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Kālacakra and the Nālandā Tradition: Science, Religion, and Objectivity in Buddhism and the West

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Introduction

In the West, growing interest in Tibetan civilization has focused on the meeting of the Indo-Tibetan sciences and healing arts with Western physics, neuroscience, mind-body medicine, and psychotherapy. As the most modern and complete synthesis of the Indian Buddhist arts and sciences, the *Kālacakratantra,* or *Wheel of Time Process,* offers an ideal entryway for cross-cultural research and practical application. Unfortunately, because we in the West have only recently gained access to Tibet's tantric Buddhism, and since tantric texts and practices were intentionally guarded in symbolism and secrecy, systems like the Wheel of Time have been thus far neglected or misunderstood. While major strides have been made in scholarly translation and study of the tantras,[1] the Kālacakra's intimate ties with the Unexcelled Yoga Tantra (*Anuttarayogatantra*) teachings of Vajrayāna Buddhism have been one rate-limiting step in Western understanding of this rich and complex system. This is especially unfortunate since the *Wheel of Time* is traditionally known as a transparent or extremely clear tantra (*shin tu gsel ba'i rgyud)*, meant to give a clear explication of tantric theory and practice as they relate to physics, biology, psychology, sociology, and associated disciplines.

This chapter addresses three misconceptions I see blocking understanding of the Kālacakra by Western scholars and scientists: (1) that the Kālacakra, as a tantric tradition, is a primarily religious system of mystical symbolism and experience

that has little or nothing to do with science either as we know it or as the Buddhists of classical India did; (2) that it is primarily a compendium of prescientific systems of knowledge and expertise regarding the external world, akin to the medieval systems of alchemy, humoral medicine, and astrology received by the modern, scientific West; (3) that it is primarily a compendium of prescientific or religious systems of knowledge and expertise concerning the interior or psychosocial world, akin to the medieval systems of magic or rhetoric, contemplative psychology, and statecraft or politics received by the modern, scientific West.

This chapter aims to expose and dispel these and other misconceptions obscuring our view of the Kālacakra's distinctive approach to the sciences; and hence to help clear the way for its study and application to questions and challenges facing modern science and civilization. The method of the chapter, however, is contextual. Rather than delving into the textual or practical details of the Wheel of Time, I will attempt to locate it within the history of the Indian Buddhist scientific tradition. This involves clarifying the unique role the Wheel of Time played in articulating the final synthesis of the Indian Buddhist scientific tradition at the time of its transplantation into Tibet (eighth to eleventh century CE). In particular, I make three points that I believe help clarify the two faces of this distinctive system: as a scientific version of the Unexcelled Yoga Tantras and as an Unexcelled Tantric version of the Indo-Tibetan sciences. (1) While the *Wheel of Time Process's* Vajrayāna synthesis of science emerged late in the history of Indian Buddhism, its multidisciplinary logic and pedagogic method are consistent with the classical Centrist synthesis of Theravāda and Mahayāna traditions forged at the monastic university of Nālandā from the fifth to seventh century CE. (2) The intent behind its synthesis is to integrate the development of scientific knowledge and social practice with the education of objective, compassionate agents of human knowledge and expertise *via* an alternative or pure science (*antara*/*akṣara*-*vidyā*) of self-correction (*buddhiśoddhana*). (3) The utopian social vision of the Wheel of Time is that the future of human civilization on this planet can only be insured by a global system of universal education in which the mundane arts and sciences are integrated with an extraordinary art and science of human self-correction or self-disarmament. I will conclude with some thoughts about future study.

I. Kālacakra: Time-Capsule of the Nālandā Scientific Tradition

Just outside the capital of ancient Magadha in northern India, the lush suburb of Nālandā was a teaching and retreat site favored by Śakyamūni Buddha, Mahāvīra, and other sages. According to traditional records,[2] by the third Buddhist council it had become the main center of learning for the Mahāsāṃgikā school, a potential precursor of Mahāyāna Buddhism. Developed by the first Indian emperor Aśoka (third century BCE) and by the Mahāyāna champion Nāgārjuna (second century CE), Nālandā became India's first monastic university under the Gupta and post-Gupta dynasties (320-650 CE).[3] It went on to play an international role in the

transplanting of Buddhist learning into Central, East, and Southeast Asia.[4] Its role in propagation ensured that after the university was destroyed during the thirteenth century, its traditions survived elsewhere. In Tibet the Nālandā tradition remained largely intact until the mid-twentieth century. So it was that, when Tibet's leading minds fled to India with His Holiness the Dalai Lama, they found themselves on the world stage as a living record of the 2,500-year-old legacy of the world's first university. As the twenty-first century dawns, the living legacy of Nālandā has once again taken root in its native soil and has spread from India around the world.

Though traditionally linked with the southern seat of Mahāsāṃgikā-Mahāyāna learning, i.e., with the Śrīdhānyakaṭaka Stūpa at Amarāvatī where Śakyamūni is said to have revealed it, the Kālacakra tradition is closely intertwined with the scientific version of the Mahāyāna academy that germinated in West and South India, at Takṣaśila and Dhānyakaṭaka, but finally took root and flowered in the Northeast, at Nālandā and its sister colleges. In fact, according to legend, the Buddha was teaching the *Transcendent Wisdom Discourse* (*Prajñāpāramitāsūtra*) only miles from Nālandā, at Vulture Peak, while he sent a magical emanation of the mother-father Kālacakra archetype to Andhra Pradesh in southeast India to teach the *Wheel of Time Process*. While the *Abbreviated* (*Laghu*) *Kālacakratantra* and its commentary, *Stainless Light* (*Vimalaprabhā*), did not emerge in India until the final phase of Nālandā's history (ninth to thirteenth century CE), by the time Kālacakrapāda the Junior built the Kālacakra temple at Nālandā (tenth century CE) its aims and methods were well integrated within the cumulative (Theravāda/Mahāyāna/Vajrayāna) scientific tradition developed at the greatest Mahāyāna university. This integration is prefigured in the iconography surrounding the Wheel of Time.

Revealed in the sacred circle (*maṇḍala*) of Mañjuśrī, the genius behind the Mahāyāna sciences, the divine archetype (*devatā*) Śakyamūni assumed to teach the *Wheel of Time Process* is linked with Avalokiteśvāra, embodiment of the spirit of altruism (*bodhicitta*) guiding all enlightened social agency. As I read this iconography, the Wheel of Time is aimed at the integration of the critical and practical faces of the Mahāyāna that took place at Nālandā from the fifth to the seventh century, and it maps out the integration of the exoteric and esoteric methods of Mahāyāna contemplation that took place there from the eighth to the tenth century. Since it articulates the final integration of the scientific curriculum at Nālandā before its demise, the *Wheel of Time* may be seen as a time-capsule of the Mahāyāna Buddhist academy transplanted into Tibet. Of course, before unpacking this view of the Kālacakra and its approach to Buddhist science, we must first work through some thorny issues of methodology and history that might block our view.

As I said, growing Western interest in Tibetan civilization has focused on the meeting of the Indo-Tibetan sciences and healing arts with Western physics, neuroscience, mind-body medicine, and psychotherapy. This meeting has led inevitably to comparisons, for which three methodologies have been used. Translator-schol-

ars in the Western academy have used the methods of philology, at times enhanced by hermeneutics, comparative philosophy, anthropology, or sociology.[5] Scientists engaged in biomedical research have relied on the empirical methods of neuroscience and other basic sciences, at times enhanced by other disciplines,[6] including philosophy, phenomenology, linguistics, and artificial intelligence. Meanwhile, health practitioners in various clinical settings have preferred the methods of the case study or clinical trial, citing the work of Buddhist scholars and research scientists.[7]

As expected, the findings of comparative studies diverge as widely as these three methods. Scholarly comparisons between the Buddhist tradition and Western science typically cite a shared methodological preference for reason and evidence over authority and revelation, as well as a shared conceptual preference for causal explanation and impersonal description. Research comparisons typically cite physiologic or mechanistic findings that support traditional claims about the effects and mechanisms of meditation. Clinical comparisons typically cite a congruence of psychological theories along with demonstrable health benefits of techniques like meditation. The limits of these three main approaches stem from their narrow scope and ethnocentric choice of method.

Comparing Buddhist and Western views of reason and revelation obscures some key distinctions between these two traditions. Śakyamūni and his heirs critiqued Vedist notions of divine authority and scriptural revelation, while also developing their own critical concepts of valid authority and traditional teaching. While these were restricted to hypothetical matters (*atyāntapokṣa*) beyond ordinary perception and inference, the requirement that empirical and rational demonstrations must be consistent with scriptural statements places Buddhist methodology somewhere between the empirical method of modern science and the analogical method of systematic theology in the West. In Buddhism, authority and tradition are considered to be of human origin (*puruṣeya*) rather than divine origin; they are seen as means of reproducing the results of Buddha's inner experimentation and mastery of mind and body. Thus its methods are aligned with those of modern science. For this reason, I translate the Buddhist term *vidyā* as "science." [8]

In using this translation, however, one must recall that given ethnocentric bias in Western science and scholarship, content-based comparisons typically obscure the key divergence between Indic and Western scientific traditions. That divergence is between a physical science in which mathematics is the privileged language and mechanics the privileged method and a contemplative one in which those roles are played by linguistics and mind/body self-regulation. Although the West developed both types of science, the former has so defined our view of it since Galileo that the latter, found in ancient contemplative science and modern psychosocial science, is either dismissed as pseudo-science or relegated to a proto- or para-scientific status.

While our modern bias is that only Galilean science can yield objective, exact knowledge and reproducible effects, even the most vocal defenders of modern science have had to admit in recent years that objectivity, precision, and efficacy in science are inexorably relative and conventional concepts.[9] Unversed in the latest

critical thinking, researchers and clinicians seeking to apologize for the therapeutic logic and qualitative methods of Buddhist science have been caught like their scholarly colleagues in a methodological mismatch. Wanting to show the validity of Buddhist sciences and techniques in accepted terms, they remain bound to the conventional methodology of their respective disciplines. Contrary to their intentions, their attempt to "validate" Buddhist sciences using the mechanistic theories and quantitative measures of the Western physical sciences is at best heuristic and at worst self-defeating.

