of materiality, and constricts the sciences' abilities to speak about mind. This is not to say that these restrictions are applied equally however, for as we have seen throughout this chapter, it is the authority of science that constructs the binaries between Buddhism and itself.

Cabézon continues his critique of this arrangement, "Peace [between Buddhism and science] appears to be the reward, but it is a false peace, one based on convenience and not on truth, for the *truth* is that both Buddhism and science are highly complex, totalizing worldviews that defy the literalist and structuralist attempts to delimit them."<sup>85</sup> Thus for Cabézon, a truly healthy dialogue between scientists and Buddhists would include issues that concern them both, and thus produce meaningful *incompatibilities* between them. Ideally, these differences would not result in a rejection of the others' conceptions of "truth" from either side, but an appreciation of harmonious *and* irreconcilable perspectives on reality that emerge when the two are allowed to come into view simultaneously and in context specific ways. This approach becomes possible when the epistemological playing field is leveled as much as possible through historical contextualization and careful philosophical comparison.

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<sup>84</sup> Or alternatively, a binary structure that privileges science with access to conventional truth and Buddhism to ultimate reality. In either case, the dichotomy seeks to erase the already existing ingresses into the other's purported domains.

<sup>85</sup> Cabézon, "Buddhism and Science," 59.

For like other Buddhist leaders of the 19<sup>th</sup> and 20<sup>th</sup> century, the Dalai Lama's ideological project is inextricable from the social, cultural, and political concerns with which it arose. We have already seen how Dharmapāla and Buddhist leaders used the discourse of science and Buddhism in their defense of Buddhism against Christian charges of pre-scientific superstitious practice. In a similar fashion, the Dalai Lama has allied his tradition with science to combat the dominant view of 19<sup>th</sup> century Western Orientalists and 20<sup>th</sup> century Chinese communists: that Tibetan Buddhism is a ritualistic and superstitious perversion of Buddhism. "Rather," Lopez writes, "Tibetan Buddhism is presented as a worthy interlocutor of Science and hence an appropriate ideology of a modern nation that might one day exist."<sup>86</sup> It is clear what the Dalai Lama stands to gain from scientific appreciation of Tibetan Buddhism. At the same time, he must also ensure that the balance of power doesn't swing too far in favor of science's authority over that of Buddhism; hence the division of scientific and Buddhist authority into the domains of conceptual and ultimate reality respectively.<sup>87</sup>

So far, this chapter has outlined the origins of "Buddhism" as a predominantly Western construct, pre-loaded with scientific language that highlights the components of the textual tradition scholars found compelling. Subsequently, the chapter examined how this construct was exported to the Buddhist world by Western

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<sup>86</sup> Lopez, *Buddhism & Science*, 33.

<sup>87</sup> One could certainly complicate this understanding of the Dalai Lama's position by introducing Nāgārjuna's view that conventional reality and ultimate reality are coextensive, which would collapse any inherent distinction between the purportedly "complementary" domains of Buddhism and science. From this perspective, the Dalai Lama's position becomes far more complex, for it eschews any sort of universalist ultimate reality upon which science and Buddhism could agree. As we shall see, the rejection of ultimate reality in both Tibetan Buddhism and quantum physics makes for extremely complex modes of engagement between the two.

sympathizers, who then helped indigenous modernizers engineer a defense against Western hegemony and Christianization with the language of science. This product of this intercultural mimesis was then brought back to West, where it triggered a widespread interest in Buddhism that has rippled throughout each subsequent iteration of the “Buddhism and science” dialogue. Never separate from cultural, political, and social concerns, the dialogue has granted science overwhelming authority over Buddhism on most matters of truth, which reflects the power exerted by the West through Orientalist scholarship and scientific triumphalism of the time. At the start of the 21<sup>st</sup> century, as philosophers of science are becoming increasingly critical of science’s claim to ultimate truth, perhaps it is time to approach the dialogue between Buddhism and science from a different perspective, one that seeks to give each enough room to articulate itself without having to be forced into agreement with the other.

To do so, rather than attempting a problematic comparison of a broad field of Buddhist and scientific thought, I will focus on the writings of two specific philosophers. Furthermore, rather than attempting to show how their writings complement one another, the project will show where they diverge, and why these differences are important to highlight rather than erase. In this way, emphasizing differentiation will help to reverse the Orientalist trend of controlling objects of study to highlight the similarities they construct, and the triumphalist tendency to subject Buddhist claims to scientific validation. With both philosophers situated in their respective contexts, the arguments of each can be appreciated on their own terms as

much as possible, and help provide useful ways of thinking in a time when the foundations of “truth” are not as clear as they once were.

Rather than Capra, who attempted to show how Tibetan Buddhism and quantum physics point towards the same ultimate reality, I aim to reveal how two integral thinkers in the Buddhist and quantum worlds reject the notion of absolute reality itself. However, it will also show that they do so along very different lines of argumentation, and for entirely different reasons. Ultimately, it will even point to some irreconcilable differences in the philosophies of each. For the moment, it now turns to the writings of 3<sup>rd</sup> century architect of the Madhyamaka school of Buddhist philosophy, Nāgārjuna. Although Nāgārjuna is the primary metaphysician of the Dalai Lama’s sect of the Tibetan Buddhism, Nāgārjuna views will not be taken to represent all of Tibetan Buddhism, which is itself a complex and internally variegated tradition. Furthermore, as the next chapter suggests, his writings, like Buddhism generally, have their own history of appropriation and modification by Western scholars to fit their own needs.

## Chapter Two: Nāgārjuna and the Rejection of Ultimate Reality

Reality, or Emptiness, itself is not a state of mere nothingness, but is the very source of all life and the essence of all forms.

– Fritjof Capra, b. 1939

Emptiness is taught by the Conquerors as the expedient to get rid of all [metaphysical] views. / But those for whom emptiness is a [metaphysical] view, they have been called incurable.

– Nāgārjuna, c. 150 CE

In order to assess contemporary claims of the compatibility between quantum physics and Tibetan Buddhism, we now turn to examine the views of reality in Tibetan Buddhism that might subtend such propositions. The problem is that even a cursory survey of the diversity of practices, scriptures, schools and sects gathered under this heading show it is just as dangerous to posit a monolithic “Tibetan Buddhism” as it is to assert a unified “Buddhism.” That being said, there are certainly commonalities among the four main orders of Tibetan Buddhism: Nyingma, Kagyu, Sakya, and Géluk. In his *Concise Introduction to Tibetan Buddhism*, John Powers shows that the four orders share a common soteriology, outline of monastic discipline, and corpus of texts imported from India.<sup>88</sup> Indeed, all four schools are linked by their use of special techniques for spiritual attainment. Powers defines these practices, or *tantras*, as “systems of practice and meditation derived from esoteric texts emphasizing cognitive transformation through visualizations, symbols, and ritual.”<sup>89</sup> Such tantras form the technical heart of Tibetan Buddhism, and are a distinguishing characteristic of its unique approach to practice. However, although tantric practice is common to all four sects generally, the approach to tantras itself

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<sup>88</sup> John Powers, *A Concise Introduction to Tibetan Buddhism*, (Ithica: Snow Lion Press, 2008), 104.

<sup>89</sup> Powers, *A Concise*, 63.

differs from school to school. For instance, while the Nyingma School holds *Dzogchen* (Great Perfection) as its highest practice, the Karma Kagyu sect emphasizes the efficacy of *Mahāmudrā* (Great Seal). Each system of tantra represents a comprehensive but distinct route to liberation for each school, although there are philosophical and technical connections between them.

Although the techniques employed by each sect on the paths to enlightenment differ, the general outline of the path itself remains the same. Powers continues, “This has been noted by the Dalai Lama, who states that the philosophical view of all orders is that of the Middle Way School of Nāgārjuna, and in terms of practice all follow the program of Mahāyāna.”<sup>90</sup> While all of these terms will be explicated later in this chapter, it is important to note here that the current Dalai Lama, temporal and spiritual leader of Tibet, asserts that the philosophical views of the school of Nāgārjuna are dominant across many traditions of Tibetan Buddhism. Therefore, although the works of Nāgārjuna do not necessarily represent the philosophy of Tibetan Buddhism *tout court*, they do offer a particular picture of Tibetan Buddhist thought that has been authorized by one of the primary figures in the dialogue of concerning “Buddhism and Science.”

Unfortunately, however, assessing the writings of Nāgārjuna is not as simple as turning to one of “his” primary works. This is true for a number of reasons which include: almost a hundred years of scholarly disagreement concerning the existence and location of a “historical” Nāgārjuna;<sup>91</sup> the multiple commentarial traditions

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<sup>90</sup> Powers, *A Concise*, 104.

<sup>91</sup> Joseph Walser, *Nāgārjuna in Context*, (New York: Columbia Press, 2005), 59.



needed to unpack the dense lyrical verse of “his” “original” works;<sup>92</sup> and the diverse parallel commentarial traditions of his philosophy that exist *to this day*.<sup>93</sup> Our inability to locate a historical figure to whom we might ascribe texts, combined with a philosophical project that has shifted and evolved through over a thousand years of interpretation, has thus produced a diversity of Nāgārjunas. In other words, the figure of “Nāgārjuna” hides an internal diversity just as “Buddhism” does.<sup>94</sup>

Even Jay Garfield translating “Nāgārjuna’s” “most important” work, *Mūlamadhyamakakārikā* (MMK) within the context of a particular philosophical school (the Prāsaṅgika-Madhyamaka), sect (Géluk-pa), and monastic college (Drepung Loseling) of Tibetan Buddhism, found diverse interpretations of Nāgārjuna among the scholars he consulted. Garfield comments, “It would hence be impossible in any case to represent accurately *the* Prāsaṅgika-Madhyamaka interpretation, or even *the* Géluk-pa interpretation or *the* Drepung Loseling interpretation of *Mūlamadhyamakakārikā*.”<sup>95</sup> In other words, the plurality of interpretations even within a specific context makes the project of providing an authoritative commentary on Nāgārjuna simply impossible, *even if* diverse external commentaries are not taken into account. Simply stated, there is no single Nāgārjuna who can be relied upon to produce an authoritative picture of Tibetan Buddhist philosophy.

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<sup>92</sup> Jan Westerhoff, *Nāgārjuna’s Madhyamaka: A Philosophical Introduction*, (New York: Oxford University Press, 2008), 6.

<sup>93</sup> Jay Garfield, *The Fundamental Wisdom of the Middle Way*, (New York: Oxford University Press, 1995), 98.

<sup>94</sup> While conclusive evidence for the existence of a historical Nāgārjuna is yet to be discovered, Siderits, and Westerhoff agree Walser’s extensive inquiry into the existence of Nāgārjuna is compelling enough to assume the existence of a historical Nāgārjuna: an embattled Mahāyāna monk writing around the 2<sup>nd</sup> century CE.

<sup>95</sup> Garfield, *The Fundamental*, 98.

Despite these contemporary revelations, it is perhaps unsurprising that Western scholarship has a history of constructing diverse but “authoritative” Nāgārjunas in conversation with particular Western philosophical schools. Rather than attempting to make sense of Nāgārjuna’s writings as an interconnected philosophical whole, Western academics excised small portions of his philosophy and constructed a variety of contradictory but supposedly authentic “Nāgārjuna’s.” As Andrew Tuck shows in his *Comparative Philosophy and the Philosophy of Scholarship*, the construction of Nāgārjuna shares with “Buddhism” itself a history of Orientalist scholarship, which Tuck separates into three distinct phases: Kantian, analytic, and post-Wittgensteinian.<sup>96</sup> In his introduction to Nāgārjuna’s MMK, Jan Westerhoff works with Tuck’s analysis to show that each phase of scholarship was initiated by Western academics who excised small portions of Nāgārjuna’s writings to lend credence to their own philosophical orientations.<sup>97</sup> This is a powerful echo of the Orientalist trends examined in the first chapter, which showed how Buddhism was constructed to highlight features particularly attractive to the West and cover those that weren’t. As with the academic construction of Buddhism, then, the academic construction of Nāgārjuna was largely controlled by scholars who selected decontextualized passages that bolstered their own intellectual commitments and presuppositions.

After each “Nāgārjuna” was replaced by its subsequent iterations (the Kantian by the analytic, and the analytic by the post-Wittgensteinian), scholars towards the end of the 20<sup>th</sup> century began to offer systematic translations of Nāgārjuna’s thought

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<sup>96</sup> Andrew Tuck, *Comparative Philosophy and the Philosophy of Scholarship*, (New York: Oxford University Press 1990), 16-30.

<sup>97</sup> Westerhoff, *Nāgārjuna’s Madhyamaka*, 9-12.

that did not attempt to corral him into alien Western frameworks. Indeed, Westerhoff suggests that the literature on Nāgārjuna has improved dramatically in the last few decades. In particular, he notes a positive emerging trend: “First of all most authors now try to treat [Nāgārjuna’s] writing *in their commentarial tradition* as expressing a single, unified system of thought rather than as a quarry of cryptic verses from which individual isolated samples can be drawn to suit one’s idiosyncratic interpretation.”<sup>98</sup> By emphasizing the cohesiveness of Nāgārjuna’s philosophical project, contemporary scholars work against the tendency to extract particular pieces of Nāgārjuna’s work and interpret them into foreign ideologies. For as the functionality of each piece of Nāgārjuna’s writing becomes clear within his larger project, it thereby becomes more difficult to excise them in service of some other system. Like the contemporary construction of “Buddhism,” which allows for differentiation between the related but non-identical systems of thought and practice it contains, so the figure of “Nāgārjuna” represents a plurality of commentarial traditions each with their own understanding of Nāgārjuna.<sup>99</sup> In order to translate the systematic philosophy presented in such traditions, however, scholars like Westerhoff are moving towards a unified argumentative whole *within their domains*.

This movement to treat Nāgārjuna’s writings as an argumentative whole is strengthened by another positive trend that Westerhoff notes: namely, an appreciation for the depth and complexity of Nāgārjuna’s philosophy on its own terms. Rather than having to prove the value of Nāgārjuna’s writing by virtue of its similarities to Kant

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<sup>98</sup> Westerhoff, *Nāgārjuna’s Madhyamaka*, 11-12.

<sup>99</sup> While I makes use of Westerhoff’s unified presentation of Nāgārjuna’s system of thought, the project does not fully ascribe the notion of cohesiveness that Westerhoff pursues. Rather, it seeks to affirm the importance of respecting plurality and incompatibility within any supposed system of thought.

or Wittgenstein (or Derrida, for that matter), scholars have begun to appreciate Nāgārjuna's philosophy for its own sake. Of the old approach, Westerhoff explains, "while such comparisons may be of hermeneutic use for those acquainted primarily with the Western tradition, most writers on the topic now agree that it is no more necessary to put on a Kantian lens to understand Nāgārjuna as it is to wear a Nāgārjunian lens to understand Kant."<sup>100</sup> Westerhoff's description of these trends in Nāgārjuna scholarship lines up well with Richard King's criticism of the dialogue between Buddhism and science. Just as few take the time to ask, "Does modern science adhere to the principles of Buddhism?" so only few might wonder, "Does Kant match the rigor of Nāgārjuna?" King might hint that this situation is due to the cultural authority of Western granted by Orientalist scholarship and Western political hegemony. By attempting to understand and appreciate Nāgārjuna's thought on its own terms, contemporary scholars thus begin to reverse the momentum of these domineering trends.

Overall, this introduction to scholarship on Nāgārjuna should reveal the impossibility of presenting an authoritative or correct interpretation of his philosophy. As Garfield notes in the preface to his translation of the MMK, "I, like any translator/interpreter must acknowledge that there is simply no fact of the matter about the correct rendering of any important and genuinely interesting text."<sup>101</sup> Because any text of Nāgārjuna must be read through a particular translator's linguistic and philosophical presuppositions, it's important to acknowledge that any work with this elusive figure constitutes a particular reading for a particular audience. This is not

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<sup>100</sup> Westerhoff, *Nāgārjuna's Madhyamaka*, 12.

<sup>101</sup> Garfield, *The Fundamental*. vii.

to say that translations of Nāgārjuna should not exist, just that they need to be methodologically self-critical. This chapter engages such an approach, so as to provide as critical as possible an understanding of Nāgārjuna's philosophy. With these considerations in mind, we now turn to an exposition of early Buddhist history and teachings.

### **Fundamental Buddhist Thought: The Four Noble Truths and No-Self**

Just as the contemporary dialogue between Tibetan Buddhism and science is inextricable from the context from which it has emerged, so the philosophy of Nāgārjuna is entangled with earlier Buddhist thought. As such, an overview of basic Buddhist teachings and terminology will help illuminate the content of Nāgārjuna's arguments. Furthermore, an introduction to the political circumstances of Nāgārjuna's time produce some clues as to why his arguments are structured the way they are.

As the previous chapter explained, the academic term "Buddhism" refers to a wide variety of practices, philosophies, and beliefs unique to a diversity of cultures around the world. However, as Rupert Gethin notes in his *Foundations of Buddhism*, "Nonetheless all the various living traditions of Buddhism in some way look back to and revere a figure who has a certain basis in history – a figure who lived and died in Northern India several centuries before the beginning of the Christian era and belonged to a people known as the Śakyas (Pali Sakya)."<sup>102</sup> This figure is known as the Buddha, born Siddhartha Gautama, and referred to as Buddha Śakyamuni by

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<sup>102</sup> Rupert Gethin, *The Foundations of Buddhism*, (New York: Oxford University Press, 1998), 8.

virtue of his people. As Mark Siderits points out in his *Buddhism as Philosophy*, relatively little is known about the Buddha from a historical perspective.<sup>103</sup> However, by combining textual evidence from different Buddhist traditions with scant historical data, some picture of the Buddha's life and context emerges as entanglement of myth and history.

Buddhist sources containing details on the figure of the Buddha date back as far as the 4<sup>th</sup> or 3<sup>rd</sup> century BCE,<sup>104</sup> leading recent scholarship to locate his life and death within the 4<sup>th</sup> century.<sup>105</sup> These early texts refer to the Buddha as a renunciant: one who abandons worldly life in search of answers to spiritual questions. Siderits notes that the renunciants of the Buddha's time rejected elements of the dominant Brahmanical religious hierarchy, which based its authority on a set of sacred texts: the *Vedas*. He comments, "These texts enjoin performance of various rituals and sacrifices, both to uphold the cosmic order and to obtain various benefits for the person in whose name the ritual or sacrifice is carried out."<sup>106</sup> Thus, the Brahmanical hierarchy utilized the *Vedas* to grant themselves authority in the cosmic order of things, and to bestow worldly blessings of wealth, power, or pleasure upon those in their favor. However, the renunciants challenged Brahmanical authority by questioning the value of pursuing comfort during one's lifetime. For if karma and rebirth dictated that all accumulated wealth and happiness could be lost in transmigration to the next life, then what would be the point of accumulating it in the first place? Thus the renunciants began to develop and cultivate ascetic practices

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<sup>103</sup> Mark Siderits, *Buddhism as Philosophy*, (Indianapolis: Hackett Publishing Company, 2007), 15.

<sup>104</sup> Gethin, *The Foundations*, 9.

<sup>105</sup> Siderits, *Buddhism as*, 15.

<sup>106</sup> Siderits, *Buddhism as*, 15.

designed to attain enduring happiness through an understanding of the true nature of self and life. Siderits adds, “And most also agreed that the truly ideal state for us must involve liberation (*mokṣa*) from the cycle of rebirths.”<sup>107</sup> Thus the renunciants strove to attain liberation (*nirvāṇa*) from cyclical existence (*saṃsāra*).

This is the milieu into which the future Buddha was born as Siddhartha Gautama, the son of a chieftain in Kapilavastu, where what is now the Indian-Nepalese border.<sup>108</sup> As the early texts dictate, Gautama became disillusioned with the comforts and pleasures of his privileged life, and abandoned his householder status to find a teacher among the renunciants. Evidently, he studied with many, mastering each of their techniques but ultimately finding them unsatisfactory. Eventually, he set out on his own path, dedicating his energy towards a solution to the problem of human suffering. After a full night of concentrated effort in meditation, Gautama attained awakening characterized by knowledge of his past lives, the laws of karma, and of what would come to be known as the “four noble truths.” Siderits concludes, “This knowledge signaled his enlightenment (*bodhi*), his attainment of *nirvāṇa* or liberation from rebirth.”<sup>109</sup> Thus Siddartha Gautama became the Buddha (one who has awoken), and spent the rest of his years teaching others the way to the liberation. This is the barest outline of the Buddha’s life, which as Gethin notes, is not terribly problematic from a historical perspective given the lack of data available to confirm or deny it.<sup>110</sup> Considerably more information surrounds the Buddha’s teaching career

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<sup>107</sup> Siderits, *Buddhism as*, 16.

