

NOTES TOWARD STAMPING ON THE CORPSE OF SCIENTIFIC MATERIALISM

By
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Our myth is that we don't have one.

-Alice Notley

1. *Our Myth*

Science and its aura constitute the pervasive, unavoidable view and methodology of modernity. We cannot understand our era without considering its dominant presence.

How we receive and convey information, transport our bodies, nourish ourselves, heal, fight our wars, the objects we possess and the clothes we wear, indeed, much of what we think bears its seal. We live within a paradigm that science--consciously or not--has generated. Accordingly, the accreted ideology of "scientific materialism" bounds and determines what is real and what is not, and shapes our perceptual universe.

Science is a series of methods aimed at exploring the natural world and inventing useful tools. It generates a changing fabric of theories about the origin, nature, and functions of that world. It's often animated by an open-ended spirit of inquisitiveness and delight in discovery. Unfortunately, science as the study of the natural world--sometimes for scientists and very much for modern global society--easily slips into *scientific materialism*, a theory that only the natural world truly exists. Rather than simply being "truth," it's instead a dogma fabricated out of scientific data by its proponents that stands as the modern paradigm for reality. Insidiously, this view filters our perceptual world and obstructs the mind's potential.

Chögyam Trungpa, in describing the "Three Lords of Materialism," notes that "ego is able to convert everything to its own use."ⁱ He describes the ego's relentless need for a fixed set of reference points to secure its existence, generating its sense of affirmation through possession of physical objects, ideas, identities, entertainments, or psychological or spiritual states. He chose "materialism" as the characteristic term of modern human *samsāra*. The feeling of possessing something tangible and material cements the possessor's fixed place in the universe, assuaging his or her existential uncertainty. Hence "scientific materialism" describes a body of beliefs that determines how we think and what we value; how we regard our bodies, our relationships, our planet; what makes for a valid therapeutic response or an invalid one; even what kind

of information we allow in and what we block out. It's a theory of reality that constructs our universe.

Rupert Sheldrake points to scientific materialism's acceptance as established, unquestioned verity: "People who put their faith in scientific materialism are often unaware that their beliefs are beliefs at all. They usually think of them as truth."² Curtis White calls this paradigm "scientism," meaning "science as ideology."³ B. Alan Wallace calls it "scientific realism,"⁴ when the scientific method of studying the material world is regarded as the only valid, truthful way of understanding human experience. All these terms indicate an ideology that takes the material world as measured by scientific methods as the only genuinely established truth free of subjective distortion.

Scientific materialism begins with scientists themselves, some of whom have proclaimed the material world as the sole reality and view science as the only reliable source of knowledge about it. While it isn't a "school," exactly, it has been advanced by some scientists as an encompassing way to view reality and been absorbed into modern philosophical schools like 20th century French deconstructionism. Scientific materialists can be quite definitive in their rejection of any kind of validity especially to religious views of reality. While we certainly can't label all scientists as materialists because they individually reflect a range of philosophical positions and beliefs, a life in science doesn't seem to correlate well with religious belief. Virtually none of the Nobel Prize winners in science, the majority of them American and European, have identified themselves as Christian. A 1998 survey of the most accomplished American scientists, those elected to the National Academy of Sciences, found only 7% "believe in a personal God," though 40% of American scientists generally would say they do. Biologists are apparently more likely to be atheists than physical scientists. Evolutionary biologist Richard Dawkins remarks how "American scientists are less religious than the American public generally, and that the most distinguished scientists are the least religious of all."⁵

Science provides measurements of the material properties it studies--something it's done with tremendous success in many fields. It only becomes scientific materialism when it's conceptually extrapolated to delimit "reality" as wholly material, an assumption held implicitly by many scientists and stated explicitly by some, particularly in books on evolution, biology, and the brain. Its parameters derive first of all from the narrow material focus of scientific work. The non-material aspects of reality tend to have no standing, as we'll explore, thanks to the exclusivity of the scientific method in charting the material world and its patterns of function. The rigor of this method demands great care and skepticism over how scientists design and perform their experiments, how they measure and interpret their data, and the kinds of

conclusions they draw from it. This method works so well, providing so much practical knowledge and amazing technology, its successes easily translate into a feeling--for scientists, modern intelligentsia, and society at large--that science can somehow explain it all.⁶ Other kinds of "truth," religious or otherwise, don't seem to cut it in comparison. This has been reinforced continuously by the popular media over the last century or more, contributing to the cultural absorption of the scientific materialist paradigm.

To its great credit and as a basis of its power and success, science has an acute phobia toward the distortions routinely pressed by humans onto the phenomenal world. Its methodologies have evolved to eliminate as much as possible human emotion, mythology, symbology, and inherited superstition from accurate attendance to the objective world around us. Its essential tools are systems of measurement, tied always to mathematics. It requires a disciplined, critical attitude toward how data becomes interpreted. Its focus from the ancient Greeks until now has mainly been the natural world, on what can be perceived and measured because it has tangible objects, dimensions, and activities.

At the same time, the scientific method has undermined, rightly or wrongly, confidence in the human emotional response to the idea of a cosmic or divine dimension to daily physical experience. As science gained its feet in Europe during the medieval period and the Renaissance, it gradually turned the tables on the notion of divine intervention or a spiritual dimension to the phenomenal world. A crucial expression of this for the evolution of modern scientific view came via philosopher René Descartes (1596-1650), who firmly established a theological barrier between immaterial, spiritual experience and the tangibility of the material, asserting the natural world as science's only appropriate realm of study. By the time of Newtonian science, Deism⁷ had asserted itself as the rather extreme accommodation of religion to science. God could now be removed to the distant past as the originator or first cause of the universe, which, because of the perfection and symmetry of its physical laws, works just fine without His meddling, thank you very much.