As for theoretical comparisons, Buddhist thinkers long ago predicted that atoms could be split into smaller particles without limit, and that solar systems were created and destroyed naturally through boundless space and time. The Buddha himself taught that life and mind were not created from nothing by a divine Creator, but that they originated and that they change through impersonal cause and effect depending on nonliving matter and energy. The theory of dependent origination (*pratītya-samutpāda*) at the heart of all Buddhist teaching explains how living beings create and recreate themselves within and across lifetimes through a process of cause and effect (*hetu-phala*), action and reaction (*karma-vipāka*), that shapes the diversity of bodies, minds, and environments, animal, human, and divine. Further, the Buddha insisted that people put his teachings to the test with reason and evidence and use them to repeat his results for themselves, urging his students to make progress in philosophy, science, and medicine.[10]

Though the similarities between Buddhist and Western sciences seem clear, the aims and methods behind them are diverse enough that the intended meaning and use of even the most similar views is often quite different. Unlike Western particle physics, for instance, the intent behind Buddhist physics is that the search for an ultimate structure of matter will never be conclusive. Unlike Western genetics, the intent behind Buddhist biology is that the evolution and development of higher consciousness are the main factors of our health and happiness. And unlike Western empirical method, the intent behind Buddhist scientific method is to insure that science is of tangible benefit by testing its effects in our own lives and by guiding it with an extraordinary science of self-transcendent honesty, equanimity, and integrity.[11]

As for quantitative measures, however clearly we show that Buddhist meditation has an effect on the brain or on stress, the theories and methods by which this is shown are definitely not those by which the effect is achieved. While such measures may be welcome to all as "proof" that meditation is no culture-bound ritual, they add little or nothing to the qualitative principles and practices by which Buddhist science formulates, replicates, and validates its desired effects. Worse, they run the risk of reinforcing serious cross-cultural misunderstanding by tacitly confirming the bias that modern empirical methods offer the only clear and reliable route to objective, precise, reproducible knowledge. However inclined we are to cling to such measures as more objective, exact, or reliable, in researching qualitative sciences these measures are at best inadequate and at worst confounding. Insisting on them as the gold standards of evaluation or translation of Buddhist science in spite of this betrays both an ethnocentric bias and a serious methodological flaw.[12]

Given our postmodern consensus on science, the modern Western dichotomies of exact versus inexact, objective versus subjective science do not do justice to the divergence between modern Western and traditional Buddhist science. In order to say which type of science is more exact or effective, one would first need to specify a human interest or aim relative to which such questions can be answered.[13] While unpacking the difference in aims assumed by these two traditions would need another paper, let me say that the interests of Buddhist science from the outset are more like the therapeutic, liberative aims of the human sciences sought by Freud and Ricouer than those of our physical sciences.[14]

Like scientific thinkers in the modern West, Buddhist thinkers transgressed the limits placed on human potential by authoritarian religions and rejected theistic ideals of omniscience and omnipotence. But while the West distributed those ideals across human communities over time, conceding that individuals are incapable of objective knowledge and action, Buddhists revised Indian theistic ideals into humanistic ideals of therapeutic omniscience and omni-compassionate social agency. Instead of seeking objectivity by perfecting disembodied, impersonal knowledge and technology, Buddhists saw no surer way to human objectivity than to perfect *humanity itself*.

No appeal to authority, this tradition's commitment to enlightenment is as a reproducible paradigm of what we might call human genius. Anticipating Gadamer,[15] Buddhist science is progressive, not because it discards authority and tradition, but because it insists, one might say democratically, that each and every individual can and should personally reproduce and advance what is best in humanity and human cultural traditions.

The divergence in methods of Western physical sciences and Buddhist mind sciences stems from this divergence in aims. Qualitative, intersubjective methods are preferred because they are appropriate to the humanistic goals of Buddhist science and because they are ideally suited to the mind/body systems in which our self-limitation exists and in which it must be corrected. Recognizing this divergence explains the limits of recent approaches to comparing Western and Buddhist science. Those limits stem from the modern Western prejudice that one can "translate Buddhism" without a serious attempt to translate its experience and practice in one's own mind and life; that one can "validate" meditative techniques by some measure other than valid personal experience and self-transformation; and that one can "study" Buddhist therapies in some way short of learning to heal oneself well enough to help others reproduce the results.[16]

With this overview, I would like next to review the results of my own research and practice in an attempt to arrive at a more accurate and complete translation of the Buddhist sciences in general and the Mahāyāna sciences in particular.

1. Multidisciplinary Science in Buddhism

The first finding of my comparative survey is that, for most of their history, the cultural distance between Western science and the scientific and technical legacy

of Nālandā was far less than it is today.[17] The divergence took place in and around the European Renaissance. The Greeks had accepted two types of science: a quantitative or formal logical tradition based on mathematics and physics and traceable to Pythagoras and Aristotle; and a qualitative or contemplative tradition based on linguistics and meditation and traceable to Empedocles and Plato. The Catholic Church controlled both, but actively adopted Platonism, so when Aristotelian Greek culture was revived to challenge its control, moderns privileged mathematics and physics and regarded linguistics and meditation with suspicion. Since then, the relationship between these two paradigms has been inverted to the point that the term "science" is reserved for the quantitative, physical science of Galileo and his heirs.

The history of science is different, however, in the Indo-Tibetan tradition. Among the many reasons for this, three stand out. First, while the Indians were not behind the Greeks either in mathematics or physics, they were far ahead in linguistics and self-regulation. Like Euclid's geometry and Archimedes' physics, Pāṇini's grammar and Patāñjali's yoga provided Indians with linked conceptual and practical systems so elegant and powerful that they became and remained definitive in the analysis and control of nature. So while qualitative science was never imposed by Indian orthodoxy as it was by Roman Catholic tradition, it still became the method of choice for science in the Buddhist academy of India. This qualitative tradition evolved alongside a quantitative alternate tradition like Aristotle's, based on formal logic, math and physics, but this alter-tradition was considered subordinate and elementary. Thus, while the monastic academies of India and the West both preferred the qualitative methods of contemplative science, the Buddhist academy preserved and developed all classical Indian arts and sciences.

This brings us to the second reason for the divergent history of science in Buddhism and the West. Given India's greater stability and tolerance, Indian linguistics and meditation were not restricted to Indian religious elites, but rather were universalized into rational disciplines that supported progressive scientific and spiritual traditions. Comparing the fate of Socrates and his peripatetic academy with that of Śakyamūni and his mendicant community helps gauge the greater tolerance and support Indians gave liberal, scientific education, relative to the Greeks.

In the medieval West, monasticism served in part as a tool of religious and political authority that was able to coopt the progressive academic traditions of Hellenism. In India, Śakyamūni crafted monasticism into a liberative vehicle that let the Buddhist academy play a progressive role in the evolution of both science and religion Though monasticism gave birth to universal education in both civilizations, Mahāyāna universities arose a thousand years earlier than did their Christian counterparts, and they did so as part of India's precocious commitment to liberal, scientific education. This commitment reflected the success of India's Buddhist tradition in engineering a nonviolent, mercantile path for the advancement of science and civilization in Asia.[18]

The third factor that led Western and Buddhist science to diverge was the difference in the aims and interests of their societies. When Constantine chose to

adopt Christianity as Rome's official state religion, he set in motion an appropriation of Greek and Hebrew culture meant to stabilize a precarious empire. This lead to the selection of conservative, hierarchical ideas and practices and to the exclusion of progressive, liberative ideas and practices. As a result, progressive and liberative aspects of Hellenistic Christian culture like Aristotle's version of science and the Gnostic contemplative version of Christianity were excluded from Roman Catholic tradition.

Ironically, the European renaissance was equally partial in selecting aspects of Greek and Christian culture to be revived. While Constantine's interest was in peace, Europeans chose an extroverted version of Hellenistic Christian culture friendly to the far West's colonizing ambitions. As a measure of the violence done by this crusading take on Athens and Jerusalem, contrast the London School's motto, "knowledge is power" with the Socratic injunction "know thyself" or gospel verse, "the truth shall set you free." As the youngest and poorest satellites of Eurasia, the far West chose an extroverted, Pythagorean-Aristotelian version of science and civilization to enhance industrial wealth and military power through physical science and technology. Meanwhile, Eurasia's older, richer societies and their satellites kept refining qualitative, contemplative versions meant to sustain and spread mercantile wealth and political tolerance through psychosocial science and technology.

As a result, when satellites like China, Tibet, Mongolia, Korea, and Japan set out to forge an Asian Buddhist renaissance from the ninth through the fifteenth centuries, they could draw on a complete, progressive Buddhist version of Indian science and civilization and had no need to alter it in order to modernize. Because of its late importation of Buddhism and its proximity to Nālandā, Tibet in particular could transplant the scholarly and practical traditions of the university in their entirety, including systematically translating its vast library of classical texts and commentaries. So Tibetans preserved the Nālandā curriculum much as it was at its height, with its integrated use of formal logical methods for basic arts and sciences and qualitative methods for advanced disciplines like hermeneutics, psychology, and self-correction. From the first Buddhist college at Samye (mid-ninth century) to the universities of the Gelukpa renaissance (fifteenth to seventeenth century), this curriculum set the standard shared by all four orders of Tibetan Buddhism.

2. Classical versus Critical Views of Science, East and West

This thumbnail history leads me to the second finding of my basic research: that East-West comparisons must reflect the way science or refined knowledge is actually viewed and used in the Buddhist tradition. If we are to arrive at a comparison of the Western and Buddhist scientific traditions that permits a working translation, it must reflect the critical paradigm of truth and method evolved to support the most advanced levels of the Buddhist curriculum.

Most comparisons of Buddhist and Western science are based on one of two textual reference frames: the basic scientific canons of Buddhagoṣa and Vasu-

bandhu; or the Buddhist logical canon of Dignāga and Dharmakīrti. This choice becomes problematic given Mahāyāna critiques of their realistic theories and formal logical methods, whether from the relativism of Nāgārjuna's Centrist Philosophy (*Mādhyamika*) or from the deconstructive psychology of Asaṅga's Idealism (*Vijñānavāda*).

As these critiques forged a new scientific consensus in India, Buddhist Realism (*Sarvāstivāda*) and Buddhist Logic (*Pramāṇa*) were relegated to the status of heuristic, provisional truth and method. To base a translation of the Buddhist sciences on a realistic version of Buddhist logic or psychology despite the consensus of Mahāyāna thinkers would be conceding too much to modern Western bias. This is especially clear given the culmination of Buddhist sciences in Indo-Tibetan syntheses like the Wheel of Time, where all physical and social sciences were relativized with respect to the ultimate spiritual science of self-correction called alternative or pure science.[19]

Given the findings of my historical survey, I sought a textual reference frame for my comparative study midway between Śakyamūni and Tsong Khapa (1357-1419), within the era in which the Buddhist academy debated between versions of the curriculum based on the methods of Buddhist Realism, Logic, Idealism, and Centrism. I focused on Candrakīrti, the Mahāyāna methodologist *par excellence*, whose view of Centrist method as a qualitative language therapy helped resolve a century-long debate between formal logical syntheses like Empiricist Centrism and psychological syntheses like Idealist Centrism. I was especially interested in contextualizing this debate at Nālandā, where Candrakīrti refined his Dialecticist or Consensualist Centrism *(Prāsaṅgika*) in dialogue with followers of Bhāvaviveka and Dharmapāla, and in debate with language philosopher Candragomin. Fortunately, this took place in the seventh century when Chinese scholars Xuan-zang and Yi-jing were compiling the best records we have of the Mahāyāna academy.

Here I would like to anticipate briefly an objection to my choice of textual and contextual reference frames from the Centrist schools of the Mahāyāna tradition. I have already alluded to the cultural bias Western scholars and scientists have against qualitative methods. A survey of Buddhology since its inception shows one unfortunate result of that bias. Given the commitment modern science has made to realistic theories and formal methods, Western scholars of Buddhism have often aligned Theravāda Buddhist Realism and Logic with empirical science and Mahāyāna Centrism and Idealism with mystical or skeptical religion. This has biased Protestant Buddhology towards the reformation rhetoric of some Theravādins, casting Pāli Buddhism in the role of pure or early Greek Christianity, while Mahāyāna Buddhism is assigned a role analogous to corrupt Catholic tradition.[20] This bias, in turn, sets the stage for a two-pronged objection to my choice of Centrism as a focus of comparison.