<sup>108</sup> Gethin, *The Foundations*, 14.

<sup>109</sup> Siderits, *Buddhism as*, 16.

<sup>110</sup> Gethin, *The Foundations*, 16.

after his enlightenment, so this chapter now turns to an exposition of the Buddha's basic teachings.

The foremost of these, delivered at Sarnath to five of the Buddha's former renunciant companions, revolves around the problem of human suffering and how to bring about its cessation. Gethin asserts that this problem and its solution function as the basic orientation of Buddhism wherever it is found. He writes of this core, "Its classic formulation is by way of 'four noble truths': the truth of the nature of suffering, the truth of the nature of its cause, the truth of the nature of its cessation, and the truth of the nature of the path leading to its cessation."<sup>111</sup> These four truths present the way to liberation from the cycle of rebirths and are thus integral to an understanding of the Buddhist path. This is particularly true as the Pali word for "truth" (*sacca*) can be equally understood to mean 'real' or 'actual thing.' Gethin understands the multiple meanings of "truth" to indicate that the four noble truths are not propositions to be assented to in order for one to become a Buddhist. Rather, they are realities that the Buddha came to understand on the night of his enlightenment: realities that Buddhists and non-Buddhists alike struggle to see. Thus for Gethin, "The 'Buddhist' is simply one committed to trying to follow the Buddha's prescriptions for coming to see these realities as they are."<sup>112</sup> In other words, the four noble truths have both a descriptive and a prescriptive aspect to them: they outline a truth about the world and the path to living in harmony with this truth. They thereby constitute a conceptual foundation upon which Buddhist thought builds in order to form the most effective paths to the Buddha's realization and liberation.

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<sup>111</sup> Gethin, *The Foundations*, 59.

<sup>112</sup> Gethin, *The Foundations*, 60.



The first noble truth, that of the nature of suffering, can be viewed as proposing the reality or actuality of suffering from the Buddhist perspective. Gethin points out that the purpose of this truth is not necessarily to convince otherwise happy beings that life is unpleasant, “Rather it addresses a basic fact of existence: sooner or later, in some form or another, no matter what they do, beings are confronted by and have to deal with *duḥkha*.”<sup>113</sup> This final term, significant in Buddhist and other Indian religious discourse, is traditionally translated as suffering, but encompasses a wide variety of understandings thereof.

For instance, while *duḥkha* refers to gross experiences of physical and emotional pain, it also can be understood as the frustration resulting from unexpected changes in life, as well as an dissatisfaction with the conditions of life that lead to rebirth. In other words, from the perspective of the first noble truth, while a person may be tempted to rest her hopes for happiness on the attainment of some occupational or material condition, the inherent impermanence (*anitya*) of such conditions guarantees that such happiness cannot last. Furthermore, as the pervasiveness of impermanence is recognized throughout the world, it gives rise to a fundamental unease or uncertainty regarding all life’s fleeting circumstances, and the prospect of moving through them again and again. This latter unease, the third form of suffering, is translated “*duḥkha* as conditions,” referring to the conditions of life responsible for continuous rebirth, and thereby, re-death. Gethin comments, “Thus *duḥkha* can be analyzed in Buddhist thought by way of three kinds: suffering as pain, as change, and

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<sup>113</sup> Gethin, *The Foundations*, 60.

as conditions.”<sup>114</sup> Seeing life as characterized by these three forms of suffering is the entrance into the second noble truth, which describes the arising of suffering

This second truth detail humans’ partial responsibility for the arising of suffering, due to their immense craving for sensory pleasures, wealth, fame, even existence itself. Gethin comments, “The suggestion is that deep in the minds of beings there is a greed or desire that manifests itself as an unquenchable thirst which is the principal condition for the arising of suffering.”<sup>115</sup> This thirst is an endless search for different objects of attraction, or merely a desire to control the circumstances of life itself. Thus craving for fame and wealth can produce suffering when these expectations are unfulfilled, or cravings for solitude and peace can be upset by loud neighbors or rowdy pets. This thirst extends into the domain of metaphysics, as well, in the form of cravings for knowledge of true reality or what comes after death. Overall, craving reveals itself as a desire to command and control both internal and external circumstances, “Yet in a world where everything is always changing, in a world of shifting and unstable conditions, craving of whatever kind will not be able to hold on to the things it craves. This is the origin of suffering.”<sup>116</sup> Here, Gethin refers back to the reality of impermanence implicit in the first noble truth: because conditions are constantly shifting, attempting to hold anything thing in place inevitably frustrates the one who grasps. And insofar as nirvāṇa is characterized as being free from suffering, attaining it requires releasing all the attachments that produce suffering in the first place.

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<sup>114</sup> Gethin, *The Foundations*, 61.

<sup>115</sup> Gethin, *The Foundations*, 70.

<sup>116</sup> Gethin, *The Foundations*, 70.

Having established that beings co-create the suffering they experience, the third noble truth – that of the cessation of suffering – proclaims “that there is a way out of the vicious cycle of desire, disappointment, loss, suffering, pain, and death.”<sup>117</sup> The way out is the fourth noble truth: “the eightfold path” of right view, intention, speech, action, livelihood, effort, mindfulness, and concentration. This noble path is aimed at overcoming the desires that arise out of a basic ignorance: an assumption that things in the world are stable and reliable. As Gethin points out, the view that happiness will be reached when desires come to possess their objects of attachment relies upon an ignorance of the fundamental impermanence that pervades existence. He concludes, “in craving we fail to see how things really are, and in failing to see how things truly are we crave.”<sup>118</sup> In other words, ignorance and desire, which both produce suffering, are bound up with one another. Indeed, ignorance is the first link in what is called the twelve-linked chain of dependent origination (*pratītya-samutpāda*) that leads to old age, death and rebirth. Thus, to bring about an end of suffering, one must follow the noble eightfold path that primarily targets the ignorance binding beings to saṃsāra.

Here, it may be tempting to assume that the remedy for ignorance and suffering merely requires dispelling one’s ignorance about the pervasiveness of impermanence. For Siderits, however, this stance relates to the misconception that Buddhism is simply about living in the present without hope or expectation that things will stick around forever. This position argues that recognizing the impermanence of all things allows for a comfortable relationship with both mortality

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<sup>117</sup> Powers, *A Concise*, 24.

<sup>118</sup> Gethin, *The Foundations*, 73.

and the shifting conditions of life characterized by an absence of grasping. However, as Siderits notes, this interpretation of the four noble truths is insufficient insofar as it mistakes impermanence, rather than the self, as the root of suffering.

He argues that it is the truth of “no-self” that dispels all ignorance, whereas the recognition of impermanence above assumes the actual existence of a self that can live in the moment until old age brings about its end.<sup>119</sup> Such a view is an example of “annihilationism:” the claim that death brings about the utter extinction of the self. Its twin is the view of “eternalism,” the view that there is an enduring self or soul that moves between rebirths. Both extremes are rejected by the Buddhist system of dependent origination, which emphasizes the causal connectedness of mental and physical events that comprise the continuing “self” and its relations with the world. In other words, the doctrine of dependent origination avoids both annihilationism and eternalism by declaring the self to be a continuous stream of physical and mental phenomena, rather than an enduring (or ceasing) essence.<sup>120</sup> As will be shown, the final remedy for the problem of suffering is revealing the self to be a causally connected complex of phenomena that perpetuates itself through the rounds of rebirth.

Like Siderits, Powers also notes that the most dangerous form of ignorance is the mistaken belief in the false notion of an enduring self or soul.<sup>121</sup> Contrary to other ‘religions’ that posit an unchanging individual or spirit that remains stable throughout life, Buddhism invites a rejection of that very self as an illusion. This illusion, according to Gethin, has a strong basis for imputation: the five aggregates of form,

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<sup>119</sup> Siderits, *Buddhism as*, 26.

<sup>120</sup> Hence its designation as the “Middle Way.”

<sup>121</sup> Powers, *A Concise*, 46.

feelings, discriminations, compositional factors, and consciousness. Respectively, these terms correspond to the sense organs and their objects, the sensations produced thereby, the differentiation between objects through contact with the senses, volitional activities, and the consciousness of the aforementioned entities and operations. Taken together, these aggregates form the basis of the individual, and then mistakenly impute an enduring self in addition to themselves. Powers continues, “When one analyzes this concept to locate its basis, however, all one finds are these five factors, none of which can constitute a self because they are constantly changing, whereas the self that sentient beings imagine is self-sufficient and enduring.”<sup>122</sup> In other words, just as the external conditions of life exhibit a fundamental impermanence that resists grasping, so too do the aggregates of the “individual.” Thus, roughly argued, if the aggregates are taken to compose the entirety of a sentient being, then, within that being there is no basis for a stable self.

As was shown in the brief discussion of the four noble truths, any ignorant view of the world produces a related set of sufferings, and this is particularly true with false notions of selfhood. This is partly because of the close relationship between self and desire; as Gethin notes, “One’s sense of ‘self’ springs not only from delusion, but from the desire to identify and claim some part of the world as one’s own, as one’s possession, and say of them, ‘this is mine, I am this, this is my self.’”<sup>123</sup> Here Gethin explains that the mistaken belief in the existence of a self generates the desire to appropriate aspects of reality that might secure the (illusory) existence of that very self. This chapter has already shown how suffering is produced through attachment to

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<sup>122</sup> Powers, *A Concise*, 47.

<sup>123</sup> Gethin, *The Foundations*, 147.

impermanent things; thus the self can be understood as a perfect machine for suffering's production.

However, this doctrine of “no-self” produces a thorny exegetical dilemma in early Buddhist texts. This is because the Buddha seems to contradict the established non-existence of the self with teachings of morality based on karma and rebirth that depend on such a self. Siderits comments, “The inconsistency stems from the fact that the latter teaching appears to involve the idea that it is one and same person who performs a deed in this life and reaps the karmic fruit in the next life.”<sup>124</sup> In other words, the Buddha seems to be positing some kind of stable self that endures through cycles of rebirths in order to receive the effects of its actions. This is, of course, in direct conflict with the teaching of no-self, which, as we have seen, rejects the idea of such an enduring entity.

Commentarial traditions have resolved such apparent inconsistencies by asserting that the teaching of no-self is a statement of “ultimate truth,” while teachings of karma and rebirth are statements of “conventional truth.” Whereas conventional truths are “acceptable to common sense and consistently lead to successful practice,”<sup>125</sup> ultimate truth “corresponds to the facts and neither asserts nor presupposes the existence of any conceptual fictions,”<sup>126</sup> For example, the statement, “you must brush your teeth to prevent cavities” falls into the realm of conventional truth. This is because the “you” invoked in the statement is understood to be a conceptual fiction mapped onto a complex of aggregates. While this fiction is useful as a metaphor to organize the underlying complexity of phenomena, and for

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<sup>124</sup> Siderits, *Buddhism as*, 58.

<sup>125</sup> Siderits, *Buddhism as*, 56.

<sup>126</sup> Siderits, *Buddhism as*, 56.

preventing tooth decay, it is understood to be a convenient designator rather than a description of how things actually are (this is true for both teeth and cavities as well). Thus, while the statement about the brushing of teeth can be conventionally true or false, based on whether or not teeth brushing actually does or does not prevent cavity formation, such a statement could never be ultimately true, since the “you” is a fiction, and a statement of ultimate truth cannot have its basis in a conceptual fiction of any kind.<sup>127</sup> By means of this distinction, the commentarial tradition converts the exegetical dilemma between karma and no-self into evidence of the Buddha’s pedagogical skill. Depending on his audience, it is said, the Buddha either describes the full and ultimate truth as an antidote to ignorance, or teaches conventional truths that allow less advanced practitioners to advance towards the ultimate truth and liberation. Thus the Buddha is said to have employed “skillful means” (*upāya*) as a teacher: drawing out the ultimate only when his audience was ready to move past the conventional.

### **Buddhist Scripture and the Abhidharma**

So far, this chapter has covered the four noble truths, the doctrine of no-self, and the views of impermanence, karma, and rebirth that undergird them. These teachings, together with the rest of the Dharma the Buddha discovered at the time of his enlightenment, forms the basis of Buddhism’s textual tradition. This tradition stems back to the “first recitation of scriptures,” when disciples of the Buddha are

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<sup>127</sup> Siderits, *Buddhism as*, 57.

said to have gathered three months after his death to orally assemble a compendium of his teachings. This compendium is called the authoritative word of the Buddha, or *buddha-vacana*. Gethin comments, “According to the accounts of this communal recitation, what was remembered of the Buddha’s teachings fell into two classes: the general discourses of the Buddha, the *sutras* (Pali *sutta*) and his prescriptions for the lifestyle of the Buddhist monk, the ‘discipline,’ or *vinaya*.”<sup>128</sup> Together with further developments of the Buddha’s teaching, called the *Abhidharma*, these teachings came to compose the “three baskets” (*Tripitaka*): the primary corpus of early Buddhist texts that spread across the Indian subcontinent in the centuries after the Buddha’s death.

This migration of Buddhism was accompanied by the generation of several distinct schools of thought, each with their own interpretations of the Tripitaka and particularly, of the Abhidharma: the first systematic commentary on the discourses of the Buddha and an attempt to form a universally applicable understanding of his various sayings. Whereas the sutras were delivered by the Buddha or his disciples in particular times and places to particular audiences, “The Abhidharma method, in contrast, presents the Buddha’s teachings without making concessions to time or place or audience, and in technical terms that are precisely defined to ensure analytical exactitude.”<sup>129</sup> Because the sutras were delivered to diverse audiences, they contain teachings that fall into the categories of both conventional and ultimate truths. This means that the sutras are rife with apparent contradictions that necessitate commentarial analysis. However, the Abhidharma was designed to present a systematic exposition of the Buddha’s teachings without the use of convenient

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<sup>128</sup> Gethin, *The Foundations*, 39-40.

<sup>129</sup> Gethin, *The Foundations*, 207.



designators such as “self,” or any other concept vulnerable to reduction detailed above. In other words, the Abhidharma is expressed solely in terms of ultimate truths, thus ensuring its applicability in any situation.

As has been shown above, any statement of ultimate truth must avoid the use of “convenient designators,” to wit, any concept that can be analytically divided into its constituent parts. Siderits elucidates this point, stating that Abhidharma philosophers accept as conventionally real anything that borrows its existence from something else, such as a tree, car, or table, all of which depend on the functional relationships of that which constitutes them. He continues, “But something that did not disappear under analysis would not borrow its nature from other things. It would not be a mental construction, and so it would be ultimately real.”<sup>130</sup> Thus the Abhidharma must express itself solely in terms of physical and mental events known as *dharmas*. These events are characterized by possessing intrinsic nature (*svabhāva*), thus being indivisible conceptually.<sup>131</sup> In other words, they cannot be analyzed into interacting parts or moments: they wink in and out of existence in various combinations that give rise to experience of self and world.<sup>132</sup> Thus water is understood to be dharmas of “wetness” flickering in sequence; likewise causal complexes of greed and anger in combination constitute a suffering mind. While everything else can be conceptually divided, dharmas are taken to be the ultimately real particles of the ultimately real world. This, however, does not mean that they pop

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<sup>130</sup> Siderits, *Buddhism as*, 112.

<sup>131</sup> Siderits, *Buddhism as*, 111.

<sup>132</sup> In *Nāgārjuna's Madhyamaka* (2008), Siderits and Katsura indicate that while all Abhidharma schools hold dharmas to be simple, or impartite, some list indivisible and enduring material particles as dharmas. Because such dharmas are temporally divisible according to Nāgārjuna, they will not be explored in this chapter.

up at random, for like the self, they are said to be part of the process of dependent origination, emerging only as the result of particular causes and conditions. They are momentary events that constitute the reality of the Abhidharma.

Here it may be useful to step back and clarify the multiple meanings of dharma present in this chapter. According to Gethin, “Dharma” itself is not a specifically Buddhist term. It is common to Indian thought, and signifies the underlying truth about the world, as well as ways of acting in accord with that truth. Gethin clarifies the relationship of the Buddha’s Dharma with the above general Dharma, noting that if Dharma is the way things ultimately are in the world, then the Buddha’s teaching is also Dharma insofar as it is in accordance with that ultimate truth. Hence, “Physical and mental events are the ultimate building blocks of the way things ultimately are; thus to understand the Buddha’s teaching and see Dharma is to see things in terms of Dharmas.”<sup>133</sup> To paraphrase: insofar as the Buddha’s teachings correspond to ultimate reality, they prescribe a manner of viewing the world that reveals the nature of things behind their appearances. The emphasis on seeing is telling here, as dharmas can only be known through direct experience in meditation; conceptual understanding of dharmas is impossible, as by definition, they cannot be described in terms of their constituent parts.<sup>134</sup>

While the Abhidharma can be understood as an exegetical project, it is also very much a soteriological project; that is, one concerned with spiritual liberation. Remembering from the four noble truths that ignorance is the root of desire and thereby the source of all suffering, ultimate truth is the antidote to that very ignorance

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<sup>133</sup> Gethin, *The Foundations*, 209.

<sup>134</sup> Siderits, *Buddhism as*, 113.

and the way out of saṃsāra. Thus the Abhidharma is the first systematic attempt to articulate the Buddha's ultimate truth (Dharma) in terms of ultimate existents (dharmas). This effort thereby translates all of the Buddha's discourses into the realm of ultimate truth by virtue of their dependence on solely ultimately existing events. Rather than describing a story of how one man's greed leads to a particular instance of suffering, the Abhidharma analyzes how greed itself as a mental event correlates to the production of an unwholesome or suffering mind. This method of articulating the Buddha's teachings remained mostly unchallenged until the emergence of new sutras centuries after the Buddha's death, and the subsequent rise of a new philosophical school.

### **The Rise of the Mahāyāna**

The origins of this movement, known as the "Great Vehicle" or *Mahāyāna*, are difficult to locate, particularly because they cannot be traced to a visible schism in the early Buddhist community. According to Gethin, Powers, and Siderits, early Mahāyānists did not wish to be seen as breaking with their contemporaries, and often lived side by side with them in the monasteries of multiple schools.<sup>135</sup> However, the origins of the Mahāyāna are clearly visible in the emergence of new sutras in the 1<sup>st</sup> century BCE that claimed the authoritative status of 'word of the Buddha.' As was previously mentioned, the original sutras were supposedly all collected in the short period of time after the Buddha's death, yet these new teachings were often composed

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<sup>135</sup> Gethin, *The Foundations*, 56; Powers, *A Concise*, 32; Siderits, *Buddhism as*, 138

in the same style of the original Buddha's sayings, and out forth centuries after the original collection. Gethin notes, "In other words, these new texts present themselves not as the commentary or understanding of a particular school of Buddhism, but as actual sutras. They thus claim the status of 'the word of the Buddha.'"<sup>136</sup> According to Powers, early Mahāyānists justified this claim by asserting that the new sutras, though taught to a few select disciples, were too advanced for most of the Buddha's original followers, and so were hidden underwater for several centuries in the realm of the *Nāgas*: serpent-like gods with human heads.<sup>137</sup> In this narrative, it wasn't until the second century CE that qualified humans like Nāgārjuna were able to bring these texts back into the realm of humanity and successfully explicate them.

However, this narrative may miss the extent to which Mahāyāna philosophers like Nāgārjuna relied on Mahāyāna texts in circulation centuries before their births. The earliest writings of the Mahāyāna movement are collectively referred to as the 'Perfection of Wisdom' literature and are dated to the first century BCE.<sup>138</sup> These texts served as the foundation of the Mahāyāna movement, introducing new themes in Buddhist thought including the "emptiness" of all phenomena.<sup>139</sup> Here, emptiness is understood as the absence of inherent existence, a condition Abhidharma philosophers hold true as it applies to the self, but not to the dharmas that constitute their ultimate reality. Thus, the early Mahāyāna texts represent a fairly clear break with Abhidharma metaphysics, insofar as they claim that dharmas themselves lack essence. Siderits notes, "If they are right about this, then the teachings of Abhidharma

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<sup>136</sup> Gethin, *The Foundations*, 56.

<sup>137</sup> Powers, *A Concise*, 33.

<sup>138</sup> Gethin, *The Foundations*, 234.

<sup>139</sup> Siderits, *Buddhism as*, 139.

cannot represent ultimate truth.”<sup>140</sup> In other words, if a statement of ultimate truth must avoid conventional designations, and the dharmas are revealed to be such conceptual fictions, then the Abhidharma cannot represent the ultimate truth itself. Rather, it would be understood as a conventional truth: a model or map towards ultimate truth, but not that truth itself. Thus the early Mahāyānists positioned themselves towards the Abhidharma just as the latter approached the sutras: claiming an understanding of ultimate truth drawn out from the conventional truth of what came before them. These claims formed the threads of what Nāgārjuna would eventually weave into his *Madhyamaka* or “Middle Way” school of Buddhist philosophy.

### **The Emptiness of Dharmas**

In his extensive historical work, *Nāgārjuna in Context*, Joseph Walser calls attention to the complex situation of Nāgārjuna and the early Mahāyānists introduced above. He summarizes his examinations of historical and mythical accounts of the rise of Mahāyāna: “The preponderance of this evidence suggests that Mahāyāna was a relatively small, in some places embattled, movement within Buddhism with no institutional status. This state of affairs seemed to persist until at least the fourth or fifth centuries [CE].”<sup>141</sup> For Walser, this means that Nāgārjuna, who seems to have been active around 150 CE,<sup>142</sup> was probably writing in the context of a non-Mahāyāna monastery, and was seeking to advance his philosophical positions without creating

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<sup>140</sup> Siderits, *Buddhism as*, 143.

<sup>141</sup> Walser, *Nāgārjuna in*, 16.

<sup>142</sup> Siderits, *Buddhism as*, 180.

conflict with the dominant Abhidharma institutions he hoped would support and reproduce his writings.

This context thereby complicates the idea that the historical Nāgārjuna expounded pure “Mahāyāna philosophy” to either his Madhyamaka followers or against his philosophical opponents. Walser comments, “Rather, what is elided by such arguments is a third and functionally more important audience – those monks and laypeople in control of the resources that the Mahāyānists needed.”<sup>143</sup> By calling attention to Nāgārjuna’s possible audiences, Walser explores the ways in which Nāgārjuna’s writings on the emptiness of dharmas, particularly in his MMK, was composed in such a way that it was acceptable to the Abhidharma institutions whose doctrines it seemed to refute. Walser continues to explain that Nāgārjuna’s strategy for the survival of the Mahāyāna revolved around camouflaging his philosophy by articulating it within the doctrinal bounds of Abhidharma texts acceptable for reproduction. Walser therefore concludes that Nāgārjuna’s writings cannot be taken as abstract Mahāyāna arguments that systematically refute or reject the Abhidharma. “On the contrary, couched within his philosophical writings are the very legal, logical, and textual strategies that ensured the survival of the Mahāyāna beyond its nascent stage.”<sup>144</sup> Such strategies will be explored later on in the context of Nāgārjuna’s arguments themselves. Here, it is important to note only that Nāgārjuna’s writing cannot simply be taken as a rejection of Abhidharma philosophy, but rather as an elaboration on it.

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<sup>143</sup> Walser, *Nāgārjuna*, 3.

<sup>144</sup> Walser, *Nāgārjuna*, 266.

It is not until the fifth century onwards, when the Mahāyāna movement began to establish itself as an independent institution, that commentaries on Nāgārjuna's MMK began to appear, such as those of *Buddhapālita* (~500 CE), *Bhāvaviveka* (ca. 500-570 CE) and *Candrakīrti* (ca. 7<sup>th</sup> century).<sup>145</sup> These commentators no longer had to justify and limit their views within the domain of the Abhidharma, as they could present it to established Mahāyāna institutions as pure Mahāyāna thought. Thus it could be argued that the Mahāyāna commentarial traditions on Nāgārjuna are what enabled his thought to break out of the terse, aphoristic verse that characterizes his MMK, and into the systemic philosophy championed by Tibetan Buddhists today. This argument in turn helps explain why contemporary scholars prefer to work with the Nāgārjuna of the commentarial traditions than with his verses alone, and why early scholarship working only with primary texts of Nāgārjuna were able to misconstrue his enigmatic verses for their own purposes. For all these reasons, this chapter will now turn to Jan Westerhoff's and Mark Siderits' presentations of Nāgārjuna's philosophical project as traced through these early commentarial streams, as they help to illuminate the Nāgārjuna of Tibetan Buddhism rather than the Nāgārjuna of the embattled Mahāyāna.

For Westerhoff and others, it is clear the central focus of Nāgārjuna's Madhyamaka is the concept of emptiness, which for the Mādhyamika applies to all phenomena.<sup>146</sup> Westerhoff points out that the major difficulty in understanding what emptiness signifies is the fact that it is a purely negative concept, that is, it signifies

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<sup>145</sup> Siderits, *Buddhism as*, 180.

<sup>146</sup> Garfield, *The Fundamentals*, 92; Gethin, *The Foundations*, 239; Siderits, *Buddhism as*, 180; Westerhoff, *Nāgārjuna's Madhyamaka*, 12. A current scholarly convention is to refer to members of the Madhyamaka School as "Mādhyamikas," and likewise Abhidharma philosophers as "Ābhidharmika's."

an absence. He comments, “This absent something is what Madhyamaka authors refer to by the term *svabhāva*, sometimes translated as “inherent existence” or “own being.”<sup>147</sup> In other words, to say that all things are empty is to assert that they lack *svabhāva*: that they are existentially dependent upon things other than themselves. Centrally, emptiness is stated as radicalization of dependent origination, that is, dharmas do not just originate in dependence upon certain causes and conditions, as the Ābhidharmika claims; they do not possess any inherent existence whatsoever. Given that Nāgārjuna’s project will thereby center on a refutation of anything possessing *svabhāva*, it will be useful to examine exactly what is signified by *svabhāva*. This term is complex and nuanced, containing both an ontological and cognitive dimension.

Within the domain of ontology, or that aspect of philosophy concerned with the actual existence of things, an object is said to have *svabhāva* if it possesses its nature in an intrinsic manner; that is, it does not derive its existence from any constituent parts or external factors.<sup>148</sup> Remember that the Abhidharma views dharmas as the foundation of ultimate reality: the only things in the world that exist “from their own side” or come into being in dependence solely upon themselves. This view necessarily entails that assumption that dharmas are that which exhibit *svabhāva*. Thus the Madhyamaka claim that all dharmas are *empty*, or lack *svabhāva*, is a direct counter to the Abhidharma position that dharmas are ultimately real, thereby relegating dharmas to the realm of conventional reality. This is, in turn, a

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<sup>147</sup> Westerhoff, *Nāgārjuna’s Madhyamaka*, 12.

<sup>148</sup> Westerhoff, *Nāgārjuna’s Madhyamaka*, 12.



refutation of *any* attempt at identifying and systematizing the ground of ultimate reality, which by definition, depends on ultimately real entities.

Furthermore, the Mādhyamika also critiques *svabhāva* as a conceptual superimposition of “essence” into a world of objects that naturally lacks it. Westerhoff elucidates this point by explaining the difference between “substance” in the Western philosophical tradition and *svabhāva* for Nāgārjuna: “Unlike the notion of substance *svabhāva* is not just a theoretical concept of ontology but rather a cognitive default, an addition that the mind unwittingly makes when trying to make sense of the world.”<sup>149</sup> Because the world is easier to understand and interact with when things people, chairs, trees, etc, are assumed actually to exist, conceptual patterns are thereby formed from habitual assumptions of objectively existing objects. In other words, the Mādhyamika points out that theoretical arguments for the existence of *svabhāva* in anything are derived from and connected to a basic way of viewing things in the world as actually existing. Thus Nāgārjuna’s project is concerned with a rejection of *svabhāva* both in the theoretical and cognitive domains of existence: emptiness is designed as a corrective for the mind’s mistaken imputation of *svabhāva* in the world. Here, Westerhoff is drawing attention to the Madhyamaka enterprise as both a philosophical and *practical* one: a point that will merit attention later on. At this point, it is simply important to note that the doctrine of emptiness is argued in order to change the way that one sees and interacts with the world, not just how one thinks about it. From here on out, “substance” will be used as Nāgārjuna indicates it: something with inherent existence.

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<sup>149</sup> Westerhoff, *Nāgārjuna’s Madhyamaka*, 13.

As Siderits points out, Nāgārjuna has no one argument for emptiness rather, he employs a variety of *reductio ad absurdum* arguments to demonstrate the impossibility of anything whatsoever's possessing *svabhāva*.<sup>150</sup> These arguments are often characterized by their usage of the "tetralemma:" a form of argument consisting in the rejection of a statement, its negation, their conjunction, and their disjunction. The tetralemma is therefore naturally puzzling, as it denies whatever statement is made and all its possible permutations. As Westerhoff points out, the tetralemma entails a rejection of all possible statements one can make of a given entity, *on the assumption that that entity does indeed possess svabhāva*.<sup>151</sup> Westerhoff comments, "If all these alternatives turn out to be inapplicable, we can conclude that the initial assumption was wrong and that there is no *svabhāva* to be found in that entity."<sup>152</sup> In other words, through the use of the tetralemma the Mādhyamika might demonstrate that even though the mind assumes that a given entity like the self is ultimately real, it is actually just a convenient designator. By demonstrating that the self could not exist if it was ultimately real, the Mādhyamika convinces her opponent that it must actually be empty.

In related fashion, Nāgārjuna crafts additional arguments with the operations of the senses, motion, and change in attempt to show that these basic experiences of the world would be impossible if those processes involved things that possess *svabhāva*. In other words, he creates a series of arguments that strive to convince his opponents the world would not function if constituted by substances. Perhaps unsurprisingly, his argument against causality is one of the most important for

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<sup>150</sup> Siderits, *Buddhism as*, 183.

<sup>151</sup> Westerhoff, *Nāgārjuna's Madhyamaka*, 13.

<sup>152</sup> Westerhoff, *Nāgārjuna's Madhyamaka*, 14.

understanding his project. As was shown above, one of the basic tenets of the Buddhist worldview is that things arise in dependence upon causes and conditions.<sup>153</sup> If this is accepted as true, and Nāgārjuna is successful in demonstrating that nothing produced by causes and conditions can have intrinsic nature, then he can more conclusively demonstrate the emptiness of all things within the Buddhist worldview.

Gethin summarizes this line of argumentation with a central question, “If something arises in dependence upon some other thing, as a dharma is supposed to, then how, Nāgārjuna asks, can it be defined in the manner that certain Abhidharma theorists want, as that which exists of and in itself, as that which possesses its own existence (*svabhāva/sabhāva*)?”<sup>154</sup> This is the paradox at the heart of the Mādhyamika’s argument against the Abhidharma: if the dharmas constitute ultimate reality by virtue of being self dependent, how could they come into being *in dependence* upon certain causes and conditions? Nāgārjuna addresses the paradox by reformulating the principle of dependent origination towards the emptiness of dharmas, and his argument against causality is key to this end.

Westerhoff’s presentation of the argument begins with the assertion that anything possessing *svabhāva* could not undergo the relationship of cause and effect.<sup>155</sup> This is because if such a substance comes into being as the effect of something other than itself, it would thereby be existentially dependent upon the other, as the existence of fire is dependent upon its fuel. Because it is existentially dependent, it cannot be said to inherently exist. However, an Abhidharma philosopher could agree that dharmas exist in causal networks, while maintaining that they do so

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<sup>153</sup> Gethin, *The Foundations*, 142.

<sup>154</sup> Gethin, *The Foundations*, 238.

<sup>155</sup> Westerhoff, *Nāgārjuna’s Madhyamaka*, 201.

independently of human conceptualization. In other words, she could argue that while the dharmas come into being in dependence upon one another, the relationship between them functions independently of mental processes. This argument would be something to the effect that fire exists as an aggregation of heat dharmas produced from solidity dharmas that constitute wood. The Ābhidharmika would assume that this relationship holds independently of a conceptualizing mind, and allows to dharmas to retain some intrinsic character.

Nāgārjuna would then respond by showing that causal relationships between dharmas would be impossible without the presence of mind. The argument works as follows. According to the Ābhidharmika, a substance irreducible by mereological reduction would also have to be *temporally* irreducible; that is, it would have to exist at a particular indivisible moment without dependence upon other moments.<sup>156</sup> This is why Abhidharma philosophers primarily write of dharmas as instantaneous events rather than objects, for if dharmas were temporally divisible, they could not be ultimately real. Because divisibility, whether mereological or temporal, implies that the object of analysis is existentially dependent on what is other than itself, a divisible object cannot inherently (ultimately) exist “from its own side.” Thus, the dharmas must exist as a dimensionless point of time.

However, the Ābhidharmika’s assertion of dharma’s temporal atomicity creates a problem for the notion of causality, which necessarily occurs in spans of time. This issue can be demonstrated as follows: let’s assume that two distinct ultimately real substances exist in a relationship of cause and effect. In this case, it

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<sup>156</sup> Westerhoff, *Nāgārjuna’s Madhyamaka*, 201.

would be absurd to posit that the cause comes into being after the effect, for the existence of the effect signifies the extinguishing of the cause. Furthermore, if cause and effect are held to be distinct from one another, they cannot exist at the same time.<sup>157</sup> However, as the argument pertains to dharmas, it is also problematic to posit that the cause comes into being first and is immediately followed by the effect, or that the cause initiates a gradual emergence of the effect. Nāgārjuna rejects both cases, again due to the temporally atomic nature of dharmas.

For Nāgārjuna, while the event of the cause exists, the effect, being future, cannot yet exist. Conversely, once the effect comes into being, the cause can exist no longer. For instance, a dharma of fuel is annihilated in the process of bringing about a dharma of heat. These dharmas, however, are distinct in time: *there can be no overlap between them*. Westerhoff points out therefore that only one relata of the causal relation can exist at one time, depending on whether the cause or the effect is present. He continues, “In this case it should be apparent that we cannot deal with a relationship between two substances or ultimately real things, since one of the relata is provided only by our expectation (or our memory in the retrospective case).”<sup>158</sup> In other words, the notion of substance causality implies a relationship that exists independently of mind. However, Nāgārjuna has argued that if dharmas were substances, they would be temporally distinct from one another. He thus concludes that the relationship between them is supplied by the mind, which expects heat to follow from solidity, or assumes that heat represents a previous moment of solidity.

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<sup>157</sup> For like the rising and falling ends of a see-saw, one substance could equally be the cause of the other – there would be no way to distinguish the causal relationship between them (See Westerhoff 2003, 201-202, or Siderits 2003, 197).

<sup>158</sup> Westerhoff, *Nāgārjuna's Madhyamaka*, 201.

This is an important point for Nāgārjuna, there can be no cause and effect relation that exists independently of mind, because the mind itself has to supply the missing relatum necessitated by the two dharmas relationship as purported substances. And if there can be no mind-independent cause and effect relationships between substances, then how can causality be a feature of ultimate reality?

One could still argue, however, that while seemingly exhaustive, the three cases mentioned above miss the possibility of cause and effect existing in a more gradual relationship, as in the case of a potter existing at the same time that her pot is coming into being. While this notion of causation in the conventional sphere (i.e. making use of conceptual constructions like “potter” and “pot”) is unproblematic, it fails as it applies to the world of dharmas. For while potters and pots can exist for long durations, substances can only exist momentarily. Again, this is why a pot cannot be considered a “substance:” it “endures” only as aggregate of solidity dharmas winking in and out of existence. Thereby, “Because substances are temporally atomic, they cannot undergo a thick temporal process of gradual emergence we observe in objects that are not part of the fundamental furniture of the world (such as pots).”<sup>159</sup> Here, Westerhoff’s “furniture” acts as an analogy for the dharmas that, according to the Abhidharma, compose the ultimately real world. He is pointing out that because dharmas are said to be instantaneous, they cannot undergo a gradual cause and effect relationship. Because they are temporally distinct from one another, they can only be related by mind. And because causal connection is mind dependent, it cannot therefore be an element of ultimate reality.<sup>160</sup> As was shown

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<sup>159</sup> Westerhoff, *Nāgārjuna’s Madhyamaka*, 202.

<sup>160</sup> Siderits, *Buddhism as*, 198.

above, the view of dependent origination states that dharmas arise in dependence upon causes and conditions. However, if causal connection is a conceptual construction, the dharmas produced thereby are likewise conceptual constructions. This, however, does not mean that they are false or not useful, just that they cannot be taken as the basic units of ultimate reality: they are empty.<sup>161</sup>

### **Nāgārjuna's "Middle Way:" The Emptiness of Emptiness**

As Siderits points out, it is tempting to take this rejection of causality between substances as evidence that anything caused is necessarily dependent upon other things, such as the mind that conceptualizes it or the collection of conditions that allows the thing to come into being.<sup>162</sup> This view could be translated into a metaphysics of interdependence, where everything exists in dependence on extrinsic factors, which themselves are extrinsically dependent, and so on. However, dependence of "extrinsic" factors implies that there is an "intrinsic" entity to do the depending, as the concepts are bound up in one another. Unfortunately, any language as such would miss the already established emptiness of the very things in question: the rejection of their inherent existence. And if nothing exists intrinsically, how can anything exist in dependence upon anything else? Siderits clarifies, "The argument, in other words, is that  $x$  can't borrow its nature from something else  $y$  unless there is already an  $x$  there to do the borrowing."<sup>163</sup> Westerhoff has already shown that Nāgārjuna explicitly rejects the existence of such an ultimately existing  $x$ , which

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<sup>161</sup> Gethin, *The Foundations*, 239.

<sup>162</sup> Siderits, *Buddhism as*, 200.

<sup>163</sup> Siderits, *Buddhism as*, 201.

thereby makes extrinsic dependence impossible. Siderits concludes, “And this means it couldn’t be ultimately true that everything depends for its nature on something else.”<sup>164</sup> Thus, if can’t be ultimately true that things inherently exist, or depend on other things to exist, it becomes extremely difficult (read: impossible) to craft any ultimately true metaphysic. Indeed, for Nāgārjuna, emptiness is prescribed as a sort of metaphysical purgative: that which forces the abandonment of all metaphysical views.<sup>165</sup> It would seem as though Nāgārjuna is arguing that if emptiness of everything is taken at face value, then the very prospect of an ultimate truth is impossible, for it would have no ultimately true things to base itself upon.

In that case, however, it might be tempting to argue that emptiness is the ultimate truth behind all things. Nāgārjuna explicitly rejects this argument, however, stating that emptiness is itself empty of inherent existence, and thus also cannot be the ultimately true basis for any metaphysic.<sup>166</sup> His argument for the emptiness of emptiness connects back to the cognitive dimension of svabhāva: emptiness is not to be taken as description of reality independent of human concepts, because it exists in order to correct the false ascription of svabhāva to entities that inherently lack it. In other words, the absence of svabhāva is not something that phenomena actually carry within themselves; *it is something projected by human minds to combat incorrect projections of the human mind*. It has already been established that the ultimate truth would have to describe things as they are, independent of human interests and concerns. Westerhoff concludes, “But such a theory of emptiness is intricately bound up with such interests and concerns: if there were no human minds who mistakenly

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<sup>164</sup> Siderits, *Buddhism as*, 201.

<sup>165</sup> Siderits, *Buddhism as*, 201-202.

<sup>166</sup> Siderits, *Buddhism as*, 204.



read the existence of *svabhāva* into phenomena that lack it there would no point in having a theory to correct this.”<sup>167</sup> To sum up, by stating the emptiness of emptiness itself, Nāgārjuna seems to have blocked all routes to the establishment of any theory of ultimate truth.<sup>168</sup>

What if the ultimate truth is that there is no ultimate truth? This seems paradoxical, as the assumption of the impossibility of ultimate truth denies that the assumption itself can be ultimately true in the first place. However, the paradox is elided if the Madhyamaka teaching of ultimate truth is taken to mean two things: ultimate truth<sub>1</sub>: “a fact that must be grasped in order to attain full enlightenment,” and ultimate truth<sub>2</sub>: “a statement that corresponds to the ultimate nature of a mind-independent reality.”<sup>169</sup> This division of meaning allows for the “semantic” interpretation of emptiness: The ultimate truth<sub>1</sub> is that there is no ultimate truth<sub>2</sub>. Brilliantly, Nāgārjuna manages to avoid the establishment of a metaphysic based upon emptiness while simultaneously clarifying the soteriological significance of his arguments.