The first prong of this objection is itself twofold: first, that the Centrism of Nāgārjuna and his heirs is too skeptical, mystical, or nihilistic to be compatible with science in any form; and, second, that Centrism is a corrupt, revisionist form of Buddhism that mistakes and displaces Śakyamūni's original intent. This ob-

jection stands or falls with mystical-skeptical readings of Centrism, readings that have been superseded by recent Indo-Tibetan Buddhist scholarship like Robert Thurman's work on Tsong Khapa. The objection is equally incoherent from a Western standpoint, given the recent turn towards relativistic and constructivist views of science.

As for the second objection, it privileges the realistic theories and methods of Buddhagoṣa, Vasubandhu, or Dignāga based on claims to the purity and priority of Theravāda Buddhism. This objection is anachronistic. The truth is that critical traditions and Nāgārjuna himself preceded these realist figures by centuries; and it is likely that a Mahāsāṃgikā-Mahāyāna version of Buddhism coevolved more or less contemporaneously with the Pāli. Finally, priority claims beg the philosophical and hermeneutic question of which of Buddha's statements, in any canon, are definitive and which version of Buddhist tradition—Vaibhāṣika, Sautrāntika, Cittamātra, or Mādhyamika—gives a definitive account of his ultimate intent.

3. The Complementarity of Buddhist Scientific Traditions

The third finding of my comparative study—the compatibility of Theravāda, Mahāyāna, and Vajrayāna versions of Buddhist science—counters further the objection I have just cited. In contrast to the sectarian tendencies of the Śrī-Lankan reformation, the institutional structure and curriculum of Mahāyāna universities like Nālandā presupposed an inclusive framework more aligned with Buddhist hermeneutics and the cumulative logic of science than with sectarian bias. The Chinese travelers Xuan-zang and Yi-jing both indicate that mastery of the Theravāda threefold canon was considered, along with language proficiency, as an entrance requirement for admission to Nālandā, to be tested by an entrance examination. This, and the Chinese observers' report of secular students at Nālandā, supports the idea that such Mahāyāna institutions set out to provide higher education to build on elementary learning offered by local schools of various Buddhist and non-Buddhist denominations. It is also consistent with the fact that students who entered Nālandā as novice monastics (*śramanera*) would eventually be ordained as *mūlasarvāstivada* monks, effectively becoming Theravādins who may or may not have upheld a complementary Mahāyāna outlook and practice.

A final factor here is the strategy of inclusiveness shared by Theravāda and Mahāyāna pedagogy, expressed in the doctrine of liberative art (*upāyakauśalya*) and the prohibition against rejecting any Buddhist precept or faction. This inclusiveness was reflected in the Mahāyāna hermeneutic strategies of gradualism. The fourfold gradualism expressed in Nāgārjuna's *Jewel Garland (Ratnāvalī)*, for instance, includes three levels of teaching consistent with Theravāda practice and only one consistent with the Mahāyāna. Nāgārjuna's other works support this by aligning his critical theory of two realities with the therapeutic framework of the four noble truths. The first of these realities is that all theories and methods are mere conventions whose truth is relative to the therapeutic aim of freedom of mind and action. Here Nāgārjuna was reiterating a critique of knowledge and exper-

tise basic to all Buddhist arts and sciences, Theravāda and Mahāyāna. Candrakīrti argued that the only coherent Centrist methodology was a dialogical language therapy which empathically assumed others' viewpoints to help them see through reified habits of mind. This helped him bring the Mahāyāna academy back down to its Theravāda foundations, by emphasizing the conventional nature and therapeutic intent of all Buddhist teaching. So the emergence of their Centrist methods as definitive for the Nālandā curriculum defines the Mahāyāna academy by its move to subject the production of scientific knowledge and technical expertise to the human quality control of self-corrective disciplines, based on the therapeutic truth and method of Theravāda, or Hinayāna, tradition.

4. A Multidisciplinary, Human Science of Mind

This brings us to the fourth major finding of my comparative study: the contextual definition of Buddhist science as a multidisciplinary human science. Assuming that the Mahāyāna academy was meant to extend the progressive social role of Theravāda learning into the mainstream of Indian science and civilization, it should be possible to map the Centrist canon and its use onto the context of Nālandā's universal curriculum and mission. In the Western academy, the rise of autonomous disciplines emulating or reacting to the methods of Galilean science has led to a reading of Mahāyāna texts as pure philosophy divorced from science, meditation, and ethics. Yet the logic of the Centrist canon belies this matching, reflecting instead a congruence with the multidisciplinary therapeutic structure of the Theravāda curriculum. To clarify this, I mapped the Centrist canon of Nāgārjuna and Candrakīrti onto the three core disciplines basic to all Buddhist learning. Thus, Nāgārjuna's *Wisdom* (*Mādhyamakakārikā*) and Candrakīrti's *Lucid Exposition* (*Prasannapadā*) elaborate a relativistic theory of knowledge to apply to the discipline of wisdom, while the *Jewel Garland* and *Introduction* (*Mādhyamakāvatāra*) define an altruistic style of social agency to align technical expertise with the discipline of ethics.

In an effort to bridge the gap between Buddhist and Western traditions of Centrist studies, I based my comparative study on texts that highlight the link between the self-corrective approach to knowledge and the altruistic approach to social agency in Centrism. Aligned with the core discipline of meditation, Nāgārjuna's *Reason Sixty (Yuktiṣaṣtika)* and Candrakīriti's *Reason Sixty Commentary* (*Yuktiṣaṣtikavṛtti)* describe how the de-reifying language therapy of Centrist philosophy is put into practice as a self-corrective method of contemplation that in turn fosters the Mahāyāna ethos of enlightened altruism and universal social agency.

Taken together, these meta-disciplines allowed Mahāyāna thinkers to extend the Theravāda curriculum into the Indian mainstream by developing progressive systems of philosophy, meditation, and ethics that provided universal alternatives to the orthodoxy and orthopraxy of India's Vedist elite. Thus, they govern the universalization of the Buddhist arts and sciences in the Mahāyāna academy, with lan-

guage-therapy universalizing linguistics and logic; self-corrective contemplation universalizing psychology; and altruistic agency universalizing physical science and technology as well as medicine.

Although this strategic alignment of Centrist texts with Theravāda disciplines is not exactly mirrored in Vajrayāna literature, it is likely that the gradual integration of esoteric theory and practice into the mainstream Mahāyāna curriculum was conceived and realized following the strategy of complementarity developed at Nālandā. Since the many controversial questions surrounding the origin of the Buddhist tantras have been recently explored by Christian Wedemeyer[21] and others, I can limit my comments here to questions surrounding the links between the Buddhist Tantras and the sciences. Before exploring this aspect of my findings, so crucial for contextualizing the Wheel of Time, I must briefly recall the common objection to my choice of the critical scientific traditions of Mahāyāna Centrism as a reference frame for studying the Buddhist sciences. Naturally, the objection applies even more strongly when the tantras are taken as representative of the Buddhist sciences. Fortunately, my responses to that objection apply in this case as well. In short, privileging Theravāda Realism and Empiricism over the Centrism and Constructivism assumed in Mahāyāna and Vajrayāna scientific traditions in the belief that the former share the naïve realism and objectivism of the West's modern physical sciences not only betrays an ethnocentric bias about science but also grossly misrepresents the therapeutic, contemplative thrust of the Buddhist scientific tradition in general. Of course, it is even more tempting to apply a reformation-style critique to Vajrayāna traditions than to their Mahāyāna counterparts, as the main charges of revisionism and corruption seem more plausible here. Accordingly, it is all the more crucial that we view Western and non-Western critiques of the Buddhist tantras in light of what we have learned recently about the history of Indian Buddhism from Tibetan scholars and other sources. For instance, Tibetan scholars point out that before Candrakīrti's day, Mahāyāna masters intentionally restricted esoteric teaching and writing, while by Atiśa's (982-1054), the trend was toward integrating Sūtra and Tantra, as they originally were in Mahāyāna scriptures as far back as the *Heart of Transcendent Wisdom Discourse (Prajñāparamit ahṛdayasūtra)*. Add to this the fact that the Mahāsāṃgikā canon included a little-known collection of esoteric formulas (*dhāranī-piṭaka*), and the late emergence of the Vajrayāna literature is quite consistent with the claim of Indian tantrikas and Tibetan historians about the origin of the Buddhist tantras. Specifically, it becomes very hard to rule out the possibility that Śakyamūni Buddha personally taught tantras like the *Esoteric Communion Process* (*Guhyasamāja*) or *Wheel of Time Process* to certain disciples whose lineage was preserved within the community that convened at Nālandā, but not within the community that convened at Rājāgṛha.

Although my finding about tantric science in no way hinges on the accuracy of the Tibetan account, I mention it because it provides a modern perspective on the history of the Buddhist tantras that serves as a counterpoint to the conventional wisdom of Western Indology, based on Theravāda Buddhist and modern Vedist sources. Whatever one makes of the early history of the tantras, it seems

fairly clear that the more progressive elements within the Indian mainstream, Buddhist and Vedist, began to actively integrate tantric traditions around the time of Candrakīrti.[22] Besides the rising popularity of the tantras, what occurred within the Mahāyāna in general and Nālandā in particular to make this integration possible was the articulation of a system of interpreting, practicing, and teaching the tantras that complemented the Centrist synthesis of Theravāda and Mahāyāna traditions refined by Candrakīrti. According to the Ārya tradition of commentary on the *Esoteric Communion Process*, the esoteric Vajrayāna shared the same pedagogic intent and method as the exoteric Mahāyāna, only offering a more effective contemplative-ethical methodology. In this sense, it fit within the cumulative curriculum of Buddhist arts and sciences as the most advanced way of putting exoteric Centrist philosophy into practice. Thus, it assumes the therapeutic wisdom of Nāgārjuna and Candrakīrti while offering alternate methods of contemplation and ethics to achieve the same goal of compassionate social agency. This complementarity in content is underscored by the historical claim, contested by Western scholars, that the Ārya commentarial tradition was articulated by the same individuals who founded and refined exoteric Centrism, notably Nāgārjuna, Āryadeva, and Candrakīrti.

Whether or not this claim is historically accurate, it reflects the consensus of the Nālandā tradition that Vajrayāna methods could be used at least as well as their Mahāyāna counterparts to universalize the Theravāda curriculum, without diluting its therapeutic efficacy as a system of human self-correction. Whatever we in the West make of this claim, its cogency within the Indo-Tibetan tradition is evident in the historical trend towards greater reliance on tantric forms of organizing and disseminating knowledge and expertise. Besides the integration of tantric methods into the mainstream teaching style of later Indian and Tibetan masters, the two major examples of this trend are the Kālacakra tradition and Tibetan medicine. Unlike Unexcelled Tantras like Cakrasaṃvara and Yamāntaka, which developed after the Ārya tradition explicitly for contemplative-ethical use, these two later systems reflect a broad consensus that the Unexcelled Tantras are preferable for the cultivation of scientific knowledge and expertise as well as spiritual wisdom and compassion.

As a final note before I turn to the West, let me say a few words about the human context of education in Buddhism. Another way in which the Mahāyāna academy extended the therapeutic structure of Theravāda learning was to integrate its vast, content-driven curriculum of text-based classes with an equally intricate process-driven system of human self-correction basic to Buddhist monastic education. This process-driven system included traditions of scholarly tutelage, ethical mentoring, contemplative self-development, and collective self-correction through group confession and debate. This compound pedagogical strategy helps us appreciate the unique context of the Mahāyāna academy and shows how the curricular content and the pedagogic process together fostered an institutional culture of self-corrective ideals and procedures. Such extended dialogical networks constitute

a deep procedure of self-correction that complements the logic and method of self-correction central to all Buddhist learning. In the Buddhist scientific tradition, the self-corrective procedures of linguistic self-analysis, contemplative validation of experience, and intersubjective replication of expertise take the place of the depersonalizing procedures of statistical formulation, experimental validation, and inter-laboratory replication that characterize science in the West. Interestingly, the indispensable role of mentoring relationships in the cultivation of objective, responsible agents of human knowledge and expertise is especially clear in Vajrayāna traditions like the Esoteric Communion and Wheel of Time. In the Ārya tradition, the formulation of pedagogic conventions to safeguard the human development of students unprepared for esoteric instruction or practice was key to preserving the complementarity of Theravāda, Mahāyāna, and Vajrayāna curricula. The publication of Candrakīrti's *Extremely Brilliant Lamp* (*Pradīpodyottana*) is seen by Tibetans as pivotal to mainstreaming the tantras because it effectively standardized esoteric instruction in forms observed to this day by all Tibetan schools, although relaxed in the Kālacakra and Tibetan medical traditions.

5. Multidisciplinary Science in the West

The fifth and last finding of my study was to identify a range of contextual matches for Buddhist science in the West today. I have already alluded to the problems faced by researchers and scholars trying to map the Buddhist sciences directly onto the conventional Western physical and social sciences. As for the physical sciences, their extreme objectivism makes them a poor contextual match for the Buddhist sciences. Modern science seeks objective knowledge and mastery of the physical world by divorcing it from any and all personal experience and action, while Buddhist science seeks such knowledge and mastery by eliminating any and all egocentric bias limiting the objectivity of personal experience and action. As a result of this divergence, the basic aims and methods of the Buddhist sciences simply do not map onto those of conventional physical science in the West. While some Western scientists may use the language of systems theory or methodological principles like the uncertainty principle to accommodate the therapeutic aims and intersubjective methods of their Buddhist colleagues, the strain this puts on the consensus of their home disciplines undermines their credibility, limits their ability to translate the intent of Buddhist science, or both. Researchers and clinicians committed to studying the Buddhist mind sciences and healing arts as something more than a curiosity have been making real strides, but they have eventually run up against the limits of Western science and medicine. Those in research disciplines, ranging from physics to psychology, have had to grapple with constraints imposed by a cultural consensus identifying science exclusively with mechanistic theories and quantitative methods. Parallels between Buddhist scientific theories and modern theories in quantum physics, biology, neuroscience, psychology, and medicine have been received as quaint accidents of history, because the language and methods behind Buddhist theories do not conform to modern Western conven-

tions. Even where parallels are supported by current methods, as in neuroscientific studies or clinical trials of meditation, the findings have been taken out of the context in which Buddhist methods are developed, tested, and practiced.

As for the social sciences, scholars, translators, and anthropologists face similar problems trying to map the Buddhist arts and sciences onto the institutional mission and context of the modern Western academy. Because these disciplines have felt obliged to mimic the objectivism of the physical sciences, they seek objective knowledge and expertise about the cultural beliefs, symbols, or products of human societies by divorcing these as much as possible from the personal experience and action of individual human beings. Buddhist science, on the other hand, seeks objective knowledge and expertise about human interaction by eliminating any and all egocentric biases limiting the intersubjectivity of communication and cooperation. As a result of this divergence, the basic aims and methods of the Buddhist sciences simply do not map onto those of conventional social science in the West. Here again, those scholars who try to accommodate the therapeutic aims and intersubjective methods of the Buddhist sciences by citing the insights of hermeneutic phenomenology or methodological principles like participant observation inevitably strain the consensus of their home disciplines in ways that undermine their credibility, limit their ability to translate the intent of Buddhist science, or both.

These difficulties mapping Buddhist sciences onto the Western physical and social sciences are no accident, in my view, but reflect the fragmentation of disciplines caused by the growing divergence between science and religion in the modern West. Deemed necessary to objectivity, the modern fragmentation of knowledge into a hodge-podge of disciplines all divorced from human experience and action is, I believe, neither necessary nor desirable but rather an artifact of the first scientists' need to cede the hearts and minds of Christendom to their Church inquisitors. The fact that Galileo was tolerated while Giordano Bruno was sent to the pyre set a clear double standard for science reminiscent of the Gospel formula, "Render to Ceasar what is Ceasar's and to God what is God's." While the new science of the physical world evolved, the new mind science of Ficino and Bruno went underground, not to resurface until after the European enlightenment, most notably in the new, human science of Nietzsche and Freud. For the first time in the modern West, it appeared that the taboo against studying the life of the mind had been lifted.

Freud envisioned psychotherapy as a complete, multidisciplinary science of mind linked with the related sciences of experimental psychology, brain research, medicine, anthropology, and linguistics as well as humanities disciplines like literature and philosophy. In theory, then, the psychoanalytic institute should provide the best possible match for the multidisciplinary arts and sciences of the Buddhist tradition. Furthermore, it offers a match not just in theory but in practice, since it arrays Western analogues for the Buddhist disciplines around a dialogical practice whose qualitative, intersubjective methods match well with those of mainstream Buddhism. Yet the historic need of psychoanalysis to prove itself against the gold

standard of quantitative, objectivist science means that any link with the study of contemplative traditions like Buddhism is controversial at best. Although psychoanalysis is widely considered the modern West's first science of mind, its status as a science has recently come under fire.[23] The main reason for this is that its theories are based on case findings gathered in the process of psychotherapy. Most scientists do not consider psychotherapy a scientific method because it gathers data by intersubjective dialogue in a shared altered state (of "free association") and analyzes it by qualitative description.[24] Hence, more interest in meditative mind science has been shown by researchers in the young field called cognitive science, consciousness studies, or multidisciplinary science of mind.[25] While these researchers are empowered to take an interdisciplinary approach that respects the intersection of philosophy, linguistics, psychology, and neuroscience assumed in the context of Buddhist science, they generally avoid the practice of psychotherapy, especially in the classical form of psychoanalysis. In their efforts to apologize for the therapeutic logic and qualitative methods of Buddhist science, most cognitive scientists feel a need to avoid the controversy over psychotherapy. Instead they attempt to "validate" the Buddhist sciences using the mechanistic theories and quantitative methods of the Western physical sciences. This attempt is at best heuristic and at worst self-defeating, in my view.

The questions here are much like those facing psychotherapy research, where demonstrations in terms of effects on brain or behavior are more or less extraneous to the theories and methods by which therapy works. While I agree with those who would match the Buddhist sciences with the multidisciplinary science of mind in the West, it is with the proviso that the best match is with those controversial forms of mind science that revolve around psychotherapy, including the various psychoanalytic schools.[26] This match assumes that the science of psychotherapy, with its qualitative formulas, state-specific methods, and intersubjective replication of results, is in fact the most appropriate cognitive-practical context for a working translation of Buddhist science, with its therapeutic theories, meditative methods, and intersubjective replication of results.[27] I should add that for such a context match to be rigorous, psychotherapy would not only need to be at the hub of the disciplines involved, it would also need to fully appropriate the knowledge and methods of these disciplines by a critical process which would be like what some call the psychoanalysis of science. [28]

Interestingly, psychoanalysis also provides a match in its deep procedures of self-correction, specifically the role played in psychoanalytic training by the requirements of supervised practice, a training analysis, and ongoing self-analysis. These content and process strategies reflect the choice of the Western psychotherapy tradition to subordinate the production of abstract knowledge and expertise to the replication of objective human agency. It is this close matching of aims and methods that make the multidisciplinary, therapeutic tradition which thinkers like Ricouer call the human sciences the ideal context for translating Buddhist science into the West.

Finally, there is the question of the relationship between Western psychotherapy and the esoteric theory and practice of tantric traditions like the Wheel of Time.

Mainstream psychotherapy has been so dominated by classical psychoanalysis and its recent schools that the full range of psychotherapy is little known in the West, even to professionals. However, if one views the range of psychotherapies as a continuum along the lines of the gradualism of the cumulative Nālandā tradition, it becomes possible to align various Western techniques, which apply a spectrum of insights and arts to a broad range of challenges, with Buddhist analogues. In terms of psychoanalytic approaches, for instance, the aims and means of classical analysis align fairly well with those of Theravāda psychology; those of relational analysis line up well with exoteric Mahāyāna analogues; and those of unconventional analytic approaches align with esoteric Vajrayāna traditions like Kālacakra (see Table 2, below). Assuming the staging system of the Ārya tradition of Unexcelled Tantras, for example, the Jungian methods of active imagery resemble those of the creation stage (*utpattikrama*); the Reichian methods of breath-control and psychosexual disarming resemble those of the ordinary perfection stage (*niṣpaṇṇakrama*); and the Lacanian methods of deconstructing neurotic consciousness and embracing spontaneity resemble those of the great perfection stage (*mahāniṣpaṇṇakrama*) or great seal (*mahāmudrā*). Although this system is modified somewhat in the Wheel of Time, the parallels remain. In what follows I will briefly address common misconceptions about the Kālacakra tradition following its distinctive multidisciplinary framework of outer, inner, and alternative sciences.

II. Kālacakra and the Nālandā Tradition of Multidisciplinary Human Science

1. Outer Kālacakra: Physical Science in the Nālandā Tradition

Much of the interest in the Wheel of Time stems from its unique synthesis of Indian views of the physical world, clear in its influence on Tibet's integration of Eurasian astrophysics, astronomy, and physical chemistry.[29] Yet even a cursory look at its views of the physical world reveals departures from the physics of Buddhist Realism as well as the integration of elements from non-Buddhist systems such as Jaina and Puraṇic cosmology. The Wheel of Time presents physical science in light of the classical Centrist critique of the Realism and Idealism of Buddhist and non-Buddhist schools. Citing the relativity of all knowledge, it explains its unique synthesis of conventional views of the physical world in light of the pedagogic needs of its universal audience.[30] Although all views are ultimately false insofar as they seem to depict a reality independent of constructs of mind or language, some are conventionally true in that they help guide actions that result in health, happiness, peace, or freedom, while others are false even conventionally. A survey of Kālacakra physics helps clarify the outlook and intent behind the view of external reality in this tradition.

The basic theory informing Kālacakra physics derives from the atomic theory of the Analyst (*Vaibhāṣika*) school. The external world is the result of atoms

(*paramāṇu*) of earth, water, fire, air, and space that combine and recombine over time as a result of the action (*karma*) of energies (*vāta, vāyu*). This and countless other world-systems (*loka-dhātu*) are created and destroyed without a Creator and provide the inanimate environment for the origination and transformation of living beings, through the combination of the same atoms with the added element of mind or intuition (*jñāna-dhātu*) and the added intentional action (*karma*) and life energy (*prāṇa*) of individuals and groups. Like the physics of the Theravāda schools, this physics has the explicit intent of offering an alternative to creationist views of the origin of the world and life, which Buddhists consider regressive and ineffectual. Further, it has the intent of critiquing Idealism, Buddhist or Vedist, preferring conventions that depict the world as external to mind and life as inexorably dependent on and interactive with inanimate matter and energy. However, unlike the realistic physics of Buddhist Analyst, Vedist Analyst (*Vaiśeṣika*), or Indian Materialist (*Cārvāka*) schools, Kālacakra physics asserts that atoms exist through sheer mutual dependence without intrinsic reality or identity and also implies that matter is devoid of any intrinsic substantiality or objectivity by asserting that all atoms of air, fire, water, and earth originate from atoms of the space element (*akāśa-dhātu*) or space-atoms (*akāśa-paramāṇu*).