The basis for this interpretation works from what has already been established: the emptiness of all things said to have intrinsic nature, including emptiness itself. How then can any statement based on anything be ultimately true?

The tetralemma applied to this question goes as follows: no statement about non-

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<sup>167</sup> Westerhoff, *Nāgārjuna's Madhyamaka*, 222.

<sup>168</sup> Powers, however, complicates this “emptiness of emptiness” as it pertains to Tibetan Buddhism. While the Gélukpa sect holds the view of emptiness detailed above (*rang stong* or “self-emptiness”), others hold emptiness as the unchanging reality that pervades all phenomena (*gzhan stong* or “other emptiness”). To the latter group, the emptiness of the Gélukpa’s is held to be *bem stong* – “dead emptiness” – because it is devoid of any qualities whatsoever. For the purposes of this project, the “self-emptiness” view will be held, insofar as the Dalai Lama rejects the “other-emptiness” stance as an attempt to “reify the Absolute and smuggle Indian substantialist notions into Buddhism” (Powers, 2008).

<sup>169</sup> Siderits, *Buddhism as*, 202.

empty things can be ultimately true (for there can be no non-empty things), no statements about empty things can be ultimately true (for emptiness is itself empty), no statement about empty and non-empty things can be true, and no statement about neither empty nor non-empty things can be true. When all members of the tetralemma are denied, one must seek out the false supposition that they all share: in this case, the assumption that there is such a thing as ultimate truth.<sup>170</sup> As has been shown, this very assumption is rejected by Nāgārjuna, who thereby shatters the possibility of establishing a Madhyamaka metaphysic: an objective description of reality “as it truly is.” Note here that Nāgārjuna’s target is the concept of ultimate reality: his rejection of inherently existing objects is the arrow that gets him there.

While it may be tempting to assume that Nāgārjuna is denying the existence of all things, a claim tantamount to nihilism, Gethin shows such an assumption misses the depth of Nāgārjuna’s arguments. For rather than arguing for an absolute nothingness behind everything, Nāgārjuna is rejecting the possibility of an absolute *anything*.<sup>171</sup> There is thereby a large gap between stating that nothing whatsoever exists, and that nothing exists *ultimately*. Nāgārjuna cannot be said to be a nihilist, one who states that nothing exists, nor an eternalist, one who claims that things really do exist. Rather, the emptiness of emptiness ensures that the Mādhyamika walks the “Middle Way” between eternalism and annihilationism *of the dharmas themselves*, rejecting all metaphysical stances that attempt to portray an objectively true “way things are.” For if dependent origination is to be held as an inviolable tenet of Buddhist philosophy, then for Nāgārjuna, the Abhidharma stance of dharmas as

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<sup>170</sup> Siderits, *Buddhism as*, 204.

<sup>171</sup> Gethin, *The Foundations*, 240.

ultimately real and self-existing directly conflicts with it. Thus, arguing for the emptiness of dharmas allows Nāgārjuna to articulate his heterodox notions as situated within a central position of Buddhist philosophy.<sup>172</sup> In this way, Nāgārjuna's declares dependent origination to be emptiness, and emptiness to be a conceptual construct: this is what allowed him to articulate his philosophy as advancing rather than undermining Buddhist thought.<sup>173</sup>

Thus, all that's left is conventional truth: truths that exist in agreement with shared beliefs and practices about the composition and dynamics of the world. As Westerhoff notes, these truths are the ones arrived at through a view of the world that includes language and conceptual frameworks. He notes that one should be wary of dismissing these conventions as a presenting a "distorted" view of reality, because, "The very notion of 'distortion' presupposes that there is a world untainted by conceptuality out there (even if our minds can never reach it) which is crooked and bent to fit our cognitive grasp."<sup>174</sup> However, the Mādhyamika would argue that the idea of a mind-independent world, a "way things actually are," is incoherent, if only because *the conceptual systems employed by humans give rise to concepts of world and reality in the first place*. There would therefore be no way to conceptualize a mind-independent reality, because conceptualization itself immediately involves the mind with what is presupposed as separate from it.

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<sup>172</sup> Gethin elucidates this point by calling attention to how Nāgārjuna uses dependent origination to situate the emptiness of dharmas as a requirement of the already-established emptiness of persons (1998, 243).

<sup>173</sup> Siderits, *Buddhism as*, 204.

<sup>174</sup> Westerhoff, *Nāgārjuna's Madhyamaka*, 220.

What then is the soteriological point of the semantic interpretation of emptiness championed by Siderits, Gethin, and Westerhoff?<sup>175</sup> As Siderits points out, the concept of an ultimate reality, such as the one expounded in the Abhidharma, is useful for the realization of no-self. For if there is an ultimate reality that exists independent of one's concerns and limitations, then coming to see the world as that reality would necessarily entail moving past the egocentric experience that preceded it.<sup>176</sup> As was discussed above, according to the four noble truths, coming to see the world in terms of ultimate truth entails the annihilation of ignorance that causes suffering in the first place. For Nāgārjuna, however, such an idea of a truly existing ultimate reality is an extremely subtle object of clinging, and thereby produces suffering. Westerhoff continues, "Such clinging is not as coarse as clinging to one's possessions, to one's body, or to one's self, but it still generates a kind of attachment which in turn supports a sense of selfhood as a subject who has realized the way things are."<sup>177</sup> Thus, *the abandonment of all metaphysical views* represents one of the final steps on the path to liberation: releasing attachment to the very teachings that constitute the path.

This is partly how Nāgārjuna established his Mahāyāna philosophy as buddhavacana, teachings in line with the original intent of the Buddha. For just as Buddhist texts stress that the *arhat* (one who perfect the Buddha's teachings) transcends all views and opinions,<sup>178</sup> so Nāgārjuna aims to demonstrate how his Madhyamaka allows a practitioner to move past the helpful but ultimately limited Abhidharma into

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<sup>175</sup> Gethin, *The Foundations*, 240; Westerhoff, *Nāgārjuna's Madhyamaka*, 220.

<sup>176</sup> Siderits, *Buddhism as*, 205.

<sup>177</sup> Westerhoff, *Nāgārjuna's Madhyamaka*, 224.

<sup>178</sup> Gethin, *The Foundations*, 241.

complete liberation from all attachments (even philosophical ones). Thus, although metaphysics of interconnectivity are well and good as conventional truths, they are nonetheless to be abandoned on the path to perfect realization.

This chapter has glossed over much of Nāgārjuna's context and many of his arguments in favor of establishing a general understanding of "his" philosophical project. It is important to note that Nāgārjuna does not simply assert the pervasiveness of emptiness: he argues for its necessity within domains of cause and effect, change, substances with properties, personal identity, ethics, epistemology, language, and truth. In all cases, the approach is to show how any statement that depends on ultimately real objects cannot be ultimately true. This leads to the rejection of ultimate reality *tout court*, and the difficult philosophical work of avoiding relativism once the "gold standard" of truth guaranteed by an objective reality is gone.<sup>179</sup>

Thus the chapter began with an initial understanding of ultimate reality as an inherently existing realm composed of ultimately real particles, towards which the Buddhist practitioner must strive to attain nirvāṇa: release from the suffering of conventional reality or saṃsāra. It then moved to the reconceptualization of such particles as empty of inherent essence, and Nāgārjuna's emptiness of emptiness as the wholesale rejection of any notion of ultimate reality. It is worth noting again that rejection of ultimate reality serves a soteriological purpose, rather than being solely an intellectual project.

Suffice to say that any claims of Tibetan Buddhism's access to "ultimate truth" are made extremely complex when Nāgārjuna's doctrine of emptiness is taken

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<sup>179</sup> Siderits, *Buddhism as*, 206.

into account. For they can no longer be understood to indicate that Buddhism has access to knowledge of a “way things are:” a transcendent reality to be reached through practice. It has already been shown that Nāgārjuna rejects such a reality as incoherent. Rather, these claims, such as the Dalai Lama’s, might be better understood as a statement of faith in the Buddhist soteriological system. These questions will be explored further in the project, for now, it turns to philosophy of science, and quantum physics in particular, in order to relate a similar trajectory of thinking about ultimate truth.

### Chapter Three: Quantum Physics and Agential Realism

STUDENT: I am a little fearful to give up everything, even though I do experience emptiness and clarity. I have this Western tendency to feel there must be something material there. There cannot be just nothing.

RINPOCHE: That must be the blessing of science.

— Chökyi Nyima Rinpoche, *Present Fresh Wakefulness*

Accounts of such [real] objects can seem to be either appropriations of a fixed and determined world reduced to resource for instrumentalist projects of destructive Western societies, or they can be seen as masks for interests, usually dominating interests.

– Donna Haraway, “Situated Knowledges”

The previous chapter described the intellectual arc of Indian Buddhist philosophy from basic Buddhist teachings and their Abhidharma presentation to the development of the Madhyamaka school of Nāgārjuna. In doing so, the chapter culminated in Nāgārjuna’s rejection of the Abhidharma view of dharmas as fundamental units of absolute reality. For the Ābhidharmika, to see the world in terms of dharmas is to see the world of ultimate reality, and thereby to attain enlightenment, or liberation, from the conventional reality of selves and suffering. According to Nāgārjuna, however, the Ābhidharmika hypostatizes the dharmas and thereby produces a subtle object of clinging, namely, ultimate reality. Such clinging is annihilated by his “Middle Way,” which rejects all metaphysical views.

Following this structure, the chapter at hand also follows a similar progression, this time with contemporary physics and philosophy. It begins by introducing the classical scientific framework of Newtonian “objective reality” composed of ultimately real objects with inherent and measureable properties.

Subsequently, it tracks the difficulties early quantum theory posed for such a metaphysic, and examines Werner Heisenberg's "uncertainty" principle as an epistemological limitation of such an objective reality. Finally, it presents Neils Bohr's alternative principle of "indeterminacy," through which Karen Barad rejects the existence of objective reality altogether. For her, such a metaphysic masks the ways in which humans are implicated in the production of the reality of which we are a part. Such deceptions are dispelled by her "agential realist" account of scientific practice, which eschews classical realist notions in favor of participatory understandings of our place as part of the ongoing differentiation of the world.

As did the previous two chapters, this one must commence with a disclaimer: it does not pretend to synthesize or attempt to represent the complex of views and practices signified by "quantum physics." Similar to the academic constructs of both Buddhism and Nāgārjuna, the concept of quantum physics is internally diverse, bearing within itself conflicting philosophical stances.<sup>180</sup> Over the course of the 20<sup>th</sup> and 21<sup>st</sup> centuries, even single experiments have produced competing interpretations, such that while the development of quantum physics has allowed for formidable technological advances, quantum physicists "do not have as tight an intellectual grasp of quantum theory as we would like. We can do the sums and, in that sense, explain the phenomena, but we do not really *understand* what is going on."<sup>181</sup> What theoretical physicist and theologian John Polkinghorne is describing here is the difference between the calculations and the philosophy of particle behavior in the quantum realm. He is indicating that while different mathematical formulas can be

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<sup>180</sup> John Polkinghorne, *Quantum Theory: A Very Short Introduction*, (New York: Oxford University Press, 2002), 55-56.

<sup>181</sup> Polkinghorne, *Quantum Theory*, 56.



successfully mapped onto quantum phenomena, and different quantum phenomena harnessed to serve the technological needs of the today's world, fundamental questions about why such phenomena act the way they do remain. How did this situation come about?

According to Polkinghorne, although most of the contemporary physics community claims allegiance to the "Copenhagen" interpretation of quantum physics developed primarily by philosopher-physicist Neils Bohr, the majority of contemporary physicists ignore the philosophical issues to which Bohr was attuned, preferring instead to focus on the tools of calculation quantum theory provides.<sup>182</sup> Feminist theoretical physicist Karen Barad argues, "This avoidance has had its cost: the foundational issues of this fundamental physical theory remain unresolved and the culture of physics is such that unreflective attitudes and approaches are rewarded."<sup>183</sup> Here, Barad presents another difficulty in attempting to write about quantum physics: not only are there different explanations for the same phenomena, these accounts do not resolve the inconsistencies of quantum behavior within a cohesive framework. Thus, attempting to compare the "worldview" of quantum physics to any other formation, such as "Tibetan Buddhism," will necessarily rely on a full-fledged philosophy of quantum physics, rather than a collation of contrasting experiments with incompatible or nonexistent interpretations.

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<sup>182</sup> Polkinghorne, *Quantum Theory*, 48. Currently, the most prominent rival to the "Copenhagen" interpretation is the "Many Worlds" interpretation: the stance that at every act of measurement, the physical world divides into a multiple universes each corresponding to the all the possible measurement outcomes.

<sup>183</sup> Karen Barad, "Meeting the Universe Halfway: Realism and Social Constructivism Without Contradiction," in *Feminism, Science, and the Philosophy of Science*, ed. L. H. Nelson and J. Nelson (Dordrecht: Kluwer Academic Publishers, 1996), 167.

Throughout the last two chapters, I have emphasized the importance of specificity, for without knowing whose interpretation we are using of a particular tradition, person, or concept, it is impossible to do meaningful comparative work. Without adopting a particular perspective, it is easy to fall into attempts to speak for entities as if they were coherent wholes – as in the cases of both “Buddhism” and “Nāgārjuna.” As has been shown, such efforts collapse internal differences into a false unity about which the presenter might speak authoritatively. In the quantum realm, such false unities emerge in the prevalence of what Polkinghorne refers to as “quantum hype,” echoed by Barad as “the ubiquitous appropriation of quantum theory” by “both its overzealous advocates and its unreflective practitioners.”<sup>184</sup> Because the experiments, theories, and philosophies of quantum physics are both complex and conflicting, it has been easy for contemporary pop-scientists and spiritualists to deliver particular aspects of quantum theory as conclusive evidence for the existence of telepathy, free will, or pervasive interconnectedness.<sup>185</sup> By connecting appropriated aspects of quantum theory to the social authority of science, such writers manage to gain credibility for their “new age” views of quantum reality.

Although it would be hard to argue that the quantum physics community is the victim of a powerful power asymmetry or exists as a colonized ‘Other,’ Barad emphasizes that it is still important recognize the quantum physics is often (mis)represented as a scientific path to mysticism, or an inherently more feminine practice of science than conventional Newtonian physics and its reductive approach to reality. She counters,

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<sup>184</sup> Barad, “Social Constructivism,” 166.

<sup>185</sup> Polkinghorne, *Quantum Theory*, 92.

But those who naively embrace quantum mechanics as some exotic Other that will save our weary Western souls forget too quickly that quantum physics underlies the workings of the A-bomb, that particle physics (which relies on quantum theory) is the ultimate manifestation of the tendency towards scientific reductionism, and that quantum theory in all its applications continues to be the purview of a small group of primarily Western trained males.<sup>186</sup>

Here, Barad calls attention to the error of positing quantum physics as inherently salvific for those seeking an antidote to the reductionist or aspiritual worldview of scientific reality. Such desires miss the fact that the theories and operations of quantum physics lie behind the very scientific reality such critics of science abhor. As such, recognizing the axes of power in which quantum physics is imbricated makes it likewise difficult to argue that quantum physics is inherently anything at all, never mind salvific.

Because of the mathematical and theoretical complexity of quantum mechanics, as well as the variety of interpretations that can explain particular experiments with its domain, I will not attempt a comparison of Nāgārjuna and quantum physics entire. Rather, I will read Nāgārjuna in relation to the philosophy-physics<sup>187</sup> of Karen Barad, architect of the “agential realist” view based on Bohr’s interpretation of quantum theory, in order to assess claims of compatibility between two views of reality presented in “Tibetan Buddhism” and “Quantum Physics.” Because the Copenhagen stance is prevalent in the physics community, and Barad’s unique reconstruction of it resolves many of the philosophical inconsistencies of quantum theory, her philosophy will stand for “quantum physics” in this particular instance, in much the same way that Nāgārjuna’s philosophy was taken above as a

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<sup>186</sup> Barad, “Social Constructivism,” 166.

<sup>187</sup> Because Barad sees the material practice of physics as inseparable from theory, she uses the term philosophy-physics to emphasize their entanglement.

voice of Tibetan Buddhism. As with Nāgārjuna, situating Barad historically will help to bring out the full force of her inventiveness in reconfiguring the views she inherited. Therefore, this chapter now turns to a compressed introduction to modern physics and the development of quantum theory according to Polkinghorne. It will be shown that his narrative produces an ideal jumping off point for Barad's philosophy, insofar as the metaphysical underpinnings of his presentation compose the view against which Barad pits her agential realism.

### **Classical Foundations of Quantum Physics**

Polkinghorne begins his narrative in 1687 with the publication of Isaac Newton's *Principia*, which established classical mechanics "as a mature discipline, capable of describing the motion of particles in ways that were clear and deterministic."<sup>188</sup> Of course, Newton's theory did not pop out of nowhere, and owes a great debt to his predecessors, particularly Descartes, who strove to explain the world in terms of the interactions and collisions of inert matter. Newton inherited this mechanistic worldview and fleshed it out mathematically, giving rise to the confidence expressed by his successor Pierre Simon Laplace, that "a being, equipped with unlimited calculation powers and given complete knowledge of the dispositions of all particles at some instant of time, could use Newton's equations to predict the future, and to retrodict with equal certainty the past, of the whole universe."<sup>189</sup> This assertion is a distillation of both the reductionism and determinism in classical

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<sup>188</sup> Polkinghorne, *Quantum Theory*, 1.

<sup>189</sup> Polkinghorne, *Quantum Theory*, 1.

physics: the idea that the entire physical world can be reduced to fundamental particles whose behavior can be predicted with absolute certainty. Thus, if a Laplacean subject were to know both the position and momentum of every particle in the universe, she would in time be able to calculate the composition of both past present and future states of *everything*. Thus in Laplace's ideal world, the human subject is an omniscient knower gazing upon the reality he reveals through scientific measurement.<sup>190</sup> This agent, given enough time and information, could understand the nature of reality in all times and places. As will be shown, developments in physics over the next few centuries would put serious pressure on this ideal.

According to Polkinghorne, the first crack in the armature of classical physics appeared in the 19<sup>th</sup> century, with Thomas Young's discovery of the wavelike nature of light. Contrary to Newton, who had conceived of light as a stream of tiny particles, Young showed that light exhibited *interference patterns*, or bands of increased or decreased intensity characteristic of wave behavior. For example, the interaction of waves of water: when the crests and troughs of one wave align with those of another, the height of wave is doubled; this is called "in phase," or constructive interference. In contrast, when the crests of one wave align with the troughs of another, the two waves cancel each other out, this is "out of phase," or destructive interference. Now, if a single wave were to pass through two holes in a barrier (say, a wall), the interactions of the two resulting wavelets would produce areas of both constructive and destructive interference. Thus, the presence of alternating light and dark bands resulting from light projected through two slits onto a screen, indicate its nature as

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<sup>190</sup> For a more polemical treatment of the ties between (Christian) ideals of omniscience and scientific realism, see Nietzsche, *On The Genealogy of Morals*.

wavelike. These observations, combined with James Clerk Maxwell's descriptive equations of light as electromagnetic waves, seemed to confirm the nature of light as a wave. That is, until Albert Einstein's demonstration of the photoelectric effect in 1905.

In this experiment, Einstein observed that a beam of light could eject electrons from a metal surface. Electrons normally circulate around the interior of a metal, but do not have enough energy to escape from its surface.<sup>191</sup> In a classical understanding of light as a wave, the magnitude or "swell" of light, rather than its frequency, would be expected determine the amount of energy transferred to electrons, just as one might expect the height of an ocean wave to determine the force with which it breaks upon a shore. Thus, light waves of high magnitude would be expected to dislodge electrons, rather than waves of high frequency. One might therefore predict that the wave's magnitude would be the dominant factor in producing electron activity. Surprisingly, Einstein's experiment exhibited the reverse behavior, for "Below a certain critical frequency, no electrons were emitted, however intense the beam might be; above that frequency, even a weak beam could eject some electrons."<sup>192</sup> In other words, the key factor impacting electron escape was the frequency, rather than the height, of waves. How could this be?