The second basic theory of Kālacakra physics expands on the physicalist insight that the bodies of animate beings emerge from the inanimate matter of the world and so tend to mirror the patterns and rhythms of their environment. Expressed in the dictum, "as without, so within," this theory of macrocosm-microcosm nonduality is elegantly formulated in the interweaving of Kālacakra astrophysics and psychobiology. While this interweaving will become clearer in my comments on the inner sciences below, for here suffice it to say that its intent is to help humans develop an objective view of themselves as embedded within the natural world and a responsible view of that world as a dynamic life-space inexorably shaped for better or worse by their every action. This view of outer and inner reality as inseparable harks back to the nondual wisdom of Mahāyāna Idealism and likewise is meant to critique naïve psychosocial constructions of reality and to empower enlightened social agency. Key to this nondual cosmology is the profound insight that the nature of reality can support either saṃsāric misery or nirvāṇic bliss, depending on the mindset and behavior of human beings. Unlike Buddhist Idealism, however, the Wheel of Time supports this macro-micro nondualism with a psychobiology that depicts the depths of the soul not as a subconscious mind (*ālayavijñāna*) but as a subtle body (*sukṣma-śarīra*) in which three levels of consciousness depend on three levels of neural structure and biochemical process.

This brief survey must suffice to address misconceptions of Kālacakra science based on the cultural preconceptions and biases of the modern scientific West. Firstly, since the *Wheel of Time Process* presents a flat-earth cosmology that revolves around the image of Kālacakra as an archetype of enlightened compassion, it is natural for moderns to confuse it with the creationist cosmologies of the medieval West. Although the Wheel of Time assumes the geocentric cosmology of Buddhist Realism, it is at least as critical of naïve geocentrism as modern cosmol-

ogy in the sense that it assumes multiple worlds extending through infinite space and time. As for creationism, it is in fact a more radical alternative to creationist views than our modern cosmology in that it explicitly rejects the idea of any world system arising from the actions of a single being or from a first cause, such as the "clockwork God" of deism or the remote God of creationist versions of big bang theory. Likewise, while its five-element atomic theory is liable to be misidentified with ancient and medieval Western four-element theory, it anticipates many of the insights of modern physics including the relativity and insubstantiality of matter as well as the dependence of our knowledge of the material world on human faculties and conventions. In fact, behind the deceptively simple, qualitative nature of Kālacakra atomism, there are at least two ways in which it challenges the current consensus of modern physics. By asserting that all matter emerges from space, it predicts that no irreducible substance or structure of matter will ever be found; and by asserting that all material elements are pervaded by a sixth element of truth or intuition (*dharma-dhātu*, *jñāna-dhātu*), it challenges the wisdom of a model of the physical world that accepts the objectivity of insubstantial matter while denying the objectivity of insubstantial consciousness. As for the Wheel of Time's astrophysics, its alignment of the external workings of the cosmos with the inner workings of life and mind are likely to be misidentified with medieval astrology and the "sympathetic magic" of Christian hermeticism. However, its depiction of the interpenetration of the outer and inner worlds is explicitly meant to counter the calculation of predictions or connections supposedly determined by God (*Iśvara*), nature (*prākṛti*), fate (*ṛta*), or chance (*āhetuka*). Rather, it is meant to orient human individuals and societies to an evolutionary view of life and mind as subject to a causality that is continuous with the causality of the physical world; and is also meant to empower them to take full responsibility for understanding and influencing the causality that shapes their lives and the world they share.

Of course, the physical science of the Kālacakra tradition will seem imprecise or dated to those of us schooled in the theories of the modern Western tradition. Nevertheless, it is imperative if we are to understand and learn from the wisdom of the Wheel of Time that we recall what our best scientific and philosophical minds have taught us about science: that its truth and method are inexorably relative to human aims and values. While Kālacakra physics may fall short of Western physics for the purposes of generating nuclear power or navigating the globe or outer space, it may offer a view of the world more useful for the purposes of guiding our everyday lives. Transparent in this respect, the Wheel of Time synthesizes the admittedly provisional science (*kṣara-vidyā*) of classical India for the purpose of modeling a conventional view of the world that will help individuals of all social and cultural backgrounds better understand and care for the world around them. In this sense, it extends and refines the work done by Mahāyāna thinkers in the Nālandā tradition: providing a progressive synthesis of scientific and religious disciplines to advance mainstream culture in India and Indicized Asia. While some of the details may seem quaint to us now, the broad outlook and intent behind its view

of the physical world and some of its distinctive insights are surprisingly modern and relevant to the current dilemmas of scientific education in the West.

2. Inner Kālacakra: Life and Mind Science in the Nālandā Tradition

Interest in the Wheel of Time has also been piqued by its unique synthesis of Indian biology, pharmacology, and mind/body medicine, which influenced Tibet's integration of Eurasian medicine.[31] Although rooted in the classical Buddhist scientific tradition, Kālacakra life science is best known for its distinctive formulation of the Unexcelled Yoga Tantras, integrating concepts from the Sāṃkhya, Vaiṣṇava, Jaina, and Śaiva Tantric traditions. The Wheel of Time presents life in light of the contemplative mind and health sciences held in common by all Indian traditions, Buddhist and non-Buddhist. In particular, it reflects the gradual integration of esoteric, contemplative models of mind and body into exoteric sciences like psychology and medicine. As with physical science, the Wheel of Time explains its unique synthesis of conventional views of the inner world in light of the pedagogic needs of its universal audience. A survey of its biology helps clarify the outlook and intent behind the view of life and mind in this tradition.

Among the many complex theories woven into the Wheel of Time's science of life, I will restrict myself to two: its model of human development; and its map of the mind and nervous system. As for the first, Kālacakra biology offers a syncretic view of development that integrates classical Buddhist views of the conception and nature of life with Vedist concepts of the soul's incarnation. The classical Buddhist view of life as originating through the interaction of physical and mental causes across many lives is assumed in the Wheel of Time view of conception as the union of egg and sperm with a mental process that is continuous with prior lives. From this point on, development is described with the help of various non-Buddhist views. The formation of the individual recapitulates the formation of the cosmos through the emergence of physical elements, which in turn give rise to the ten kinds of life energies (*prāṇa*) that support a body of instincts (*vāsanā-śarīra*), adapting the Jaina view. These energies in turn shape the formation of the nervous system with its channels (*nāḍī*), complexes (*cakra*), and drops (*bindu*), supporting the emergence of the remaining aspects of human nature including the life systems (*skandha*), sensory media (*āyatana*), intelligence (*buddhi*), ego-function (*ahaṃkāra*), and mentality (*manas*), adapting the Sāṃkhya view. Finally, Kālacakra describes the development of the ordinary individual in ten life stages, adapting the Vaiṣṇava model of Viṣṇu's ten incarnations (*avatāras*) to depict the way human development recapitulates the evolutionary ascent from more primitive forms of life to higher ones.

The intent behind this syncretic account of human development can be glimpsed through the adaptations that distinguish Kālacakra's distinctive outlook on life. Borrowing the Jaina view of the developmental causality of karma as a subtle material process, the Wheel of Time implicitly critiques Buddhist Realism and Idealism for their reification of mind and mental causation as more or less indepen-

dent of matter. By restricting this model of developmental causation to the basic, unenlightened life cycle (*saṃsāra*), however, the Wheel of Time critiques the Jaina concept of the soul and its action-patterns as permanent. Likewise, the Kālacakra critiques Buddhist and non-Buddhist Idealism by borrowing the Sāṃkhya model of the involvement of the spirit or person (*puruṣa*) with a material nature (*prakṛti*), while distinguishing its view from Sāṃkhya dualism by asserting the nondualist view that the person is an innate intuition (*sahaja-jñāna*) or blissful omniscience (*sarvajñātā*) actively involved with a nature that is devoid of intrinsic reality (*nihsvabhāva*) and primally luminous (*prakṛti-prabhāsvara*). Finally, the Wheel of Time critiques any nihilistic and materialist reading of Buddhist Centrism or Tantrism by adapting the Vaiṣṇava view of life as a process of spiritual incarnation, while distinguishing its psychobiology from the elitism of Vedist spirituality through identifying Viṣṇu with the innate intuition that makes every mind a vehicle for spiritual evolution throughout the lifespan and across many lives.

The second basic theory that helps clarify the outlook and intent of the Kālacakra science of life is its unique, syncretic view of the mind and nervous system. To clarify the esoteric psychology of the Unexcelled Tantras, the Wheel of Time adapts Vedist concepts from the Śaivite Tantra and Sāṃkhya-Yoga traditions as well as terms and arts from the Buddhist and Vedist systems of Indian medicine. Assuming the esoteric model of mind from Unexcelled Tantras like the *Esoteric Communion Process*, the *Wheel of Time Process* converts it into a psychology suitable for mainstream use by integrating the Sāṃkhya model of three qualities as found within the Śaivite model of four states of mind. Thus, it aligns the coarse, subtle, and extremely subtle levels of mind and nervous system with the qualities of clarity, intensity, and darkness (*sattva, rajas, tamas*), as well as the waking, dream, and deep sleep states. By dividing the extremely subtle level of mind in two, it adds to these a fourth level devoid of the qualities of clarity, intensity, and darkness and associated with the fourth state supporting the bliss and nonduality of sexual orgasm. Finally, the three qualities are also identified with the three humors or aspects (*tridoṣa*) of bodily self-organization defined in Indian medicine, wind, bile, and phlegm (*vāta, pitta, kapha*) as well as their subtle analogues in the central nervous system, the left, right, and central channels (*iḍā, piṅgalā, suṣumnā-nāḍī*), while the four states are identified with the complexes of the central nervous system at the forehead, throat, heart, and navel, and the four kinds of neural drops that originate from those complexes.

As with the Kālacakra view of development, the intent behind its syncretic view of the mind and nervous system may be most readily seen in the ways in which it diverges from its Buddhist and non-Buddhist sources. Rooted in the models of earlier Buddhist tantras, the Wheel of Time maps the mind so as to make its depths seem sensible and accessible to the initiated and uninitiated alike, revealing what prior systems conceal. The introduction of a fourth level of mind, for instance, puts the focus on the most intimate layer of intuitive consciousness linked in the other Unexcelled Tantras with the primary processes of sex and death, and shrouded in secrecy along with the mysterious practices of the great perfection stage. Like-

wise, Kālacakra's integration of Vedist models of qualities and states of mind help demystify its depths by linking them to the daily experience of cosmological and biological rhythms. Unlike the fourth state in Kaśmiri Śaivism, for instance, in Kālacakra the fourth state refers to the ordinary human orgasm, rather than to an extraordinary spiritual experience. More reminiscent of India's medical systems than its prior Yogic or Tantric traditions, the Wheel of Time's adaptations aim at offering a scientific account of the common condition of everyday life rather than its spiritual transformation through contemplative practice or ethical discipline. Yet unlike Indian medicine, the Wheel of Time emphasizes the innate potential of every human body and mind for self-healing and self-transformation through the control of perception, expression, and breathing. This is conveyed by its designation of the four states and levels of mind as the four bases (*vajras*) of a Buddha's enlightened body, speech, mind, and intuition.