Einstein solved the puzzle by reconceptualizing the beam of radiation as a stream of packets of energy, or *quanta*.<sup>193</sup> In this understanding, the energy

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<sup>191</sup> Polkinghorne, *Quantum Theory*, 9.

<sup>192</sup> Polkinghorne, *Quantum Theory*, 9.

<sup>193</sup> Quanta, Latin "amount," were first suggested by Max Planck as radioactively emitted discrete packets of energy. Planck replaced the idea of smooth or constant energy transfer with the jumpy behavior of these quanta which carry energy. Thus, any energy exchange involving quanta are said

transferred to a given electron is dependent on both the frequency of the wave (which is proportional to the energy of the quantum) and the collision of the quantum with the electron (which transfers said energy). Thus, “The intensity [or magnitude] of the beam simply determined how many quanta it contained, and so how many electrons were involved in collisions and ejected. Increasing the intensity could not alter the energy transferred in a single collision.”<sup>194</sup> Because the frequency of light is directly proportional to the energy of the quanta, a critical frequency of light is needed to catalyze any electron activity. Said differently, without the proper frequency of light, no electrons could be made to jump from the metal. However, once the frequency of the wave is high enough to eject electrons, increasing the intensity of the wave augments the number of energy packets that cause escape events.

The packets, or quanta, eventually *photons*, in beams of light were the key to understanding the photoelectric effect, but they directly contradicted all those 19<sup>th</sup> century insights into the nature of light as a wave. Unsurprisingly, the physics community was baffled by the experiment, for they were now presented with Young’s conclusive demonstration of light as essentially a wave, and Einstein’s equally potent revelation of light as essentially particulate. Furthermore, these characteristics of light seemed fundamentally irreconcilable, for waves are spread out in space, and particles are discrete bounded entities. Thus it made no sense to think of the nature of light as both wave and particulate. Thirty years later, physicists began to conceive of and even to demonstrate not just that light, but even particles as having this paradoxically dual essence.

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to be “discontinuous,” for they can only occur in sharp jumps according to the energy of the quanta involved. Hence the term, “quantum mechanics.”

<sup>194</sup> Polkinghorne, *Quantum Theory*, 9.

The ability of objects in the quantum domain to behave in purportedly mutually exclusive manners was termed the “superposition principle” by Paul Dirac. Working off the Matrix and Wave mechanics of Werner Heisenberg and Erwin Schrödinger respectively,<sup>195</sup> Paul Dirac’s *Principles of Quantum Mechanics* framed superposition as “the mixing of states that classically would be mutually exclusive of each other,” such as the simultaneous location of a piece of chalk on *both* sides of a room.<sup>196</sup> Polkinghorne describes the phenomenon of superposition as the mysterious core of quantum physics, and Nobel Prize physicist Richard Feynman takes the “double slit experiment” as the key revelation of that center: “In reality,” he professes, “it contains the *only* mystery. We cannot make the mystery go away by ‘explaining’ how it works. We will just *tell* you how it works.”<sup>197</sup> Feynman’s insistence on “telling” rather than “explaining” relates back to the emphasis Polkinghorne places on “doing sums” without understanding what is happening beneath the equations. As will be shown, although the double-slit experiment seems clear enough, the picture it gives of the underlying reality of quantum behavior is intensely unpalatable for anyone bound to the ideas of classical physics.

In the experimental set-up, a source of quantum entities, such as an electron gun, fires a steady stream of electrons at a screen with two slits. Behind the screen is a detector that can register the impact of the electrons fired at it one at a time. Here,

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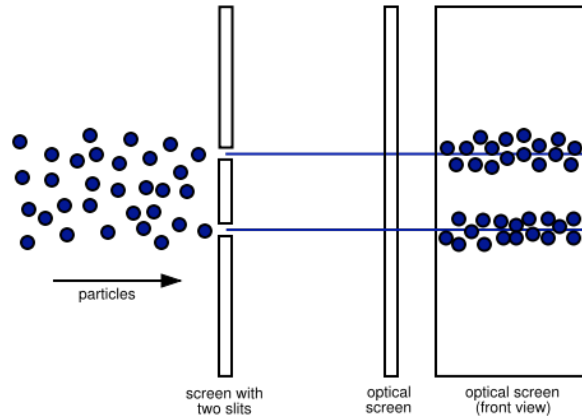
<sup>195</sup> Heisenberg was the first to introduce to quantum theory complex calculations involving “matrixes” of numbers whose properties corresponded to quantum phenomena that either could or could not be simultaneously measured. Schrödinger, on the other hand, set out the fundamental wave equation for dynamic systems of interacting particles that, like light, exhibited both wave and particle behavior.

<sup>196</sup> Polkinghorne, *Quantum Theory*, 21.

<sup>197</sup> Richard Feynman, Robert Leighton, Matthew Sands, *The Feynman Lectures on Physics Vol. III* (Boston: Addison Wesley Longman, 1970), 1. Emphasis original.

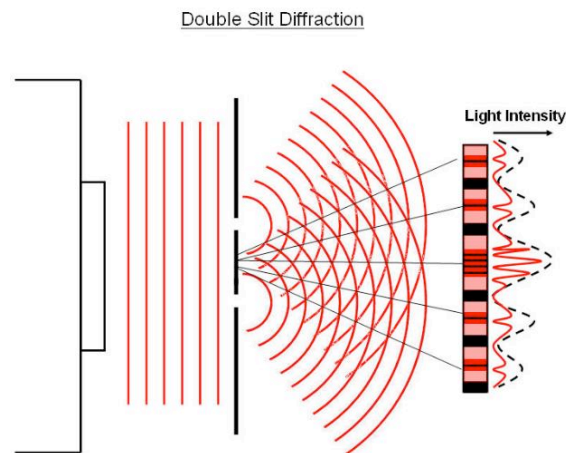


the electron gun is firing *particles*, which *should* travel through one slit or the other and hit directly across one at a time, forming two straight lines from gun to detector, corresponding to the two possible paths, like so:



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Now, if the gun were firing waves at the two slits, one would expect this sort of interference pattern to result. Thanks to overlapping of the wavelets approaching the detector, the most intense overlapping of waves is to be found between the two slits, like so:

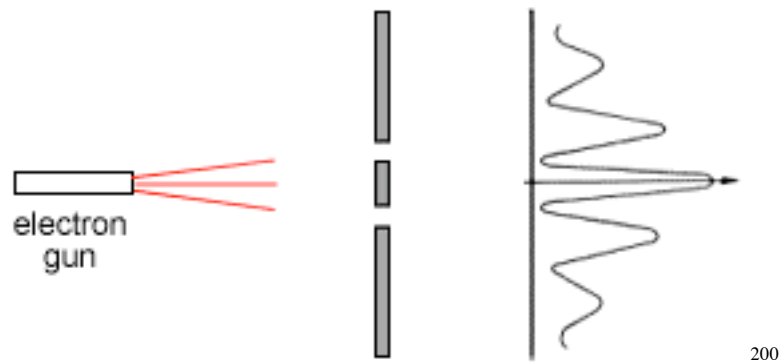


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<sup>198</sup> Science Blogs. "A Tale of Two Slits," accessed March 5, 2014, <http://scienceblogs.com/startswithabang/2009/06/01/a-tale-of-two-slits/>.

<sup>199</sup> Cronodon. "The Photon." Accessed April 6, 2014, <http://cronodon.com/Atomic/Photon.html>.

As the marks of electrons accumulate, however, the pattern they form is not that of clusters directly behind the two slits, but rather the interference pattern of wavelike behavior. In the diagram below, the wave pattern on the far right corresponds to the amount of electrons that impact the detector. Thus, the large peak in the middle represents the largest number of electrons, and so forth.



Oddly enough, it is the purportedly particulate electrons that produce the same interference pattern seen above with waves. Bizarrely, even though the gun is firing electrons one at a time, they behave as waves passing through both slits and producing interference patterns. In other words, the majority of “particulate” electrons land midway *between* the two slits, as though they had interfered *with themselves* on the way to the screen.

The central paradox is this: electrons seem to be exhibiting both particle and wave behavior. Their movement one by one to the detector seems to suggest particle behavior, but the collective interference pattern signifies wave behavior. These two

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<sup>200</sup> Esoteric Science. “Particles or Waves?” Accessed February 21, 2014. <http://www.esotericscience.com/AtomsQM.aspx>

models are incredibly difficult to reconcile, for in order to generate an interference pattern with electrons fired one at a time, the supposedly individual particles would have to travel through *both slits* in order to interfere with themselves and land between the two classically possible paths. Needless to say, in the classical realm, an object, like an electron, should not be able to travel through different paths simultaneously. For example, a train approaching two tunnels through a mountain would not be able to take both tracks at the same. Essentially, when both slits are open, *single electrons fired as “particles” exhibit the interference behavior seen in waves*. Electron behavior changes dramatically if the experiment is altered.

Suppose it were possible to close one of the pathways in the above experiment, say the bottom one. If this happened, all electrons fired at the detector would land opposite the top opening, traveling as particles in a straight line from gun to detector.<sup>201</sup> In other words, the interference pattern in the above diagram would cease to exist if one of the slits were closed; electrons would behave as particles rather than waves. Again, the wave pattern only emerges when both pathways are open. Thus the experimental apparatus determines how the electrons behave; it makes no sense to think of particulate electrons traveling through the two slit apparatus. For this view presumes that indivisible electrons travel down both paths simultaneously, which is impossible. When both slits are open, it only makes sense to conceive of the electrons as waves. In contrast, when one slit is closed, the electrons are best understood as particles. *They cannot be thought of as a particle and a wave simultaneously, for their behavior depends on the experimental apparatus.*

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<sup>201</sup> Polkinghorne, *Quantum Theory*, 24.

From these implications of the double-slit experiment, Polkinghorne draws out several features of his interpretation of quantum mechanics: that clear (classical) pictures of quantum processes are impossible to obtain, and that exact predictions of quantum behavior are likewise out of the question. While the former problem is instantiated in the problematic behavior of electrons as traveling down multiple paths, the latter is illustrated by a further modification of the above experiment.

In this alteration, detectors are placed on each slit to determine exactly which path each electron takes in order to land at the midpoint, in an effort to determine if single electrons do indeed go through both paths simultaneously. With this set-up, electrons end up with close to a 50-50 distribution opposite slits A and B: the interference pattern disappears and we're stuck with particulate electrons again. Surprisingly, measuring the path of each electron, as with closing one path or the other, eliminates their wave-like behavior. If electrons are expected to behave as particles travelling through one path or the other, they do so. If, on the other hand, they are expected to behave as waves traveling through both slits, the interference pattern appears.

Thus for Polkinghorne, the arrangement of the apparatus partly determines the experimental results, for "Asking a particlelike question (which slit?) gives a particlelike answer; asking a wavelike question (only about the final accumulated pattern on the detector screen) gives a wavelike answer."<sup>202</sup> Furthermore, because the questions asked rely upon mutually exclusive experimental apparatuses (one path vs. two path), the results cannot be observed simultaneously. They are thus said to be

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<sup>202</sup> Polkinghorne, *Quantum Theory*, 25.

“complementary” rather than conflicting, for they correspond to mutually exclusive arrangements.<sup>203</sup> For Polkinghorne, the wave-particle duality of observables is explained as function of human interaction with them, insofar as the experimental apparatus determines how scientific entities manifest themselves for purposes of observation.<sup>204</sup>

Thus for Polkinghorne, the nature of light (and electrons) is *both* particulate and wave-like, and the expression of either merely depends on the way light is being examined. Of course, this raises serious epistemological concerns for Polkinghorne, for unlike in classical physics, where the “physical world is laid out before the potentially all-seeing eye of the scientist,” the entities of the quantum world are partially veiled to the inquiries of physicists. In Polkinghorne’s words, “Our access to knowledge of quantum entities is epistemologically more limited than classical physics had supposed.”<sup>205</sup> In other words, while the realm of classical physics is purportedly composed of solid and predictable objects (tennis balls, pianos, couches) that exhibit the same behavior in a variety of settings, the domain of the quantum seems populated by “cloudy and fitful” entities that behave differently depending on how they are observed. Remember that Laplacean knowing (the all-seeing eye) involves a neutral or invisible subject taking measurements on objects with intrinsic natures that exist outside herself. Thus the experiments above seem to shatter that possibility, for not only do entities in the quantum realm not exhibit smooth, predictable behavior, but the ways in which they operate seem to be dependent on the

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<sup>203</sup> Neils Bohr’s “Complementarity” Principle will be examined in great detail further on in this chapter.

<sup>204</sup> Polkinghorne, *Quantum Theory*, 36.

<sup>205</sup> Polkinghorne, *Quantum Theory*, 32.

apparatus used to examine them. Indeed, Laplacean omniscience is most clearly rejected in quantum experimentation, for as we shall now see, the very conditions of such knowing (the position and momentum of particles), are impossible to obtain.

In 1927, the inability simultaneously to measure both the position and momentum of a given particle was articulated as Heisenberg's "uncertainty principle."<sup>206</sup> Heisenberg postulated that one way to measure a given electron's position would be to shine a light upon it, and then see where it is. Because higher frequencies of light yield more accurate results, Heisenberg proposed high frequency radiation as the most effective means of measuring position. However, as we have seen in relation to the photoelectric effect, high frequency radiation means high-energy quanta, which would strike the electron they were observing. This means that the measurement of position would impart a change of momentum to the electron, and that increasingly accurate measurements of position would yield increasingly fallible measurements of momentum. By examining an electron's position, one alters its behavior irreversibly. The measurement is therefore not "transparent," as it leaves the object of observation irreversibly marked by the observer. Even though the position of the electron is determined by the impact of photon and electron, its momentum cannot no longer be ascribed to it alone, for it is a combination of observer and observed momentum. Thus it is impossible to know both where an electron is and what it is doing on its own, and vice-versa; and this is the uncertainty principle.

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<sup>206</sup> Polkinghorne, *Quantum Theory*, 32.

Polkinghorne concludes, “This demi-knowledge is a quantum characteristic. Observables come in pairs that epistemologically exclude one another.”<sup>207</sup> Here, Polkinghorne is acknowledging that observables such as position and momentum cannot be simultaneously *known*. Even though Polkinghorne is acknowledging the impossibility of Laplacean omniscience, then, *he is also assuming the actual existence of observables that cannot be known simultaneously*. In other words, he assumes that a given particle possesses both position and momentum, but that only one of these properties can be measured at a time. Furthermore, he assumes the actual existence of electrons outside of a given experimental apparatus, conceiving of electrons as inherently existing entities that possess measurable properties. So even though he rejects the idea of absolute knowledge of physical reality, he still assumes that *there is such a real world out there to be known*. In other words, Polkinghorne is approaching the mysteries of quantum mechanics through a “realist” epistemological lens, which assumes that better or worse methods of knowing can be employed in scientific relations with the quantum realm.

Scientific realism is the view that scientific theories more or less correspond to an intrinsically existing reality, outside of human interests, concerns and engagement. Polkinghorne claims that realism “explains why [the] scientific endeavour is seen to be worthwhile, attracting the lifelong devotion of many people of high talent, *for it is an activity that yields actual knowledge of the way things are*.”<sup>208</sup> For Polkinghorne then, the value of science lies in its ability to reveal *truths about reality* that are inaccessible to the untrained, undevoted, or low of talent. This

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<sup>207</sup> Polkinghorne, *Quantum Theory*, 33.

<sup>208</sup> Polkinghorne, *Quantum Theory*, 85. Emphasis mine.

valuation of science is anchored in the existence of an ultimately real world to which scientific practice has special, though limited, access. Thus for him, the paradoxes and mysteries of quantum phenomena are best understood as epistemological limitations.

According to Polkinghorne, “we can only know the quantum world if we are prepared to accept it in its Heisenbergian uncertainty.”<sup>209</sup> Because the measurement of a given electron’s position disturbs its inherent momentum, it is not possible to measure all the observable properties of a given quantum entity simultaneously. For Heisenberg, this is true because the act of measuring momentum is not “transparent:” it does not leave the object of observation unmarked by the measurement interaction. Thus the measurement of momentum is fundamentally “uncertain,” as it is impossible to recover the electron’s initial, or observer-independent, momentum. In other words, the only way to simultaneously measure the position and momentum of a particle would be to acknowledge that human interaction with it is part of the particles supposedly “inherent” properties. But, knowledge of Polkinghorne’s real “quantum world,” separate from human agents, can only exist as such if measurements refer to observer-independent properties, like electron position. Crucially, then, the uncertainty principle preserves the possibility of an inherently existing quantum realm by delineating what kinds of knowledge are off limits within it. In other words, by claiming uncertainty as the proper epistemological approach for understanding quantum theory, Polkinghorne indicates that the observer-independent properties of the quantum world can only exist within a framework of uncertainty.

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<sup>209</sup> Polkinghorne, *Quantum Theory*, 87.



Thus Polkinghorne throws his chips in with Heisenberg, preferring to side with the realist camp of quantum theory, despite the limitations it presents. Uncertainty dominates the realism of Polkinghorne, and for him, Heisenberg is “The most truly reflective of the founding figures of quantum theory.” This accolade rests in stark contrast to what Polkinghorne’s perceives as the “endless ruminations” of Neils Bohr, whose “gift in philosophical matters fell far short of his outstanding talent as a physicist.”<sup>210</sup> As will be show, Bohr is not so quick to dismiss the possibility of preserving transparent measurement in questions of position and momentum. His account of measurement “transparency,” however, leads to *very* different conclusion than Heisenberg’s; in short, Bohr ends up rejecting the form of realism anchored by the uncertainty principle. Perhaps it is time to turn to Bohr’s take on the problem of measurement, and uncover exactly what might be so distasteful about his views to someone like Polkinghorne.

### **The Myth of Transparent Measurement**

Bohr goes a step farther than Heisenberg in his exploration of the measurement interaction between observer and observed – light and electron respectively. Although it is clear that the measurement of the electron’s momentum is not transparent, one should in theory be able to mathematically calculate it out of the experiment, leaving the electron’s initial momentum unchanged. If the initial momentum of the photon used to measure the electron’s position were known, and the photon’s momentum after collision with the electron could be measured, then this

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<sup>210</sup> Polkinghorne, *Quantum Theory*, 83.

change in the photon's momentum could be used to calculate the equal and opposite momentum change of the particle. Said simply, the initial momentum of the electron could be determined by measuring the final momentum of the photon that struck it and relating the change in photon momentum to the change in electron momentum. This operation would hinge upon the ability to measure the photon's position and momentum after its collision with the electron, but if successful, the experimenter could have her cake and eat it, too. The photon would reveal the particle's position, and the momentum imparted by the photon could be subtracted out, leaving the particle with its "inherent" properties as though no interaction occurred. The divide between knower and known would be clear as day, and we could be realists about electrons and their properties without any qualms.

Unfortunately, such a calculation is impossible to perform, as explained by Bohr's insight that "concepts are defined by the circumstances required for their measurement."<sup>211</sup> Here, Bohr indicates that concepts like position and momentum, particle and wave, only have meaning within the confines of particular experimental setups that produce them. Thus, the apparatuses that allow for the measurement of "position" and "momentum" are their material definitions; likewise with "particle" and "wave." In this understanding, matter and meaning are coextensive. As we have seen with the latter pair, *it only makes sense to speak of particle or wave behavior within its corresponding apparatus: "which-path" or "two-slit" respectively.* Bohr continues, "That is, theoretical concepts are not ideational in character, they are

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<sup>211</sup> Barad, *Meeting the Universe*, 109.

specific physical arrangements.”<sup>212</sup> In other words, different material set ups *produce* different concepts; concepts are not disembodied thoughts that refer to material things “out there” in the world. This is a key point for the case at hand, for as will be shown, concepts like position and momentum can only exist in mutually exclusive experimental arrangements. Thus, if values of both position and momentum are necessary to determine the full account of a measurement interaction, then we cannot calculate or subtract out the interference the measurement commits. Let’s examine an example related to Heisenberg’s original thought experiment, this time with a Bohrian twist.