Since the Wheel of Time is an esoteric tradition revolving around a spiritual archetype and ritual initiation into the contemplative life, it is natural for us as moderns to misidentify its inner sciences of life, health, mind, and society with the symbolism and rituals of Western monotheism. Yet the outlook and intent with which it depicts the origin and nature of human life is decidedly scientific and secular, offering a view of life that may be generally described as evolutionary and naturalistic. Where the inner sciences of the Kālacakra tradition adapt the views of India's contemplative traditions, Buddhist and non-Buddhist, it is clearly with a view to describing the human potential for two divergent modes of life: a reactive life driven by self-destructive instincts; or a progressive life based on the sublimation of sexual bliss. Given this intent, its inner science is more akin to the evolutionary psychologies of ancients like Empedocles or moderns like Freud than to the revelatory psychologies of Mediterranean or Indian theism. In fact, I have argued elsewhere[32] that its esoteric map of the mind may be cross-referenced with the Western maps of psychoanalysis and cognitive neuroscience, with the help of meditation research (see Tables 1 and 2). From the standpoint of Buddhology, this involves a retrospective mapping of the main psychologies integrated in the three-vehicle (*triyāna*) synthesis of the gradual path (*patha-krama*) in the Nālandā tradition onto the developmental neuroscience of tantric medicine. Specifically, Theravāda, Mahāyāna, and Vajrayāna psychologies (glossed in Table 1 as "personal," "social," and "process" phases of development), are mapped onto the basic psychobiology of the coarse, subtle, and extremely subtle levels of mind/nervous system. Of course, Kālacakra adds a fourth level, emphasizing the binary nature of the extremely subtle observed in the main division of Nāgārjuna's perfection stage map. In this sense, the Wheel of Time extends and refines the work done by Mahāyāna thinkers in the Nālandā tradition: providing a progressive synthesis of scientific and religious disciplines to advance mainstream culture in India and Asia. While some of the details may seem occult to us now, the broad outlook and intent behind its view of life and mind are surprisingly modern and relevant to the current dilemmas of scientific education in the West.

Practice Phase	**Neural Level**	**Mental Level**	**Blocks (Drag)**	**Motive/ Intent**	**Arousal/ Attention**	**Skill Level**	**Insight Level**
Personal Care	Coarse/ Cortical	Waking/ Fantasy	Traumatic Cognition	Relief/ Release	Low/ Inclusive	Reflection/ Mindfulness	Analytic/ Gestalt
Social Concern	Subtle/ Limbic	Daydream Dreaming	Traumatic Affect	Care/ Concern	Low/ Exclusive	Alterness/ Effort	Imaginal/ Visceral
Process Integrity	Subtlest/ Core	Sleep/ Orgasm	Stress Instincts	Joy/ Mastery	High/ Integral	Devotion/ Flow	Euphoric/ Ecstatic

Table 1. Simplified Kālacakra Map of Human Psychobiology and Development.

3. Other/Alternative Kālacakra: Contemplative Science in the Nālanda Tradition

Undoubtedly, the greatest interest in the Wheel of Time has focused on its uniquely accessible synthesis of the Indian Buddhist Unexcelled Tantras, especially preserved in the Vajrayāna Buddhism of Tibet. Building on the basic views of the universe and human life presented in the Kālacakra's outer and inner sciences, alternative Kālacakra offers a complete path for the transformation of the human condition from one of compulsive alienation to one of blissful engagement. Here too, it integrates the theories and methods of contemplative science from Buddhist and non-Buddhist, exoteric and esoteric traditions, to provide one of the world's most lucid and scientific systems of mind/body self-transformation. As with its basic outer and inner sciences, the Wheel of Time explains its unique system of alternative science in terms of the pedagogic needs of its universal audience.

The best place to start to understand the outlook and intent behind alternative science in this tradition is to explore its relation to the physical and psychosocial sciences we normally think of as complete in themselves. Assuming the Centrist critique of knowledge and method, the Wheel of Time reverses the objectivist hierarchy of sciences we have come to accept in the modern West. Rather than ranking sciences based on their proximity to a supposedly independent objective reality—physics first, biology second, psychology third, etc.—the Wheel of Time orders knowledge based on the theory of two realities (*dvisatya-vāda*). Since all dualistic knowledge and expertise is relative and conventional, all ordinary science is provisional (*kṣara-vidyā*). Only that knowledge which consists in nondualistic, intuitive openness to the infinitely relative and ungraspable nature of things, outer and inner, is ultimately valid, pure, or unchanging science (*akṣara-vidyā*). Although this critical approach to knowledge and method seems counter to Buddhist Realism and Logic, exoteric Centrists and their Kālacakra peers point out a similar critique in the four noble truth framework of Buddhist teaching as well as the epistemology of Digṅāga and his heirs. Just as the basic science spelled out in the first two noble truths is relative to the third, healing truth of nirvāṇa, so the validity of inference and constructed perception is relative to the deconstructive intuition of direct perception (*pratyakṣa*), especially yogic direct perception (*yogi-pratyakṣa*). In short, no formula of knowledge or practice, however invaluable, can be objective in and of itself; because it is inexorably partial and symbolic, and so must be

constantly corrected against the touchstone of purely critical reason and validating personal experience. While we in the West have spent the last centuries learning to tolerate this insight, Mahāyāna Buddhist thinkers were ready long ago to adapt their scientific tradition to this reality. And they did so by developing scientific systems of self-correction effective and universal enough to help individuals and groups reliably cultivate the radical open-mindedness and unbiased concern for the world that make ordinary humans into extraordinary scientists.

The Nālandā tradition of self-correction or mind training (*buddhiśodhana*) preserved in Tibet is often traced back to Śantideva, although its roots are clear in the writings of Nāgārjuna and Candrakīrti. In particular, the *Reason Sixty* and its *Commentary* are known to Tibetan scholars for their focus on the mindset of genuine intuition (*samyak-jñāna*) most receptive to contemplative self-correction. While this focus is most often linked with the rise of exoteric Idealist Centrism (eighth to ninth century CE), a less obvious, esoteric tradition of self-correction leads to three Unexcelled Tantras deeply influenced by the idea of an intuition body (*jñāna-kaya*) taught in the *Recitation of the Names of Mañjuśrī (Mañjuśrīnāmasaṃīgti)*. Of these three—Guhyamañjuvajra, Yamāntaka, and Kālacakra—Kālacakra is most explicit about how the intuition body, an ecstatic subjectivity innate in all beings, can be quickly developed to help practitioners personally realize the objective reality of all things. Perhaps the best way to appreciate the unique outlook and intent behind the Wheel of Time's contemplative science is to explore the ways it departs from other exoteric and esoteric Mahāyāna systems of self-correction.

Firstly, Kālacakra contemplative science diverges from the exoteric Idealist Centrism developed by Śantarakṣita (c. 740-810) and Kamalaśīla (c. 760-815) by presenting the depth-psychology of intuitive self-correction in terms of the neuroscience of the Unexcelled Yoga Tantras rather than the Idealist theory of a subconscious mind. It also diverges from the other Unexcelled Buddhist Tantras by identifying the intuition body with the fourth state of mind assumed in the Śaivite Tantras, while linking it with the ordinary biology of sexual orgasm. This divergence has a twofold impact. It makes overt the art of sublimating sexual energy and bliss normally kept covert in the final phase of the Unexcelled Tantras called the great perfection stage or great seal practice (*mahāmūdra*). And it also makes that extraordinary art seem more comprehensible and accessible to the initiated and uninitiated alike by depicting it in terms of the ordinary psychophysiology of human sexual experience. This impact is supported by the artful way Kālacakra's contemplative science draws on the complementary theories of its physics and biology. For instance, the theory that life and the world both emerge from a space-element pervaded by an element of intuition (*jñāna-dhātu*) makes it easier for most to conceive of dissolving the subtle matter and energy patterns supporting the ordinary alienated life cycle (*saṃsāra*) and building up in their place the drops of sublimated bliss that sustain the extraordinary, open-hearted release (*nirvāṇa*) of enlightened engagement with the world. Likewise, distinctive concepts like the idea that the central channel is not normally fully blocked, as in other Unexcelled Tantras, but open to the circulation of blissful energy even in nonpractitioners,

or that ordinary sexual intercourse does not preclude sublimation practice (*rāga-dharma*), as long as it is motivated by real compassion, have the cumulative effect of encouraging a mainstream audience that they may be capable of this transformational practice. In short, the adaptation of language from enlightened physical and biomedical sciences seem calculated to make contemplative self-correction appear more rational and practical to the increasingly democratic and cosmopolitan community served by Nālandā.

Secondly, the extraordinary outlook and intent of Kālacakra's contemplative science is clear not just in its depiction of the path but also in its distinctive presentation of the result or fruit of that path, the fourfold objectivity or omniscience (*sarvaijñatā*) of Kālacakra. Here, the Wheel of Time's unique fourfold model of mind unfolds as a map of the unexcelled journey or supreme pilgrimage through the nervous system of the individual towards the blissful, nondual mastery of the outer and inner worlds. In particular, objective self-knowledge and artful mastery of the waking, dream, sleep, and orgasmic states transform the practitioner's body, speech, mind, and intuition from their basic conditions to the blissful, omniscient agency of Kālacakra. Thus, the repetitive, traumatic interaction of the outer and inner worlds at these four levels is transformed by four successive stages of contemplation, each of which shifts the atomic energies of the stress instincts that act as demons (*māras*) or obscurations (*avāraṇa*) into a blissful communion of outer and inner, through the nondual realization of the objective physicality of voidness (*śūnyatā-rūpinī*) by the subjective changeless bliss (*akṣara-sukha*) at each level. This constitutes the complete correction (*sarvākārā viśuddhi*) of life in the world that is the four bodies of buddhahood. In particular, the reified waking construct of self and world as intrinsically alien is replaced with the void image (*śūnya-bimba*) of Kālacakra mother-father, representing the blissful interplay of macrocosmic and microcosmic rhythms; the nightmare symbolism of life as a struggle for survival is replaced with the luminous dream of the global community of Kālacakra as a perfectly communicating family of multiracial, multicultural couples all embracing the blissful energy of life; the deluded sleep in which subjectivity and objectivity are mutually obscured from each other is replaced with the numinous absorption in which they commune in their innate freedom from the perplexity of dualistic constructs; and the addictive bliss in which the genetic material of mother and father reproduces stress instincts and their atomic energies is replaced with the changeless bliss in which the male and female spirits of enlightenment (*bodhicitta*), freed from all tainted atomic energies, pervade the spacious physicality of voidness. This fourfold embodiment of blissful omniscience is the full fruition of the primal enlightenment (*ādhibuddha*) innate in all living beings, realized by the mature intuition body of a vajra master (*vajradhara*).

Since the Wheel of Time is an esoteric tradition that culminates in a spiritual science and divine archetype of contemplative living, it is natural for us as moderns to misidentify its path and fruit with the ritual practice and mystical experience of Western monotheism. Yet the outlook and intent with which it teaches the transformation of human life in the world is decidedly humanistic in its aims and

scientific in its methods, offering a view of contemplative life that may be generally described as therapeutic and educational. Where the contemplative science of the Kālacakra tradition adapts the models and methods of the Indian Buddhist tradition of self-correction, exoteric and esoteric, it is clearly with a view to describing the human potential for transforming reactive life driven by self-destructive instincts into a progressive life based on the sublimation of sexual bliss. Given this intent, its contemplative science is more akin to the evolutionary psychologies of ancients like Empedocles or moderns like Freud, Jung, and Reich than to the ritual-mystical soteriology of monotheism. The fruit of this path, the individual's correction of self-limiting destructive instincts and sublimation of socially generative sexual instincts, is akin to awakening the civilizing genius of Eros described by Empedocles and in Freud's *Civilization and Its Discontents*. From the standpoint of Buddhology, Kālacakra reconciles the physics of Buddhist Realism with the psychology of Buddhist Idealism by subjecting both to a critical revision guided by Centrist contemplative science. Thus, Buddhist atomism is aligned with the Centrist view of Buddha's insight that matter is void; Buddhist psychology is aligned with the Centrist view of his insight that mind and body coevolve through selfless wisdom and love; and Buddhist contemplative science is revised to better reflect the Centrist view of his omniscience as a blissful openness that accepts the reality of all with unconditional love and care. In short, Kālacakra revises the conventions of Buddhist science to better reflect the ultimate nature of reality Buddha realized in his nirvāṇa, insisting in true Centrist spirit that that luminous, blissful nature is not localized (*apratiṣṭitā*) apart from the world but rather the very nature of this relative matter and mind. In this sense, the Wheel of Time extends and refines the work done by Mahāyāna thinkers in the Nālandā tradition to develop a system of contemplative self-correction that can prepare individuals to guide the advancement of human science and civilization towards a sustainable, global culture of peaceful collaboration. Elsewhere,[33] I have used the similarity between the aims and means of Western psychotherapy and Buddhist mind science to map modern Western and Indo-Tibetan techniques of cultivating nonviolence, compassion, and sublimation (Table 2).

III. The *Wheel of Time*: A Global Vision for Sustainable Science and Education

According to the Kālacakra legend, when Sucandra, ruler of the mythical kingdom of Śambhala, asked Śakyamūni to reveal the *Wheel of Time Process* it was with a global vision of the future of science and civilization in our world. As our world system entered its decadent age (*kāliyuga*), the Universal Monarch (*Cakravartirājā*) sought the former prince's guidance to protect his kingdom, hidden somewhere in the vastness of Central Asia, from the escalating political violence that was already threatening the very survival of Eurasian civilization. In particular, Sucandra sought teachings from the Universal Vehicle (*Mahāyāna*) meant to guide

Cultural Traditions:	**Western Behavioral**	**Western Analytic**	**Indo-Tibetan Buddhist**	**Indian Vedist**
Individual Practices:				
	Relaxation Techniques Autogenic Training Cognitive Therapy	Dynamic Therapy Ego Psychology Classical Analysis	Basic Mindfulness Basic Quiescence Basic Insight	Hatha Yoga TM Stage 1,4 Krishnamurti/ Aurobindo
Social Practices:				
	Family Therapy Dialectical Therapy Couples & Parenting	Object Relations Interpersonal Therapy Existential Therapy	Giving & Taking Exoteric Mind Training Insight & Quiescence	Patanjali Yoga State1-2 Bhakti/Seva Yoga Advaita Vedanta
Process Practices:				
	Hypnotherapy/EMDR Guided Imagery Sex Therapy/ Movement Intimacy Work	Self-Psychology Jungian Analysis Reichian Analysis Lacanian Analysis	Kriya/Carya Tantra Yoga/Unexcelled Yoga Tantra 1 Unexcelled Yoga Tantra 2a Unexcelled Yoga Tantra 2b	Yoga Stage 5 TM Stage 3/Yoga Stage 6 Kundalini Stage 7 Sahaja/Yoga Stage 8

Table 2. Provisional Comparative Map of Cultural Practices of Self-Correction.

whole societies out of the cycle of trauma and violence and into a utopian Pure Land (*Buddha-kṣetra*) of enlightened people and institutions, just as the Kings and Queens of the Kuśana, Śātavāhana, Gupta, and Pāla dynasties of India would in their eras. Further, not content with the exoteric universalist teachings the Buddha gave at Vulture Peak near Nālandā, Sucandra specifically requested the esoteric alternative teachings alluded to in the *Heart Discourse* as the quickest method of realizing transcendent wisdom. In fact, the teachings Śakyamūni revealed as the Wheel of Time articulate a prophetic vision of the not-too-distant future quite unlike that found in most spiritual traditions, including the Mahāyāna Pure Land traditions that became so popular in East Asia. What is unique about the Kālacakra's vision of the role of spiritual wisdom and art in human history is that, in the midst of endangered civilization, it offered a radically progressive alternative to the cultures of prejudice and violence threatening our world to this day, an alternative based on the promise that scientific education and democratic society will spread universally to all the world's diverse cultures and peoples. According to Kālacakra legend, this sustainable alternative tradition profoundly affected the society of Śambhala within the span of just eight generations. By the time of Mañjuśrī Yaśas, the country's first Democratic King (*Kalkī* or *Kūlika-rājā*), education had spread to the point that the caste system could be abolished.

Whatever historical truth there may be to this legend, one thing is clear. The Kālacakra tradition is no idle prophecy, but an eminently reasoned and pragmatic plan for a sustainable global future for humanity, based on a decisive commitment to progressive, democratic forms of science and civilization. While the legend and

teaching of the Wheel of Time has seemed to many shrouded in an exotic air of magic and mystery, it is as far from the romantic lore of myth and legend as our own European tradition of enlightenment. This may not be as incredible as it sounds when we consider the fact that, like our enlightenment vision of science and democracy, the Kālacakra vision is grounded in the most mainstream institution of contemplative life: the university. The fact that the emergence of the Wheel of Time preceded our scientific enlightenment by at least a millennium is not so shocking when one considers that the first Indian universities, Takśaśīla, Dhānyakaṭaka, and Nālandā were founded a millennium or more before the first Western universities at Bologna, Paris, and Oxford. More surprising is the fact that the basic elements of the scientific worldview of the Kālacakra anticipate not just the modern physics of Newton or modern biology of Freud, but also the postmodern insights of Einstein, Heisenberg, Wittgenstein, and Lacan. As if that were not enough, the timeless contemplative science of the Wheel of Time presents us with the futuristic promise of fully adapting our experience of ourselves and our world to the new realities of quantum physics, neural plasticity, and positive psychology, of which many have not yet heard.

Whether Śambhala is a still-hidden utopia or a global vision shared in a virtual domain, a contemplative scientific community without cultural borders, it is clear that its critical view of reality and its techniques of self-correction are remarkably pertinent to the challenges facing humanity today. In view of the looming problems of terrorism, sectarian violence, ethnic cleansing, inner city violence, and violence in our homes and schools, it is fortunate indeed that the once warlike peoples of Tibet and Mongolia have preserved what may be the world's most accessible and effective system of enlightened self-disarmament.

Faced with the time-warp in which modern science is just catching up with the wisdom of this older tradition, those in the West interested in serious study of the Kālacakra literature, arts, and sciences will need to practice some of the patience the Wheel of Time teaches. For unlike the West's main traditions of religious prophecy, the Kālacakra's scientific futurism embodies a progressive style of cultural agency in which the spirit of universal compassion is active as transcendent tolerance for the blocks that keep alienated individuals and groups attached to prejudice and the repetition of trauma. While we moderns have learned to think of religions as perpetuating superstition and destructive emotions like shame, fear, and hate, in order to learn from the Kālacakra the modern scientific community of the West must begin to face and heal its own reactive bias against things contemplative or spiritual. As I see it, this is the rate-limiting step in recognizing what may be the prime challenge facing scientific civilization today: the need to integrate the psychotherapeutic, contemplative, and ethical disciplines of self-correction modern science and civilization have jettisoned along with the religious traditions and institutions out of which they emerged. This philosophical obstacle has a lot to do with the lack of resolution in certain postmodern debates facing the liberal, scientific academy in the West. These include the debate between the physical and social science communities over objectivity versus cultural relativism; the debate

between secularists and traditionalists over the role of science versus religion in education; and the debate between objectivists and pluralists over the possibility of multiple approaches to science and spirituality.

Let me simply say that I believe that these problems were clearly recognized in Buddhist and Vedist thought after Nāgārjuna and resolved at Nālandā by the eighth century. That resolution is reflected in the complementary Buddhist paradigms of embodied objectivity refined by Candrakīrti and Dharmakīrti. The gist of that resolution is to confirm Śakyamūni's critique of the idea of absolute objectivity or omniscience, as well as his insistence that appropriate objectivity or embodied omniscience does insure that human knowledge and action yield personal freedom and social happiness. Since the objectivity of human knowledge and expertise is no greater than the objectivity of those who employ them, the best way to advance objectivity may be to maximize the natural, social, and cultural processes of self-correction by which individuals and groups become more objective over time.

While modern philosophers of science have had to adapt themselves to this way of thinking in recent years, it is so foreign to the objectivism of modern science that few individuals and fewer communities in the West as yet have been able to make the necessary transition.[34] One voice in the Anglo-American academy that may be a harbinger of the kind of shift needed is legal philosopher Thomas Nagel. I will therefore close with a quote from Nagarjuna's *Reason Sixty*, with an explanatory comment by Candrakīrti, some passages from the *Kālacakratantra*, and finally with some excerpts from Nagel's classic, *The View from Nowhere.*

First, Nāgārjuna:

> Those who insist on a non-relative
> Self or world, Alas!
> They are impoverished by worldviews
> Like absolutism and nihilism.[35]
>
> The great souls are free
> From [self-centered] conflict or bias;
> For they who have no [fixed] position,
> How can there be opposition?[36]
>
> Seeing with their wisdom eye
> That things resemble reflections,
> The great souls do not get caught
> In the thicket of objects.[37]

Here is Candrakīrti's *Commentary*:

> Once the practitioner sees that what the "god" of his consciousness reifies as being existent or non-existent is deceptive and fictive in nature, he sees it as uncre-

ated with respect to intrinsic reality and hence definitively understands it. Since the mind thus poised knows [things as] uncreated with intrinsic reality, it is purged of endless [constructs of] things like material elements that are created with such [apparent reality], and hence becomes free of them as a reflected image ceases when the form reflected is removed.[38]

When freed from egocentric position and opposition by their freedom from [reifying] being as such, those [great souls] with such [purged] intuition will definitely terminate their addictions.[39]

In the empathic objectivity of the noble, [egocentrically biased minds] seem like children, ignorant of the nature of existence, caught in the trap of the [addictive] world, whatever they do. With an intellectual eye purified by wisdom [however], the noble see objective reality precisely as it is . . . hence, "great souls do not get stuck in the thicket of objects."[40]

Now from the *Kālacakratantra*:

The individual is like a silkworm, binds himself with conceptualizations, which are the *guṇas* [qualities] present in *prakṛti* [nature]. However, due to the absence of conceptualizations, the individual liberates himself with the mind. Therefore, king, one's own *karma*, present in the *guṇas* of *prakṛti*, causes suffering and happiness.[41]

A living being, fettered with the psycho-physical aggregates, elements, and sense-faculties, with the fears of the three worlds, with the five faculties of action (*karmendriya*), with the subtle-elements (*tanmatra*), with *karmic* defects, with the mind and its *guṇas*, with the intellect, self-grasping, and the like, roams repeatedly with a subtle state of being within the six states of existence. When a mental state is left behind, one attains the indestructible, supreme state in which one is no longer a living being (*janmin*).[42]

The body-*vajra* of the Jina, which has all aspects, is inconceivable in terms of sense-objects and sense-faculties. The speech-*vajra* accomplishes Dharma by means of utterances in the hearts of all sentient beings. The mind-*vajra* of the Vajrī, which is the nature of the minds of sentient beings, is present throughout the entire earth. That which, like a pure gem, apprehends phenomena is the gnosis-*vajra*.[43]