In this revamped thought experiment, observation of position requires a dark room, a source of photons to illuminate the particle, and a fixed detector plate to record the picture of the flash, which is to say, the position of the particle. To measure position, it is essential that the plate be rigidly fixed, so as to avoid recording a blurry, or inaccurate picture of the particle. To measure momentum, however, the detector plate must be movable. This is true because the particle’s momentum change is measured by the photon that strikes it; this photon then carries momentum to the detector plate. This set-up, however, presents a huge problem for measuring both the position and momentum of the photon, because the detector cannot be both rigid and movable at the same time! In Barad’s words, “Crucially, then, *the position and momentum are not simultaneously determinate because they require mutually exclusive experimental circumstances* (a fixed support and a movable support

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<sup>212</sup> Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, (Durham: Duke University Press, 2007), 109.

respectively).”<sup>213</sup> Because any apparatus can correspond to *either* position or momentum *but not both*, the full extent of a measurement interaction is by definition impossible to calculate. It is not just that position and momentum cannot be *known* simultaneously, they cannot *be* simultaneously. Only one of these observable features can exist at a time, as with the case of particle and wave behavior.

Hence the issue: it is not possible to determine the effects of the photon’s interaction with the particle by measuring its position and momentum, because concepts like position and momentum only exist within mutually exclusive apparatuses. Thus, the momentum of a particle *does not exist* in an apparatus that embodies position and vice versa. Barad adds, “Therefore we arrive at Bohr’s conclusion: *observation is only possible on the condition that the effect of measurement is indeterminable.*”<sup>214</sup> This is a key point that for Bohr that does not only apply to the case at hand.<sup>215</sup> Because *any* measurement requires a particular material arrangement employed to the exclusion of others, the full extent of *any* measurement is impossible to determine. This is a point that will be explored in detail further on. For now, this thought experiment has revealed yet another challenging question: if measurement values do not relate to measurement-independent objects, then to what, exactly, do they relate?

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<sup>213</sup> Barad, *Meeting the Universe*, 111.

<sup>214</sup> Barad, *Meeting the Universe*, 113.

<sup>215</sup> Earlier in her work, Barad points out that Planck’s constant, the fundamental unit of quantum discontinuity, is a *universal* one. Hence, it applies to the macro-world of everyday objects in addition to the quantum microworld, which means that Bohr’s arguments are general rather than specific. In other words, because there is no evidence that the world is separated into a quantum and Newtonian domain, each with their own separate laws, Bohr’s argument applies to the world at large, not just the thought experiments in question.

The Cartesian binary of discrete, knowing subject and discrete, known object is in trouble here, for the object in question can no longer thought to exist independently of the measurement interaction used to reveal “its” “properties.” Barad again cites Bohr, “Since observations involve an indeterminable discontinuous interaction, ‘*as a matter of principle, there is no unambiguous way to differentiate between the “object” and the “agencies of observation. No inherent/Cartesian subject-object distinction exists.*’”<sup>216</sup> This point is best illustrated with the example of the thought experiment above, used this time to explore how the experimental role of the photon is dependent upon the experimental arrangement.

In the case of a fixed detector plate, the photon’s position is measured so as to determine the position of the particle. According to Barad, this is essentially the same operation as taking a picture of the particle with a flash camera, in which case the light is the observer, more precisely; it is part of what Bohr refers to as the *agencies of observation*.<sup>217</sup> In the case of a mobile detector plate, by contrast, the momentum of the light is being measured; hence it is part of the *object* in question. Thus it is the specific experimental arrangement that determines exactly the object of an observation, for there is no pre-existing object to be measured; there is only what a given apparatus constitutes as such. Likewise, it is the apparatus that determines what serves as the agencies of observation. There is no inherent distinction between object and agencies of observation; there is only the “cut” enacted by a particular apparatus,

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<sup>216</sup> Barad, *Meeting the Universe*, 114.

<sup>217</sup> Here, Bohr’s terminology signals his appreciation of the inseparability of the conceptual and the physical. The agencies of observation are those aspects of the experiment that correspond to the “subject” of the Cartesian binary; in this case the prosthetic appendages of the human engaged measure the particle’s position.

and furthermore, different apparatuses enact different cuts. Likewise, there is no inherent divide between a scientist, her materials, and the reality she explores.

### **Uncertainty vs. Indeterminacy**

This short detour through Bohr's understanding of measurement interactions as fundamentally indeterminate exposes the break between his thought and Heisenberg's. It bears repeating that Heisenberg's initial conclusion on the matter of uncertainty was that there is a limit to what humans can know about the behavior of particles on the quantum level. This limit, in turn, preserves the separation of the human subject from her material experimental object. Because light used to measure position imparts a necessary *disturbance* to the observed particle's momentum, Heisenberg argues that the uncertainty relation is an epistemic principle, concerned with a fundamental limitation of knowledge. Barad continues, "In other words, a determinate value of the electron's momentum is assumed to exist independently of the measurement, but we can't know it; we remain *uncertain* about its value, owing to the unavoidable disturbance caused by the measurement interaction."<sup>218</sup> It's worth noticing here that Heisenberg's analysis of measurement interactions stops right before Bohr's begins: with the assumption of a disturbance that cannot be subtracted out of the experiment. Heisenberg takes the disturbance for granted, which allows him to leave the rigid divide between scientist and reality intact, while limiting the amount that can be known the latter. By contrast, Bohr's exploration of *why* the

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<sup>218</sup> Barad, *Meeting the Universe*, 116.

“disturbance” cannot be erased leads him to reject the idea of an inherent divide between scientist and world, as well as the notion of anything “there” to “disturb.”

While Bohr and Heisenberg both argue that that the scientist is *always* implicated in the outcome of a given experiment, they do so in very different ways. For Heisenberg, human engagement with reality determines the boundaries of observer-independent reality, in terms of what can and cannot be *known* about the world. For Bohr, because the choice of experimental arrangement dictates the emergence of subject and object within it, *there is no such independent reality*, only a participatory one. Thus in the case of position and momentum, what Heisenberg takes to be a matter of *uncertainty*, Bohr and Barad describe in terms of *indeterminacy*. For while Heisenberg takes as given a fundamental limitation to knowledge of particle behavior, Bohr takes as given a fundamental limitation to the very *being* of a given aspect of particle behavior. In other words, if concepts such as position and momentum, or particle and wave, can only exist within mutually exclusive or “complementary” material arrangements, then the problem is not that we cannot *know* them at the same time, it is that they cannot *be* at the same time. Scientific practice for Bohr cannot be understood merely as observation: it is a direct engagement with a world that articulates itself through different material arrangements.

Again, while uncertainty concerns knowing, complementarity concerns being. For Bohr, “understands the reciprocal relationship between position and momentum in *semantic* and *ontic* terms, and only derivatively in epistemic terms (i.e., we can’t know something definite about something for which there is nothing definite to

know).”<sup>219</sup> Again, Barad calls attention to the relationship between matter and meaning instantiated by physical arrangements of “ideational” concepts, for if the concept does not exist in a particular apparatus, it therefore certainly cannot be measured. In other words, because concepts like position and momentum, or particle and wave behavior, only come into determinate being through exclusive material arrangements, they cannot be thought to simultaneously exist in some independent physical reality. They can only exist through specific physical arrangements, not in some objectively true external world revealed through scientific practice. Thus Bohr is not so much concerned with the problem of disturbance as he is with the existence of fundamental indeterminacies.

Therefore, rather than employing the notion of “disturbance” as inherent in observation, Bohr argues for the idea of “quantum wholeness” as the core of his philosophy-physics. *This wholeness is not Capra’s notion of an undifferentiated unity underlying all things onto which boundaries are mapped.* It is rather the non-dual wholeness of matter and meaning that necessarily enacts local, particular cuts between objects and agencies of observation. Because the agencies of observation are integral to the differentiated wholeness of the situation at hand, there is nothing there to “disturb,” there is only the entire experimental picture. With the example of position measurement, the light does not “disturb” the momentum of the particle, for the particle does not possess momentum within the apparatus at hand, and further, *nor does the particle exist outside of the instance of quantum wholeness which allows “its” boundaries to be constructed.* Barad describes such a single situation of

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<sup>219</sup> Barad, *Meeting the Universe*, 118.



quantum wholeness as a *phenomenon*, which takes into account the specific *intra-action* between object and apparatus that differentiates the object from the agencies of observation, as with the case of the photon and its momentum.<sup>220</sup>

For Barad, experiments are not moments of observation; they are instances of world making where matter and meaning meet. Such events are reproducible phenomena, with known specific material conditions that allow for their unambiguous reproduction. In turn, objectivity is not characterized by the revelation of objective properties of independent objects, rather, “‘Objective’ means reproducible and unambiguously communicable – in the sense that ‘permanent marks...[are] left on bodies which define the experimental conditions.’<sup>221</sup> In the case of the position and momentum experiment, the visible impact of the photon on *either* a fixed *or* movable plate constitutes the unambiguous communication of either position or momentum respectively. In the first case, light is part the measuring instrument that marks the body of the detector; in the latter, it is a body marked by its collision with the electron and measured by the detector.<sup>222</sup>

Since there is no inherent distinction between the instrument and object of a measurement, measurement values are not revelations of objective reality. Rather, measurement values *refer to phenomena*, which take into account all relevant features of the experimental apparatus. Centrally, such features are those that enact the cut

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<sup>220</sup> Note here that while Bohr uses language of interaction in his description of the entities involved in a particular phenomena. Barad shifts to language of intra-action, to emphasize that the object and agencies of observation emerge within the confines of a particular phenomena – they are merely abstractions outside of it.

<sup>221</sup> Barad, “Social Constructivism,” 171.

<sup>222</sup> Barad also notes that such marks constitute the intra-active emergence of causality, for in the first case, light (cause) creates a mark on the detector (effect), while in the latter, the particle (cause) marks the light (effect). For more on intra-active causality, see Barad, *Meeting the Universe*, 214.

between object and agencies of observation, and thereby, create the very things described by the experiment. Here, because phenomena are characterized by the deliberate and provisional construction of a subject-object distinction, classical concepts that operate on a subject-object binary can still be employed to describe them. For example, in the case of the phenomenon involving position above, light can be meaningfully described as the subject of the experiment, and the particle as the object. However, exactly what constitutes the subject and object will change depending on the experimental set-up, and “In fact, according to Bohr’s principle of complementarity all possible ways of drawing the subject-object distinction must be considered to obtain the maximal accounting of our investigations.”<sup>223</sup> Thus, the Cartesian divide between the human knower and the known world gives way to a radical, multi-perspectival approach to scientific practice – one which redefines radically the role of the human, and grants agency to non-human elements of experimentation.

### **Agential Reality and Agential Realism**

Bohr’s philosophy-physics moves past Heisenbergian approaches to explorations of the physical world, which assume an invisible, external human subject who can know the world “in itself.”<sup>224</sup> Rather, Bohr is attentive to the ways in which reproducible phenomena allow for unambiguous communication of results with the use of specific and locally defined concepts. This is an absolute rejection of the

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<sup>223</sup> Barad, “Social Constructivism,” 173.

<sup>224</sup> Just as the Ābhidharmaika assumes that a discrete human knower can come to see ultimate reality in terms of dharmas.

Laplacean omniscient scientist, for human experimental engagement with the world must be taken into account to salvage any notion of objectivity.<sup>225</sup> For if the relevant arrangements of a given experiment are not related in full to another team of researchers, the experiment will not be reproducible. The cut between object and agencies of observation may be constructed differently, producing different results.

Said differently, Bohr is contesting the separation of epistemology and ontology that resonates from Cartesian subject-object / culture-nature / word-world dualisms. Because specific material arrangements define concepts, knowing is completely bound up with being in the world. This stance is a direct challenge to any conception of reality as existing prior to or outside of language, for, “What is being described is our participation *within* nature.”<sup>226</sup> In other words, Bohr is rejecting the notion of a passive “blank slate” world constituted by language, or an active world that reveals itself through representation. Instead, he is troubling the very separation of world and word in the first place.

What Barad is proposing is a physical reality constituted by phenomena: an ontology that takes into account the non-dualistic nature of matter and meaning differentiated through cuts made by particular apparatuses. If phenomena are that which construct a boundary between objects and agencies of observation, so that discrete entities can be meaningfully measured, then it makes no sense to talk of the existence of such things outside of the phenomena that produce them. According to Barad, “Reality is not composed of things-in-themselves or things-behind

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<sup>225</sup> Not to mention the wrench that Bohr’s indeterminacy throws in the gears of Laplace’s deterministic universe. For if causality is constantly reconfigured through intra-activity, then there could no objective world of inherently existing causes and effects unfolding in sequence.

<sup>226</sup> Barad, “Social Constructivism,” 175.

phenomena, but things-in-phenomena.”<sup>227</sup> Said differently, agential reality is not some independently existing world that is forever outside the grasp of human understanding; it is a world constituted by material-conceptual practices that allow for meaningful communication. Thus being does not exist prior to language, and is neither inaccessible to language, nor wholly constituted by it. In turn, although humans represent nature, nature is not a blank slate, nor is it ever separate from the discursive practices that characterize phenomena as material-culture. For Barad, being is best understood as human participation in nature, or agential reality.

Furthermore, “Since phenomena constitute agential reality, and it is phenomena that scientific theories describe, it follows that scientific theories describe agential reality.”<sup>228</sup> While this may sound like a classical realist or correspondence of truth position, it is crucial to note that Barad is proposing a correspondence between scientific theory and *agential reality*, rather than some abstract “ultimate” reality independent of human interests and concerns. In other words, Barad is asserting that scientific theories correspond to particular instances of quantum wholeness that are composed of constructed boundaries, rather than abstract or inherently existing entities. Because a phenomenon is comprised by the material arrangements that produce what counts within them as an object, it follows that scientific theories can be used to describe such objects *as they exist within particular phenomena*.

For example, take the case of wave/particle duality of light, which baffled realists of the 19<sup>th</sup> and 20<sup>th</sup> centuries. If light were a real entity of the objective world, it should not be able to behave both as a particle and wave, as these states are

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<sup>227</sup> Barad, “Social Constructivism,” 176.

<sup>228</sup> Barad, “Social Constructivism,” 177.

exclusive of one another. Now for Polkinghorne, the takeaway from the dual nature of light was that it manifests itself differently depending on the circumstances used to examine it. Note that in Polkinghorne's case, light is thought to be an intrinsically existing object that displays different behaviors in incompatible experimental situations. For Bohr, in contrast, "wave" and "particle" are classical concepts that refer to mutually exclusive phenomena, not to independent objects of some objective reality. Because descriptive concepts are context-dependent, it makes no sense to speak of light behaving as particle and wave independently of any sort of physical arrangement. Thus there is no "light" to speak of as an aspect of independent reality, only light as constructed in particular circumstances. There is not inconsistency in theoretical descriptions of wave and particle like behavior of light, as long as such descriptions refer exclusively to particular phenomena rather than "light" as a whole.<sup>229</sup>

In turn, this emphasis on context-dependent realism puts tremendous pressure on the ideal of a final reductionist account of the world. Instead, multiple context-dependent phenomena are necessarily employed to contest the Cartesian subject-object binary in as many ways as possible. These phenomena are best understood as the entanglement of *intra*-acting agencies, that is, they are relations that give rise to *relata*. In other words, for Barad, it makes no sense to speak of *interactions* within

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<sup>229</sup> It is worth remembering here that the quantum thought experiments of Bohr reveal general onto-epistemological principles about agential reality at the macro and micro levels. For example: if one is to study a particular living organism, one must do so in the context of a particular environment. However, due to the dynamic relationship between organism and environment, different environments yield different characteristics for the organism at hand *and vice versa*. As with position and momentum, organism and environment are complementary variables: they can only be examined from the mutually exclusive perspective of the other. For more on environmental *intra*-activity, see Barad, *Meeting the Universe*, 170.

phenomena, for interactions presume the relation of two already existing entities. In contrast, we should speak of intra-actions, a term that signifies that relations *precede* the existence of the relata, for “It is through specific agential intra-actions that the boundaries and properties of the components of phenomena become determinate and that particular concepts (that is, particular material articulations of the world) become meaningful.”<sup>230</sup> Thereby, if apparatuses are that which bring agential reality into being, then a whole host of ethical questions arise as to who decides what apparatuses to employ, where, and why.

Barad is quick to note that any language of “decision” can mistakenly conjure up an illusion of liberal humanist actor of the will: a scientist is who is free to arrange a given apparatus however she sees fit.<sup>231</sup> However, such language misses the reality of any scientist’s enmeshment within the scientific community. Especially because apparatuses are designed to produce reproducible and unambiguous phenomena so as to meet conditions for objectivity, they necessarily exist within shared community standards. In Barad’s words, “That is, scientists make meaning within specific communities, they do not do so autonomously.”<sup>232</sup> Furthermore, because such communities are allied with particular state bodies and sources of private funding, and other “axes of power,” the boundaries they construct are fundamentally connected with different interests in different places.

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<sup>230</sup> Barad, *Meeting the Universe*, 139.

<sup>231</sup> For indeed, apparatuses are not just experimental arrangements – the scientist herself is produced through intra-acting apparatuses such as race, gender, late capitalism, nationalism, etc. She is thereby enfolded into “the ongoing reconfiguring of the world.” Barad, *Meeting the Universe*, 171.

<sup>232</sup> Barad, “Social Constructivism,” 181.

Likewise, since the experimentation is culturally situated, “The scientists marking off the boundaries are marked by the cultural specificities of race, history, gender, language, class, politics, etc. In stark contrast to the classical framework, there is a sense of agency and therefore accountability.”<sup>233</sup> By reconceptualizing science as a process of world making involving culturally situated actors intra-acting with agential reality, Barad ensures neither the particularity of nor responsibility for particular boundaries is forgotten.<sup>234</sup> The boundaries produced by these situated communities have material consequences, which for Barad, open the possibility of an “ethic of knowing,” or an *ethico-onto-epistemology*.

One of the key benefits in approaching scientific practice through the lens of agential realism is that it enables the interrogation of constructed boundaries. Again, Barad is careful not to let Bohr’s notion of “quantum wholeness” be understood as some “innocent whole over the sum of its parts,” rather “wholeness signifies the inseparability of the material and the cultural, and likewise, the absence of inherent divisions between the two.”<sup>235</sup> As such, any instance of wholeness produces distinction and differentiation from which to create meaning. She offers, “Utopian dreams of dissolving boundaries are pure illusion since by definition there is no agential reality without constructed boundaries.”<sup>236</sup> Because she is interested in examining how instances of power construct and reconstruct temporary boundaries,

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<sup>233</sup> Barad, “Social Constructivism,” 185.

<sup>234</sup> Because these terms seem to indicate a distinction between humans and world, it is important to note that in her book *Meeting the Universe Halfway*, Barad drops the idea of science as pure “social constructivism,” which privileges the cultural over the natural. In its place, she writes of “naturalcultural” constructions, where the categories of human and world are contextually constructed through the process of the world making itself intelligible *to itself*, not just to humans.

<sup>235</sup> Barad, “Social Constructivism,” 182.

<sup>236</sup> Barad, “Social Constructivism,” 182.

she rejects any understanding of boundaries as “natural” or “arbitrary” divisions of a holistic oneness. For her, it is through the examination of the boundaries provided by different apparatuses that one can understand the composition of a given phenomena and its place within agential reality.

This is an essential point for understanding the intent of Barad’s agential realism: the rejection of an ultimate reality separate from human interests is a multifaceted intervention in how humans conceive of themselves as agents within the world. As a feminist scholar of science studies and a theoretical physicist, Barad is interested in challenging Enlightenment notions of objectivity that preserve the illusion of disembodied knowledge.<sup>237</sup> At the same time, she strives to preserve a reconstruction of realism that takes into account the value of scientific practice *while* exposing how particular interests and goals are inextricable from scientific practice. To do this, she turns the powerful discourse of Cartesian dualisms and Newtonian concepts of observers and objects from the separation of human subjects and objective reality, to the participation of humanity within agential reality. In her eyes, “Why would be interested in such as thing as an ‘independent reality’ anyway? We don’t live in such a world.”<sup>238</sup> By making a participatory reality the realm of scientific practice, Barad calls attention to how different scientific practices influence the reality in which they occur, and vice versa. In doing so, she simultaneously undermines the scientific appeal to a transcendent, objective truth, while opening a space for responsible practices of science that take responsibility for the way they participate in the ongoing differentiation of the world.

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<sup>237</sup> For more on matters of Feminist objectivity and perspectival seeing, see Haraway, *Situated Knowledges*.

<sup>238</sup> Barad, “Social Constructivism,” 185.



In summary, this chapter began by presenting a Newtonian assumption of independently existing objects revealed through transparent acts of measurements. It started to depart from this Cartesian separation with Heisenberg's uncertainty principle, which asserted that not all measurements could be transparent. Following Heisenberg, it examined Bohr's notions of complementarity and indeterminacy, which argued that no measurement interaction can ever be transparent, and thus, any measurement is an act of participation within reality. Finally, it explicated the agential realism of Karen Barad, and her framing of Bohr that fully rejects any notion of an independently existing objective reality, and instead, focuses on the ways that human and non-human agents participate in the ongoing differentiation of the world. While explicitly rejecting any form of ultimate reality separate from human interests and concerns, she leaves agential reality and all its differentiations as the only world in which human participate. A central question remains: how does this agential reality compare with that of Nāgārjuna? And further, does Nāgārjuna even have a reality to compare in the first place?

## Conclusion: Leaving Ends Loose

There is only a perspectival seeing, only a perspective ‘knowing’; and the more affects we allow to speak about one thing, the more eyes, different eyes, we can use to observe one thing, the more complete will our ‘concept’ of the thing, our ‘objectivity,’ be.

– Freidrich Nietzsche, *On the Genealogy of Morals*

The *seeming* way is the domain of concepts. But the *real* way is beyond concepts.

– Chökyi Nyima Rinpoche, *Present Fresh Wakefulness*

After three chapters on Buddhism and science in conversation, Madhyamaka philosophy, and quantum philosophy-physics, it is time to deploy this work in service of this project’s central goal: assessing claims of compatibility between the “realities” of Tibetan Buddhism and quantum physics. The first chapter revealed a long history of engagement between “Buddhism” and science, loaded with social, cultural and political concerns. Focusing on strict comparisons between Buddhist terminology and 19<sup>th</sup> century scientific discoveries helped examine the Orientalist and colonial currents in which such comparisons operate. Subsequently, the project isolated the ontologies of Nāgārjuna and Karen Barad, rather than attempting an analysis of “Tibetan Buddhism” and “Quantum Physics” *tout court*. Together, these three chapters provide the resources both to situate and to articulate a self-aware comparison of *two* views of reality in Tibetan Buddhism and quantum physics. Furthermore, rather than attempting to *conflate* their rejections of ultimate reality, this final section will explore how they *differ*. Instead of collapsing Nāgārjuna’s and Barad’s rejections of

ultimate reality, this chapter will reveal a fundamental break between the anti-realism of Nāgārjuna, and the participatory realism of Barad. In other words, it will emphasize the ways in which Nāgārjuna rejects reality as varying degrees of nonsense, while Barad secures it with her reformulation of Bohr's philosophy-physics.

### **Back and Forth Through History**

This project has devoted a great deal of attention to examining the ways in which different views and arguments arise from particular circumstances. It has therefore examined Nāgārjuna and Barad in the context of their philosophical predecessors, whose materials they repurposed to suit their own arguments. For Nāgārjuna, the doctrine of dependent origination formulated as emptiness showed that dharmas, said to be the foundations of ultimate reality, are actually conceptual constructions.<sup>239</sup> Through a variety of arguments, he asserts that because dharmas do not exist independently of mind, any notion of an ultimate reality based off them is incoherent, for any such reality includes human interests and concerns. For Barad, in contrast, the force of Bohr's indeterminacy principle entails a rejection of the inherently property-bearing entities of classical scientific realism. In her case, the indeterminate measurement interactions of Heisenberg's "uncertainty," which set

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<sup>239</sup> Again, demonstrating causality as a conceptual construction rather than a feature of ultimate reality helped secure Nāgārjuna's argument against the ultimate reality of dharmas. For if dharmas come into being through causes and conditions, but causality is a conceptual construction, then dharmas cannot be thought to exist separately from human interests and concerns, for they come into being in dependence upon mental phenomena (which should be separate from ultimate reality). For more on this, see Gethin 1998, 238; or Siderits 2007, 191.

limits upon what humans can know of scientific reality, actually reveals that separate scientific reality cannot exist as such.

However, even this comparison between Nāgārjuna and Barad's rejections of ultimate reality has its own historical framing: more than one hundred years of compatibility claims between Buddhism and science, from karma and evolution to interdependence and relativity. Regarding such claims, Lopez argues, "Identifying the historical origins of an assertion is the first step – a necessary but not a sufficient step – towards understanding that assertion."<sup>240</sup> As has been shown in the first chapter, the origins in question are complex, indeed.

King, Masuzawa and others all helped show that "Buddhism," constructed as a religious category in the 19<sup>th</sup> century, was loaded with projections of the culture that designed it. At a time when Victorian intellectual circles were debating and championing Darwin's *Origin of Species* (1859), scientific rationalism was presented as the culmination of European intellectual history and epistemological progress. At the same time, the growing "Victorian crisis of faith" between science and Christianity was producing a need for a new religion compatible with science: a religion that operated according to Christianity's ethical standards but eschewed its "pre-scientific" dogmatic claims. Thus the "Buddha" whom European philologists constructed in the 19<sup>th</sup> century was a rational, ethical social reformer who favored empirical methods of truth seeking over religious dogmas. He was, in Lopez' terms, a "Scientific Buddha," exported by Western intellectuals and claimed by indigenous

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<sup>240</sup> Donald Lopez, *The Scientific Buddha: His Short and Happy Life*, (New Haven: Yale University Press, 2012), 10.

Buddhist elites as a weapon against Christianization and colonial ingress.<sup>241</sup> For by articulating their traditions as “science,” Buddhist modernizers were able to jump past “religion” to the top of the Western cultural scale, by arguing that the Buddha had known *all along* what scientific progress was just beginning to discover.

Today, such “ancient and mystical” confirmations of contemporary scientific discoveries continue to serve as cross-cultural ammunition for the universal truth claims of certain scientists.<sup>242</sup> Lopez described such mystical validation as a “deep longing for the primordial:” a timeless mystical truth that might anchor new and challenging developments of contemporary science. For if the Buddha’s enlightenment is characterized as the attainment of an eternal omniscience, then such enlightenment must predict, and be confirmed by, future scientific discoveries of truth. In other words, claiming compatibility between Buddhism and science allows scientists to present their findings as reformulations of eternal truths, rather than mere discoveries that might be rejected by the continuous advance of scientific knowledge. Here, it is important to note that while much of the conversation between Tibetan Buddhism and science has shifted to questions of Neuroscience and meditation, claims of compatibility between Buddhist metaphysics and quantum physics continue to be made. Given the tendency to see physics as the science that uncovers the bedrock of reality, compatibility claims between physics and Buddhism exhibit a clear form of Lopez’s “longing for the primordial” as it pertains to truths about the nature of the universe.

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<sup>241</sup> Lopez, *The Scientific Buddha*, 10.

<sup>242</sup> Thus the *Tao of Physics* presents the truth of modern (Western) physics as aligned with that of Eastern (ancient) mysticism, a move that provides scientists with the comfort that what is now known was once known long ago. Lopez, *The Scientific Buddha*, 45.

As Lopez and others point out, each articulation of the “Buddhism” in “Buddhism and science” is designed to be compatible with different scientific views of reality, and is inextricable from the political currents that lead to its many formations. Therefore, *it is unsurprising that “Buddhism” and “science” continue to agree, for they are continuously constructed to do so.* From Theravada cosmology and heliocentrism, to karma and evolution, from Zen interdependence and relativity, to Tibetan Buddhism’s emptiness and quantum physics, the referents of “Buddhism” and “science” have changed drastically over the course of the last two centuries.<sup>243</sup> In a world still dominated by scientific understandings of “truth,” contemporary articulations of Buddhism as compatible with science, like Capra’s *Tao of Physics* or HHDL’s *The Universe in a Single Atom*, likewise leverage the social authority of science to validate their particular construction of Buddhism.

This situation cannot mean, then, that science and Buddhism are now on equal footing, for as Lopez points out, “It is clear that the Buddhism that is compatible with science must jettison much of what Buddhism has been, and is, in order to claim that compatibility.”<sup>244</sup> Just as 19<sup>th</sup> century scholars dismissed different cultural practices of Buddhism as perverse derivations of their “authentic” textual construction, so many of the lived practices and beliefs of Buddhism must be pared to suit the construction of scientific Buddhism. Thus, if we are ever to move past the Orientalist narcissism that finds our modern selves in some “ancient” (yet constructed) Eastern Other, perhaps it is time to move past the need for compatibility, and explore the meaningful contours of similarity and difference between these two complex and totalizing

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<sup>243</sup> Donald Lopez, *Buddhism & Science: A Guide for the Perplexed*, (Chicago: The University of Chicago Press, 2008), 33.

<sup>244</sup> Lopez, *The Scientific Buddha*, 16.

cultural formations. With this goal in mind, we now return to the philosophies of Nāgārjuna and Barad to figure out just how related they actually are.

### **Emptiness and Quantum Wholeness**

As Walser points out, Nāgārjuna expounded his Madhyamaka philosophy within the confines and constraints of an embattled Mahāyāna minority. As such, it is important to treat Nāgārjuna's views of emptiness as intra-acting with particular social and political concerns, rather than as timeless wisdom. Additionally, one must recognize that there are soteriological concerns in Nāgārjuna's philosophy: his "Middle Way" is a philosophy to be put into practice and realized for the benefit of all sentient beings. For his notion of emptiness is not some ultimate truth about the world, but rather, a conceptual purgative useful for the final realization of no-self.

Remember that Nāgārjuna begins with the Ābhidharmika's metaphysical stance, which asserts the existence of an ultimate reality composed of ultimately real dharmas. For the Ābhidharmika, seeing reality in terms of dharmas means seeing the world in terms of ultimate truth, and thereby attaining liberation from the ignorance of conventional reality. Nāgārjuna attacks this stance in part with the principle of dependent origination, which states that all phenomena, including dharmas, arise in dependence upon causes and conditions. For Nāgārjuna, if causality is a conceptual construction, and the dharmas come into being dependent on causes and conditions, then dharmas cannot be ultimately real.<sup>245</sup> For if dharmas exist only momentarily,

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<sup>245</sup> For again, ultimate reality can only be composed of ultimately real existents, that is, things that inherently exist outside of human interests and concerns.

there can be no overlap between a dharma of heat and one of fire. Hence the moment of heat cannot bring about the moment fire on its own, for these dharmas are separate in time and thus cannot interact: only a conceptualizing mind can supply the relation between them. If these bases of ultimate reality are revealed to be conceptual constructions, then how can any kind of ultimate reality exist outside of human interests and concerns?

With a variety of *reductio ad absurdum* arguments, Nāgārjuna convinces his opponent of the totalizing pervasiveness of emptiness. He claims that nothing exists intrinsically: not the dharmas and not even emptiness itself. And if nothing exists intrinsically, then the very idea of ultimate reality is fundamentally untenable. Thus, the emptiness of emptiness leads to a rejection of *all metaphysical views*, including notions of interdependence *as they pertain to ultimate reality*. Crucially, then, while Capra interprets emptiness *metaphysically* as an underlying unification of all things, Nāgārjuna does so *semantically*. This is to say that while Capra translates emptiness as a fundamental interconnectedness behind all things, Nāgārjuna rejects such interpretations as a hypostatization of emptiness that reifies the idea of an inherently existing reality. For the Mādhyamika, the emptiness of emptiness means that different views of the world are varying degrees of nonsense, and can lead with more or less success to the ultimate truth: that there is no such thing as ultimate truth.

With the rejection of ultimate reality comes Nāgārjuna's complex treatment of "conventional" reality as the only "reality" to which humans have access, but one that must never be taken as fully "real" in the ultimate sense. For if the conceptual analysis of said reality reveals the emptiness thereof, then reality as such can only be



a projection of human interests and concerns onto projections of emptiness. From Nāgārjuna's point of view, concepts do not refer to an underlying undifferentiated ultimate reality; they refer to emptiness, *which is itself a conceptual construction*. Again, *there is no transcendent basis of reality for the Madhyamaka – no inherently existing world to which concepts refer, whether it is interdependent or not.*<sup>246</sup> This means that Capra's understanding of Nāgārjuna as setting out a metaphysic of non-differentiation is best read as a misguided appropriation, for Nāgārjuna explicitly rejects any such statement about how the world "actually is." If striving for ultimate truth is a subtle form of attachment, then emptiness is the remedy. As we have seen, the emptiness of emptiness leaves the Mādhyamika with purely immanent notions of truth that are context-dependent and which lead to more or less successful practice without referring to any inherently existing entities. As will be shown, while it may be tempting to conflate this rejection of ultimate reality with Barad's, her intervention differs greatly from Nāgārjuna's in both form and function.

As with Nāgārjuna, Barad does not expound pure philosophy as abstract disembodied truth. She locates herself as a feminist philosopher and theoretical physicist working between the extremes of social constructivism on the one hand and scientific realism on the other. As such, she sets out to craft an ontology that takes seriously both the material and cultural elements that intra-act to produce the world. Rather than accepting or rejecting "reality" as such, she reconceptualizes it as

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<sup>246</sup> Westerhoff notes that such a "one-truth" model of reality troubles any kind of representationalist theories of knowledge, for if there is no intrinsically existing reality to which representations can more or less correspond; "representations" are context-specific bases of successful interaction with "objects" that lack any essential properties. Furthermore, Nāgārjuna's rejection of ultimate reality likewise entails a rejection of any intrinsic separation between concepts and world that assume linguistic and conceptual practices "distort" the world "out there" (2003, 219-220).

“agential.” In short, she examines the social, cultural and political dynamics of scientific practice, and seeks to understand how different axes of power construct the boundaries of the world in which we participate. Her philosophy is thus an ontological, epistemological *and* ethical intervention in science studies and practice. For as we have seen, if scientific theories correspond to agential reality rather than objective reality, then different agents must be held accountable for different constructions of agential reality.

Like Nāgārjuna in the context of the *Ābhidharmika*, Barad is working against Newtonian ideals of an ultimate reality, composed of inherently existing objects that science reveals to human agents. In such a view, “transparent” measurement processes preserve the clear Cartesian binary of subject and object, as measurement interactions are thought to leave their objects unmarked. In such classical conceptions of physics, the full knowledge of such objects ultimately promises “Laplacean omniscience:” total knowledge of the past and future states of the universe.<sup>247</sup> In a limited form, such realism is perpetuated by Heisenberg’s uncertainty principle, which states that because of discontinuous measurement interactions, there is a limit to what we can know about the objective world. Within his framework though, scientific practice is still thought to reveal objective truths about a reality separate from everyday experience, which masks the ways in which such a reality is intra-actively constructed by various human and non-human agents. In Barad’s language, classical “objective” scientific practice allows the axes of power partially responsible for the construction of reality to hide their involvement within it, and claim that they

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<sup>247</sup> One wonders if this omniscience is too a form of liberation from the confusing and chaotic material universe that certain scientists seek to order and understand.

are just revealing truth as it inherently exists. This stance takes science as a “giant distillation column, removing all cultural influences, and allowing patient practitioners to collect the pure distillate of Truth.”<sup>248</sup>

Barad critiques Heisenberg’s epistemologically “uncertain” formulation of this view with Bohr’s reframing of measurement interactions as fundamentally non-transparent and indeterminate *in all cases*. For Bohr, because any measurement interaction requires mutually exclusive experimental arrangements to determine its full effects, any measurement is fundamentally indeterminate. Because the full extent of any measurement interaction cannot be known and subtracted out, the “subject” and “object” relationship in any instance of observation is ambiguous. Therefore, it actually makes no sense to speak of “subtracting” out measurement “interactions,” or “disturbances,” because such intra-actions form an integral part of the phenomenon in which they occur. Hence, “observations do not refer to objects of an independent reality,”<sup>249</sup> they refer to a relational reality of which humans are a part: Barad’s agential realism.

This new ontology is composed of *phenomena*: those instances of world-making where matter and meaning meet. For Barad, particular apparatuses construct the objects and agencies of observations within such non-dualistic wholes of matter and meaning, or “nature” and “culture.” For example, the diffraction patterns of light within the original double slit experiment: within that phenomenon, the object of light can be meaningfully described as a wave, but not as a particle. For scientific theories

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<sup>248</sup> Karen Barad, “Meeting the Universe Halfway: Realism and Social Constructivism Without Contradiction,” in *Feminism, Science, and the Philosophy of Science*, ed. L. H. Nelson and J. Nelson (Dordrecht: Kluwer Academic Publishers, 1996), 184.

<sup>249</sup> Barad, “Social Constructivism,” 170.

and concepts refer to *things within particular phenomena, not inherently existing things in the objective world*. Light is not a feature of an independent reality revealed to us – both “us” and “light” are constructed within the confines of a particular apparatus – and neither can be meaningfully spoken of outside the material-cultural systems that constantly construct them. For Bohr and Barad, then, there are no “real” entities outside of the phenomena that constitute them – and likewise no inherently existing world such concepts represent. This spells trouble for the view that quantum physics presents an understanding of ultimate reality as an undifferentiated unity, for Barad’s agential realism exists only through the context-dependent construction of boundaries articulated through the intra-actions of human and non-human elements. In other words, Barad’s agential realism does not refer to an undifferentiated and inherently existing quantum reality that gives rise to phenomena; it *refers to phenomena and the boundaries within them as constitutive of agential reality*. For her, there is no undifferentiated and unified substrate from which phenomena arise or “map” boundaries onto: there is only the constant renegotiation of constructed boundaries within the non-duality of matter and meaning.

Taking the boundaries of “things-in-phenomena” as contextually constructed allows the agential realist to question why and how certain concepts are used *to the exclusion of others*, and how different perspectives of phenomena were either employed or prevented from mattering. Such questions allow for scientific practice that is objective (repeatable) and realist (insofar as it refers to phenomena), while still being open to ethical scrutiny. In other words, by situating humans within agential reality, as opposed to outside objective reality, Barad clears space to examine what

aspects of our participatory reality are constructed, and why. Barad replaces Newtonian and Heisenbergian objective reality with her agential realism, which takes objective practice seriously, for “scientific theories describe agential reality – which is just what we are interested in (we don’t live in a transcendent reality).”<sup>250</sup> For Barad, agential realism is the best reality we’ve got.

### **Away from Reflection and Sameness**

At this point, it is certainly tempting to draw parallels between Nāgārjuna and Barad, for they do seem to have much in common. Both reject the idea of an inherently existing reality revealed through meditative or scientific practices, and likewise, both reject any representationalist relationship between language and world. This leads them both to argue for context-dependent understandings of truth: for the Mādhyamika, there are only the immanent and conventional truths that provide the basis for successful practice in a world empty of inherent existence. For the agential realist, there are only the truths that correspond to specific phenomena, “the between of our intra-actions,” where discrete entities can be meaningfully described via through their embodiment within specific material-cultural apparatus. But it is here that unbridgeable gaps begin to open between these two thinkers.

It is worth noticing that in the above paragraph, Nāgārjuna’s and Barad’s stances are lifted from their socio-political contexts for the purposes of comparison. Such abstraction, of course, misses the salvific bent of Nāgārjuna’s thought, and the

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<sup>250</sup> Barad, “Social Constructivism,” 185.

ethical imperative of Barad's. Here, it's worth remembering that emptiness is to be understood as a conceptual construct – a “skillful means” by which an advanced practitioner might annihilate his and others' misconceptions about reality. This means that in the case of a disciple unprepared for the semantic interpretation of emptiness (that there is no ultimate reality), the Mādhyamika might actually teach the metaphysical (that there is an interdependent ultimate reality to which emptiness refers).<sup>251</sup> By skillfully grounding her arguments as if they referred to some ultimate truth, the Mādhyamika stands a better chance of guiding would-be Madhyamaka practitioners uncomfortable with the absence of final, transcendent truth. In extreme contrast, the agential realist certainly would not re-posit any kind of objective reality anchoring agential realism, for this would undermine the entirety of her project. Furthermore, she might not be pursuing enlightenment in the first place!