Finally, these excerpts from Nagel:

I shall offer a defense and also a critique of objectivity. Both are necessary in the present climate, for objectivity is both underrated and overrated, sometimes by the same persons . . . these errors are connected: they both stem from an insufficiently robust sense of reality and of its independence of any particular form of human understanding.[44]

What really happens in the pursuit of objectivity is that a certain element of oneself, the impersonal or objective self, which can escape from one's creaturely point of view, is allowed to predominate.[45]

This involves the idea of an unlimited hypothetical development on the path to self-knowledge and self-criticism, only a small part of which we may actually traverse. We assume that our own advances in objectivity are steps along a path that extends beyond them and beyond all our capacities . . . and can never be completed, short of omniscience.[46]

Our objectivity is simply a development of our humanity, and doesn't allow us to break free of it; it must serve our humanity and to the extent that it does not we can forget about it.[47]

Of course, the art and science of self-correction, Buddhist or Western, are meant not to displace ordinary science but to advance it, much as alternative science guides the ordinary physical and psychosocial sciences in the Wheel of Time tradition[48] or "extraordinary science" improves "normal science" in Kuhn's vision.[49] The difficulty we postmoderns have understanding this stems from the climate of exclusivity that Nagel describes, a climate whose roots lie in the culture-specific conflict between objectified empirical science and church-controlled contemplative science in the West. Aligned with the therapeutic centrism of Nāgārjuna, Candrakīrti, and the Kālacakra, Nagel envisions the true path of reason today as a middle way between the cultural dead-ends of objectivism and relativism, scientism and antiscientism. Fortunately, the preservation of contemplative traditions like the Wheel of Time suggests he is wrong to assume that "the methods we need to understand ourselves do not yet exist."[50] One of the most precious gifts Tibetan civilization holds for our planet is its living link to this remarkable multidisciplinary science of civilized living, a time-capsule of the liberating arts and sciences of the world's first university at Nālandā.

Endnotes

1. Three recent works on Kālacakra are representative: Wallace, V. A. *The Kālacakratantra: The Chapter on the Individual.* New York: AIBS/Columbia Press, 2004; Wallace, V. A. *The Inner Kālacakratantra.* Oxford: Oxford University Press, 2001; Gyatso, Khedrup Norsang, trans. G. Kilty. *Ornament of Stainless Light.* Boston: Wisdom, 2004.

2. Obermiller, E. *Buston's History of Buddhism in India*. Tokyo: Suzuki, 1975; Chattopadyaya, A. and L. Chimpa. *Taranātha's History of Buddhism*. Simla: Indian Institute of Advanced Studies, 1970.

3. Cf. Loizzo, Joseph. "Candrakīrti and the Moon-Flower of Nālandā: Objectivity and Self-Correction in India's Central Therapeutic Philosophy of Language." University of Michigan: University Microfilm Services, 2001; and Joshi, Lalmani. *Studies of the Buddhistic Culture of India*. Delhi: Motilal Banarsidass, 1980; Stewart, Mary. *The Historical Archeology of Nalanda*. Archeological Survey of India, 1989.

4. Traditional sources for this history are the records of Chinese visiting scholars Xuanzang and Yi-jing: Beal, S. *Su-Yu-Ki: Buddhist Records of the Western World*. London, 1884/1969; Takakusus, J. *A Record of the Buddhist Religion as Practiced in India and the Malay*. Oxford: Oxford, 1896.

5. A good example here is B. Alan Wallace, whose work ranges from traditional Buddhist scholarship to comparisons of Western and Buddhist mind science traditions.

6. See the work of neuroscientist Richard Davidson in Daniel Goleman, *Destructive Emotions*, New York: Bantam, 2003.

7. A key figure here is Jon Kabat-Zinn, as expressed in his book on mindfulness-based stress-reduction, *FullCatastrophe Living*, New York: Bantam, 1998.

8. Palliative-care expert Leslie Blackhall and I review the argument for complementary sciences using the example of Indo-Tibetan Buddhist medicine in Joseph Loizzo and Leslie Blackhall, "Traditional Alternatives as Complementary Sciences: The Challenge of Indo-Tibetan Medicine," *Journal of Alternative and Complementary Medicine*, 1998.

9. Cf. Kitcher, Phillip. *Science, Truth and Democracy*. Oxford: Oxford University Press, 2001.

10. Thurman, Robert A. F. *Tsong Khapa's Speech of Gold: Reason and Enlightenment in the Central Philosophy of Buddhism.* Princeton: Princeton University Press, 1984.

11. This distinction emerges in the fascinating dialogue recorded in Ricard, Mathieu, and Thuan in Trinh Xuan, *The Quantum and the Lotus*, New York: Crown, 2001.

12. Few Western philosophers of science are more attuned to this distinction than French chemist and philosopher Gaston Bachelard. Cf. Tiles, Mary. *Bachelard: Science and Objectivity.* Cambridge: Cambridge University Press, 1984.

13. Although familiar in the West as early as Fichte, this insight was articulated in the later philosophy of Wittgenstein and found its way into Anglo-American philosophy of science *via* his influence on Thomas Kuhn. Cf. Wittgenstein, Ludwig. *Philosophical Investigations*. New York: Macmillan, 1953, and *On Certainty.* New York: Harper, 1970; also Kuhn, Thomas. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press, 1964.

14. A strong, critical reading of Freud's humanistic approach to science may be found in Patricia Kitcher, *Freud's Dream: A Complete Multidisciplinary Science of Mind,* Cambridge: MIT Press, 1998; while perhaps the most profound defense and use of Freud is in Paul Ricoeur, *Hermeneutics and the Human Sciences,* trans. J. Thompson, Cambridge: Cambridge University Press, 1982.

15. Gadamer, Hans. *Truth and Method*. New York: Seabury Press, 1975.

16. This point was first made by Lama Anagarika Govinda, *The Psychological Attitude of Early Buddhist Philosophy*, New York: Weiser, 1973. For a recent treatment, see John Pickering, ed., *The Authority of Experience*: *Essays on Buddhism and Psychology,* Richmond, Surrey: Curzon, 1997.

17. The continuity between Greek and Indic science parallels the better-known continuity in ancient philosophy. See Thomas McEvilley, *The Shape of Ancient Thought: Comparative Studies in Greek and Indian Philosophies*, New York: Allworth, 2002.

18. Cf. Stanley Tambiah's *World Conqueror and World Renouncer*, Cambridge: Cambridge University Press, 1967.

19. See the chapter on Kālacakra science in Vesna A. Wallace, *The Inner Kālacakratantra*, Oxford: Oxford University Press, 2001.

20. Wedemeyer, Christian. "Vajrayana and its Doubles: The Tantric Works of Āryadeva." University of Michigan: University Microfilm Services, 2000.

21. Ibid.

22. For a discussion of the evidence that this integration was well underway at Nālandā in Candrakīrti's day, see chapter six of my "Candrakīrti and the Moon Flower of Nālandā," University of Michigan: University Microfilm Services, 2001.

23. Cf. Kitcher, Patricia. *Freud's Dream: A Complete Multidicisplinary Science of Mind*. Cambridge: MIT Press, 1998.

24. Loizzo, Joseph. "Intersubjectivity in Wittgenstein and Freud: Other Minds and the Foundations of Psychiatry." *Journal of Theoretical Medicine,* Vol. 18, No. 4, 1997.

25. Varela, Francisco, Evan Thompson, and Katherine Roach. *The Embodied Mind*. Cambridge: MIT Press, 1990.

26. Loizzo, Joseph. "Meditation and Psychotherapy: Stress, Allostasis and Enriched Learning." In *Annual Review of Psychiatry*, American Psychiatric Association, Vol. 19, No. 1, 2000.

27. I have dealt with this in the context of my writings on the philosophy and psychiatry: Loizzo, Joseph: "Guarding Patient Agency." *Philosophy, Psychiatry and Psychology,* Vol. 7, No. 2, 2000; "Intersubjectivity in Wittgenstein and Freud: Other Minds and the Foundations of Psychiatry." *Journal of Theoretical Medicine,* Vol. 18, No. 4, 1997; "Commentary On Insight, Delusion and Belief." *Philosophy, Psychiatry and Psychology*, Vol. 1, No. 4, 1995.

28. This process has deep roots in Continental philosophy of science, beginning with Nietzsche. While most closely associated with phenomenologists like Husserl, Merleau-Ponty, and Ricoeur, it is most clearly articulated in the philosophy of science of Gaston Bachelard. One current Anglo-American heir to this tradition is my colleague, biologist Robert Pollack, founder of the Center for the Study of Science and Religion at Columbia. See also Robert Pollack, *The Missing Moment: How the Unconscious Shapes Modern Science*, Boston: Houghton Mifflin, 1999.

29. This influence is clear in the recent publication of three volumes documenting the linked systems of Tibetan astrophysics, phytochemistry, and Kālacakra contemplation (Rome: Tibet Domani). These are *Tibetan Astro-Science, A Clear Mirror of Tibetan Medicinal Plants,* and *Kalachakra* respectively

30. Vesna Wallace, *The Inner Kālackratantra*, op. cit., 56, n. 2, cites the *Vimalaprabhā* commentary of *Kālacakra*, Ch. I, v. 2.

31. This influence is clear in the recent publication of three volumes documenting the linked systems of Tibetan astrophysics, phytochemistry, and Kālacakra contemplation (Rome: Tibet Domani, 2000).

32. Loizzo, Joseph. "Optimizing Learning and Quality of Life Throughout the Lifespan: A Global Framework for Research and Application." *Annals of New York Academy of Sciences*, forthcoming, Spring, 2007.

33. Ibid.

34. Phillip Kitcher's defense of science is an interesting case in point, showing both the extent to which the objectivity claims of science are being relativized even by its strongest advocates, and the extent to which science remains in the crossfire in the centuries-old struggle between secular and religious versions of Western civilization.

35. *Yuktisastika* (YS), 44. This and the following quotations are my translation of verses and commentary, from *Nāgārjuna's Reason Sixty with Chandrakirti's Commentary: Trans-*

lated with an introduction and critical editions, New York: American Institute of Buddhist Studies/Columbia University Press, 2007; hereafter, Loizzo, 2007.

36. YS, 50; Loizzo, 2007.

37. YS, 54; Loizzo, 2007.

38. *Yuktisastikavṛtti* (YSV), ad.k.34; Loizzo, 2007.

39. YSV, ad.k.50; Loizzo, 2007.

40. YSV, ad.k.53; Loizzo, 2007.

41. *Kālacakratantra*, Ch.2, v. 85, as translated and cited by V. A. Wallace, *The Kālacakratantra*, op. cit., 132.

42. *Kālacakratanta*, Ch. 2, v. 95, translated and cited in V. A. Wallace, *The Kālacakratantra*, op. cit., 143.

43. *Kālacakratantra*, Ch. 5, v. 99, translated and cited in V. A. Wallace, *The Inner Kālacakratantra*, op. cit., 156.

44. Nagel, Thomas. *The View from Nowhere*. Oxford: Oxford University Press, 1986, 5; hereafter, Nagel.

45. Nagel, 9.

46. Nagel, 128.

47. Nagel, 221.

48. Wallace, V. A., *The Inner Kālacakra*, op. cit.

49. Kuhn, Thomas. *The Essential Tension*. Chicago: University of Chicago Press, 1977.

50. Nagel, 10.