At this point, it should be clear that both Nāgārjuna and Barad are working with different materials and in different directions. Nāgārjuna questions the ultimate reality of *dharmas*, and through a variety of conceptual routes, *argues* that they must, in fact, be empty of inherent existence. Barad, in contrast, questions the ultimate reality of scientific *objects*, and through an analysis of experimental constraints, *proves* that they cannot exist. Thus, while it is tempting to argue that Nāgārjuna and Barad both reject ultimate reality, *it is clear that on a fundamental level, the ultimate realities they reject are not the same*. While both are composed of fundamental particles thought to exist independently of humans, one such reality is (mistakenly) pursued in order to achieve enlightenment; the other is (incorrectly) used to anchor

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<sup>251</sup> Jan Westerhoff, *Nāgārjuna's Madhyamaka: A Philosophical Introduction*, (New York: Oxford University Press, 2008), 221.

scientific claims about the “real” composition of the world. Furthermore, while both Nāgārjuna and Barad conclude that the reality in which humans participate is the only one to which they have access, the “participatory” reality of each also differs in important ways.

For Nāgārjuna, the ultimate truth required for liberation is the abandonment of ultimate truth itself: any concept of a transcendent, “ineffable” reality free from conventional concepts. Again, any notion of ultimate reality is a conceptual construct itself, and must be abandoned through a liberal application of emptiness. Thus, the concepts of conventional reality, insofar as they can be conceptually parsed into emptiness, are at best, useful pointers for successful practice. For Barad, the ultimate truth required for an ethic of knowing in science is the abandonment of scientific ultimate truth: an inherently existing real world behind the phenomenal. For her, any classical notion realism is fundamentally untenable *because scientific practice proves it to be false*. For Barad, agential realism is the best possible understanding of the reality in which humans participate. It is not a reality to be rejected on the path to enlightenment; it is a philosophical framework used to make sense of quantum physics and the agential construction of scientific knowledge. This is to say that while Nāgārjuna rejects the existence of any essence of reality, Barad argues that, “what is at issue and at stake is *a matter of the nature of reality*, not merely a matter of human experience or human understandings of the world.”<sup>252</sup>

Thus, not only do both philosophies argue against different understandings of ultimate reality, but they also do so for entirely different reasons, producing entirely

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<sup>252</sup> Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, (Durham: Duke University Press, 2007), 160. Emphasis mine.

different conclusions. This is not to say that there aren't interesting resonances between them, rather, it is to say that any attempt to argue that these interlocutors of "Buddhism" and "quantum physics" are saying *the same things* about the nature of reality is simply false. For if the only possible point of contact between them is their shared rejection of a "nature" of reality that they might agree upon in the first place, then that which seemingly brings them together actually sets them apart. For the manner in which their arguments unfold differ drastically, and their interventions lead to very different conclusions. Furthermore, as the lengthy chapters on both of them have indicated, the arguments of each are best located within specific conceptual frameworks that highlight the intellectual arc and purpose of each. This is not to say that meaningful translation across languages and time cannot or should be performed, but rather that attempting to translate an entire philosophical system into another requires lifting each out of its specific contexts, a practice that is extremely dangerous.

For instance, notice how agential realism and Nāgārjuna's emptiness could potentially be problematically situated in some kind of overarching "two-truths" notion of complementarity, where the entirety of Barad's conventional reality points towards, but is separate from, Nāgārjuna's ultimate annihilation thereof. Here, agential reality proves the absence of ultimate reality, while still being trapped in the realm of concepts, insofar as they refer to phenomena.<sup>253</sup> Enter the Mādhyamika, who

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<sup>253</sup> For while it may be tempting to correlate emptiness with some kind of undifferentiated reality from which Barad's phenomena arise, it is crucial to remember that agential reality is the constant *differentiation* of intra-activity within phenomenon. Insofar as phenomena compose agential reality, the "real world" of Barad is always composed of *discrete entities within phenomena*. It is surely not an undifferentiated quantum soup, like Capra's underlying quantum unity.



guides the scientifically minded practitioner out of Barad's participatory reality, and into the reality-annihilating liberation of non-conceptual wisdom. Unfortunately, such a framing lends epistemological authority to science while maintaining Buddhist soteriological dominance, *at the same time that it mangles the complexity of both*. Furthermore, such framing constructs an unbridgeable divide between the two entities it produces. *In other words, the complementarity approach to Buddhism and science presumes that there cannot be an apparatus that produces meaningful intra-action between them*. Thus, while the logic of complementarity seems to bring Buddhism and science close together, it actually sets them as irreversibly apart, preventing the possibility of more challenging modes of engagement.

Furthermore, to argue that the quantum physics-philosophy of Barad *proves* the complex arguments of Nāgārjuna not only forces their very different concepts into an impossible common framework, it also places the two in an unbalanced epistemological power dynamic that presupposes science's ability to *prove* rather *argue* something as true. As we have seen, such suppositions of science's privileged access to truth *rely upon the very realist position that Barad explicitly rejects*. In other words, insofar as it relates to a multiplicitous participatory reality rather than human-independent one, agential realism cannot provide some final validation of Nāgārjuna. Crucially, neither can Nāgārjuna be read as a mystical and timeless verification of agential realism, for Nāgārjuna provides no such metaphysical truth claim. At best, engendering any kind of relation between the two requires specific articulations of what concepts will be put into conversation with one another so that meaningful patterns of resonance and dissonance can emerge. Such an approach

stems from Barad's notion of "diffractive reading," which moves past reflective approaches that reify separate entities (Buddhism looks a lot like science!), and tacks towards diffractive ones (How can "Buddhism" and "science" be read through one another in different ways?). In contrast, to the former approach, the latter pays attention to fine detail, operates within the confines of specific apparatuses, and emphasizes difference and relationality over sameness and mimesis.<sup>254</sup>

Given that this thesis is designed to address the claim that "'Tibetan Buddhism' and 'quantum physics' are saying the same things about 'reality'," this and the previous three chapters have introduced enough material to make such claims extremely problematic, if not fundamentally untenable. In summary, the first chapter provided a battery of social and political reasons as to why such claims continue to be sounded, as well as the political and power dynamics implicit within them. Subsequently, I argued that such a monolithic "Tibetan Buddhism" and "quantum physics" required for comparison *do not exist as such*. Finally, this final chapter addresses the problem of positing a single "reality" that "they" agree upon, for as we have just seen, "they," taken as Nāgārjuna and Barad, both reject and posit entirely different understandings of "reality" itself.<sup>255</sup> This is of course not to say that Nāgārjuna and Barad stand for Tibetan Buddhism and quantum physics as monoliths (no such monoliths exist), but rather to insist that even within the confines of a historically contextualized comparison between two specific philosophies, a host of

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<sup>254</sup> For more on diffraction, see Barad, *Meeting the Universe*, 88-94.

<sup>255</sup> Furthermore, I am suspicious that the single "reality" posed in the above question is something akin to the objective reality of scientific realism, to which, as we have seen, science has privileged access. In such a case, "Tibetan Buddhism" would only be able to agree with science within the confines of scientific theory: this is the model that the Dalai Lama's "complementarity" seeks to protect Buddhism from.

dissonances arise. As should be clear by now, this project does not seek to silence all that is not harmony and unison. Instead, it tacks towards the amplification of difference often lacking in the contemporary iteration of the Buddhism and science dialogue.

Through Lopez, we have seen how scientific universalists desire ancient proofs of their newfound truths: Buddhism and science working hand in hand to uncover the absolute nature of existence – the perfect combination of spirituality and science for the 21<sup>st</sup> century. We have also seen how Buddhist modernists articulated their traditions within different modes of scientific understanding, in order to be recognized as “modern” by the secular hegemonic West. Such a relationship may seem an ideal mutualism, until one recognizes the bruises one leaves on the Other. As I have emphasized throughout this project, the “Buddhism” of “Buddhism and science” is often a dramatic reduction of vibrantly plural and lived “Buddhisms” of the world. Especially within such a discourse of universal truth, which eliminates the reality of perspectival seeing, *what gets to count as truth is determined by the cultural formation in the position of epistemological authority*. This is to say that any perspective on truth that claims to reveal “things as they are,” misses the extent to which “things” are different depending on where they are viewed and by whom. By claiming a transcendentally valid perspective, universalists are forced to either consume or reject the perspectives of alterity that align with or contradict their own.

It is science, scientists, and their privileged access to social authority that determine what kinds of Buddhisms align with the purportedly universal vision of science. As seen with the Dalai Lama, in order to remain in productive conversation

with science, Buddhism must articulate itself within its framework and leave behind what doesn't quite fit. Of course, this view presupposes an abstract essence to Buddhism that as we have consistently seen, is extremely problematic. Insofar as different Buddhisms have transformed themselves through various cultural formations, however, how are we to think about the case at hand?

While it may be tempting to stand opposite those lauding the validation of Buddhism through science and instead, argue for the cessation of the dialogue, this position has its own host of problems. For one, it remains a subtle form of Orientalism, which presupposes an Occidental science and Oriental Buddhism that must be kept separate to prevent further problematic interaction. Such a stance misses the extent to which the above dichotomy is untenable in the face of constant engagement and reformation of the two supposedly distinct categories. Furthermore, it maintains a patronizingly academic authority to judge the Eastern Other as engaging in practices that might endanger its Otherness. At the same time, not paying attention to the destructive tendencies of the dialogue is an equally unpalatable option. However, there is a way through these two poles: recognizing the extent to which Buddhist and scientific worldviews have already transformed one another, and allowing room for meaningful differences and conversation to exist between them. If Buddhism were no longer forced to accord with science entirely, or to preserve its claim to ultimate truth while sacrificing its conventional reality, then perhaps it wouldn't be so bad if the dialogue between science and Buddhism happened upon some unbridgeable gaps.

As this chapter has shown, both Nāgārjuna and Barad reject universalist reality from the perspectives of “Buddhism” and “science” respectively.<sup>256</sup> What happens when monoliths “Buddhism” and “science” need not correspond to a likewise singular “reality?” How dangerous would it be to recognize the plurality of “Buddhisms” and “sciences,” as well as the different “realities” in which they operate and interact? Such an understanding would certainly help balance the dialogues, and give voice to a host of previously silenced Buddhist (and scientific) worlds. Furthermore, this more pluralistic approach would augment appreciation for the differences such perspectives bring to the world in which they participate. By reading different Buddhisms and sciences through another, one can navigate the extremes of collapsing them together, or holding them completely apart. Let’s give it a try.

### **Toward a Diffractive Reading**

This initial discursive apparatus assumes a Nāgārjunian perspective, one that enacts intra-actions between the Mādhyamika’s conventional reality and the “phenomena” of Karen Barad. Within this context, Nāgārjuna’s rejection of ultimate reality entails agential intra-actions, for the entities of the Mādhyamika’s reality do not exist independently of the context in which they are constructed. If nothing inherently exists for the Mādhyamika, then “things” can only be found within specific material-cultural arrangements.<sup>257</sup> As in agential realism, there is no “gold standard”

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<sup>256</sup> Although it is important to note that the agential realism of Barad, while perspectival, still preserves a scientific monism that science itself proves.

<sup>257</sup> Material-cultural is used intentionally here to signify the Mādhyamika’s rejection of any inherent division between mind and world. It is the *Yogācāra* or “Mind-Only” school of Mahayana philosophy

objective reality for the Mādhyamika, only contextual claims that take into account the present “natural-cultural” factors – including the listener’s level of doctrinal comprehension. Such claims might include the teaching of no-self, which the Mādhyamika knows to not be ultimately true, but might help a student more than if they believed she believed did have a self. Thus, in order to prevent the karmic weight of a theft, the statement, “I own the red car in the driveway” can still be true, insofar as it does not refer to an independent reality, but instead refers to a phenomenon.

As we have seen, if all things are assumed to be empty of inherent existence, including persons, red cars and driveways, it may be useful to speak of them as intra-acting, *for they do not exist as such outside of the phenomena that construct them*. In other words, enfolded intra-acting apparatuses such as that of late capitalism, individualistic consumerism, classism, (poor) public transit systems, neighborhood zoning laws, *and skillful means*, construct the cuts that allow for the red car to be meaningfully spoken of as a discrete object that belongs to my discrete self. Here, Barad’s reciprocal dependence of materiality and language is preserved within the phenomena (the red car is a specific material arrangement with four wheels and an engine, rather than a squirrel), and thus the claim about the car need not refer to an independent reality. Rather, the claim refers to material-conceptual entities that are empty of essence, for they only exist within the confines of particular phenomena. Thus for the Mādhyamika, understanding conventional reality in terms of phenomena seems not to pose much of a problem. In fact, agential realism might even be a

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that denies the existence of physical objects. As we have seen, the Mādhyamika makes no such metaphysical claims.

productive stance to help explain how the Mādhyamika avoids being a complete relativist about truth. Thus, within this apparatus, the boundaries of “one truth” and “phenomena” do not come into clear relief – perhaps it is because the intra-actions within are too nebulous. However, if we take a more Baradian perspective, and shift the apparatus to construct a highly specific cut between “phenomena” and “emptiness,” a host of new interpretive possibilities arise.

For Barad, phenomena are constitutive of agential reality – there can be no truth outside of particular phenomena. This, in turn, implies our participatory reality involves continuous material-cultural engagement, as different apparatuses and phenomena enfold one another to produce the multiplicity of reality. That is, there is no substrate from which agential reality emerges – agential reality is the constant renegotiation of constructed and re-constructed boundaries through the intra-activity of matter and meaning. From the Mādhyamika’s perspective, the agencies of observation and objects of agential reality are empty of essence. This is to say while they do not inherently exist, they are also not manifestations of a pervasive emptiness behind the material-conceptual world.<sup>258</sup> Again, Barad’s phenomena are incompatible with the metaphysical interpretation of emptiness, which paradoxically posits an essential non-essentiality as the reality of all things. How would they relate to the semantic interpretation?

Here, emptiness need only be projected to combat the wrongful ascription of essences to things – emptiness as metaphysical purgative rather than transcendent truth. This is to say that like the agential realist, Nāgārjuna also rejects the idea of an

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<sup>258</sup> Here, it’s worth noting the boundaries of this particular apparatus, for the “other emptiness” stance, which posits emptiness as the unchanging absolute behind reality, is prevented from mattering.

essential substrate from which reality arises, an undifferentiated unity that conceptual boundaries are mapped on to.<sup>259</sup> If things are empty only insofar as they are thought to independently exist, then *if the Mādhyamika is intra-acting in agential reality, she need not project emptiness into a world already devoid of essence*. Thus for the agential realist, the realized Mādhyamika could seemingly be a philosophical ally – only the beginner, locked into patterns of hypostatization, could produce serious tensions.

However, as was discussed above, the fully realized Mādhyamika hasn't only transcended the projection of essences, she has also (possibly) achieved the realization of no-self – the absence of an apparatus to produce “self” and “other.” For the agential realist, if concepts are understood as specific material arrangements within agential reality, then *the Mādhyamika who has realized no-self has “transcended” the constructed dualisms of agential reality entirely*.<sup>260</sup> For if every concept is defined by a particular material arrangement, then the absence of apparatuses entails the absence meaningful intra-action within the world, or *total indeterminacy*. The Mādhyamika has not meditated herself into some other ultimate plane of existence; she has ceased to exist within this one. While “she” may still be constructed within the context of a given phenomenon, she only “matters” from an external perspective. It is important to note here that the Barbadian perspective (apparatus) produces very different patterns of intra-action than the Nāgārjunian one. Crucially, different apparatuses produce different diffractions of meaning!

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<sup>259</sup> Remember that for the agential realist, “wholeness” signifies the non-duality of matter and meaning that differentiated into context-specific objects and agencies of observations that have no inherent boundaries as such. Again, Baradian wholeness is not Capra's unity!

<sup>260</sup> Here, it is fruitful to reconceptualize the realization of no-self as the absence of an apparatus to construct the very cut that produces the phenomenon of the self.



Read through one another, Madhyamaka philosophy and agential realism produce a wealth of insights and questions. We have already examined how they both reject the existence of ultimate reality, and of essential qualities behind the objects of a participatory reality. We have also seen a fundamental divergence: while Nāgārjuna seeks to reject objective reality, Barad moves to secure a reformulation of it. However, directly engaging the two within particular apparatuses yields more complex intra-actions. For the seemingly anti-realist Mādhyamika, is agential realism to be understood as a corollary to the “one-truth” model, or does it claim to reveal the nature of reality (something Nāgārjuna would reject) without appealing to a metaphysical truth?<sup>261</sup> For the agential realist, does the Mādhyamika intra-act as an ally in the struggle against classical notions of scientific objectivity, or does she undermine the entire project by striving towards the dissolution of boundaries rather than their responsible construction? Clearly, without as essential Mādhyamika and agential realist to discuss, the answers will range depending on the phenomena in which they intra-act. *Different apparatuses will produce different results: depending on how Madhyamaka and agential realism are constructed, their intra-actions will produce different patterns of meaning.* Furthermore, these seemingly contradictory results are perfectly valid, for they are true only within the context of their interpretive frames. There can be no final comparison of Nāgārjuna’s Madhyamaka

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<sup>261</sup> Remember that Siderits (2007) formulated the semantic interpretation of emptiness as “the ultimate truth (required for enlightenment) is that there is no ultimate truth (statement referring to mind-independent reality).” How uncomfortable might the Mādhyamika be with Barad’s agential realist interpretation of indeterminacy: the objective truth (that is: experimentally demonstrable fact) is that there is no objective truth (truths that correspond to independent reality) – might such a stance constitute a metaphysic for the Mādhyamika?

and Barad's agential realism, no totalizing sameness or difference, for meaningful intra-action between them can only exist within the confines of particular phenomena.

In these more complex apparatuses, Nāgārjuna and Barad need not agree on the composition of reality, for their rejections of ultimate reality can be read as more or less compelling *depending on the perspective with which they are approached*. Rather than holding them fully together or apart in any static fashion, this chapter argues that for different reasons and in different ways, both thinkers highlight the problems of positing a reality outside of human interests and concerns, and draw attention to different participatory realities in which we live. While Nāgārjuna argues that conceptual reality is useful only as it points towards the realization of no-self, Barad argues that her agential realism *actually is* the participatory reality that scientific theories describe. As such, whereas Nāgārjuna emphasizes conventional reality as better or worse manners of illusion, Barad claims that agential reality is really real, insofar as it incorporates human and non-human elements into the ongoing differentiation of world. Yet, while they are not saying wholly the same things, neither are they saying wholly different ones either.

This is to say that while meaningful comparative work can be done between different Buddhist and scientific stances, it is important to leave different views room to speak for themselves and in their own terms. This is not, as may be assumed, a call for the cessation of cross-cultural dialogues that employ seemingly incommensurable linguistic and conceptual paradigms. It is, however, an appeal to treat such dialogues as polyphonic rather than monovocal. By appreciating the unique expression of different viewpoints within their own context, rather than corralling them into

totalizing frameworks, one can take a more receptive and appreciative stance towards this world of many worlds. Instead of reducing philosophical systems to their “essential” components, and concluding their (in)compatibility as a whole, one can make provisional comparative determinations and allow meaning to come into view *within particular contexts*.

Indeed, while different Buddhisms and sciences have both resonant and dissonant perspectives on the nature of reality, continuing to relate the two through either scientific validation or falsification perpetuates the constricting trends of Orientalist comparison. Ideally, shifting focus from scientific compatibility and complementarity to indeterminacy and intra-activity would positively affect the mutual transformations that are already occurring in the dialogues. Not only would such a change grant room for different Buddhisms to articulate themselves within their own frameworks, it would also allow different sciences room to reflect on their particular position within the many realities they intra-act with.

In other words, the purpose of this project is not to silence the dialogue of Buddhism and science, but to point out the historically-derived power dynamics between the two, and point towards more complex modes of interaction that take non-scientifically validated perspectives seriously, and allow room for meaningful difference. It began with an assertion from the Dalai Lama, and subsequently, uncovered some historical perspectives on how such a claim came about. After unveiling the incompatibility between “Tibetan Buddhism” and “quantum physics” on the nature of reality, it questioned why such compatibility was desirable in the first place. As we have seen, the desire seems to stem from a longing for a scientific

replacement for Christianity, perhaps, “the dream of something to believe in that does not make us have to choose between religion and science?”<sup>262</sup> Maybe it is time to move beyond this dream, to recognize that the categories of “religion” and “science” are just as inter-related as those of “Buddhism” and “science.” Maybe it is time to stop collapsing the many religious and scientific traditions of the world into some hegemonic universal truth, and instead, wonder at and respect the proliferation of uniquely valid realities that emerge intra-actively to deny the erasure of difference.

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<sup>262</sup> Lopez, *The Scientific Buddha*, 19.

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