Historians have considered a number of the American founding fathers Deists, and even argued, as Dawkins notes, that some were atheists. Dawkins points in particular to Thomas Jefferson's disparaging remarks about Christianity, and describes the prevailing group philosophy of the founders as secularism.⁸

Due to lengthy efforts at the suppression of scientists like Galileo by the Catholic Church in Europe, the primary voice of institutional Christianity became exposed as rigid and violently dogmatic, eventually making the choice between science and

religion an easy one for the educated and liberal. The real triumph of science begins in the 19th century as it displaced religion altogether--and the prestige of philosophers as well--as the reliable articulator of truth for many of the intelligentsia. It entered a winning streak that produced extensive, detailed information on human and planetary biology, the cosmos, the chemical and elemental nature of matter, and so on. Most spectacularly, it produced breakthrough inventions in medicine, energy, communications, transport, war, agriculture, and consumer goods that constituted a remarkable standard of living (at least for those who could share in it). This effectively swept away all competitors to its dominance. If it can fly us to the moon and split the atom, it does--seemingly--what no other pretender to "the truth" can manage. And it did it through dogged adherence to rational intellect and an unwavering focus on the material world, becoming a global force across all boundaries.

For all of science's practical triumphs rooted in measuring the physical world, scientific materialism's theological, deeply held belief that an objective, independent physical world is the only truth and reality remains unestablished, and adherence to this view personally and socially undermines the spiritual dimensions of human beings and an accurate understanding of the universe we live in. The upshot, as physicist and Buddhist teacher Jeremy Hayward says, is life in "the dead world."⁹ It's a "dead world" insofar as we believe it to be a random set of solid, discrete material objects, with the existence of living, sentient beings the result of a kind of physical accident. It's a nihilistic view that sees consciousness and the universe as wholly mechanical, while any other dimension that you might call spiritual, sacred, supernatural, or immaterial has no credibility as the easily dismissed superstition of bygone eras.

Ironically, science itself has never truly established the material nature of the universe; *physics*, of all things, has never located anything that is an essential, irreducibly *physical* material from which the universe is made. Nor has it shown a universe that exists objectively and independently from the means of perception; in other words, we see the universe as accords our systems of measurement and the ways our minds perceive, both of which shape what is seen. Even what's considered "established science" owes something to preestablished assumptions and subjective prejudice; it offers no more than a partial explanation for what it purports to describe, an explanation that can be removed completely and replaced by a fundamentally different one, establishing a different "truth." Hence the Buddhist dedication to working directly with subjective perception becomes relevant and necessary. The Buddhist interest in dissolving dualistic fixation is its way to an accurate reckoning of reality.

A crucial belief of scientific materialism considers consciousness an effect of the brain and thus it disbelieves any experiences of consciousness that don't fit this model. While it describes life and consciousness in purely material terms, what constitutes thought, subjectivity, and the animating force of life fall outside its mechanistic descriptions. What also falls outside its theory are elements crucial to the Shambhala Buddhist tradition: basic goodness, subtle energy, wisdom beings, and sacredness itself. These principles require personal, subjective development—the necessary means by which they're accessed—and would never be acknowledged as authentic by a materialistic view. At the same time, they're principles, if understood and cultivated, that can bring individuals, human society, and the globe back into balance. Science alone won't do this, though it is a branch of wisdom necessary to face what's happening on our planet. We need to recover all dimensions of ourselves and our reality (exactly the kind of things the materialistic view wants us to reject), making science a tool of sacredness and vision, not an excuse for cutting us off from an expanded perception and a further, vital intimacy with our world.

2. Science Fails to Establish the Objective World but Nobody Notices

There's no denying the power unleashed by the scientific method. It's found ways to manipulate the phenomenal world that would have seemed like sorcery to the ancients. (Maybe it *is* sorcery, in some basic sense, since it makes use of thought and matter to accomplish astonishing things.) Given that the scientific determination of what's actual and what's not rests entirely with the establishment of consistent, reproducible measurements, what's confirmable as "reality" has no relevance to how one might *feel* about it, nor to whatever "irrational" or un-reified cognitive processes that might have gone into a perception, even a scientific one. Thus, if we hold scientific methodology as the sole determiner of "reality," it strips us of the potential validity of our subjectivity. Our emotional reactions and intuition are not ultimately measurable and will not find their way into a lab report. Even if—ironically—they're part of the scientist's personal process of scientific discovery, they're not part of the "truth" being established in a scientific sense, which must be constructed in purely rational and mathematical terms. While this may be necessary for the scientific method, it can effect a diminishment of those parts of subjectivity that actually contribute to acquiring knowledge and cultivating understanding. Feeling and intuition are also crucial to opening channels of perception of any non-material dimensions to ourselves or the universe, and to

finding meaning in human life.

Albert Einstein believed fervently in an objective world beyond human prejudice, seeking its fundamental properties that he hoped would be a “unified field,” an all-embracing explanation for the universe, its patterns and manifestation, and he spent a brilliant life in physics seeking it without finding it. Quite the opposite happened. The certainty of a solid, external, objective world fell apart.

If any aspect of science could establish objectively understood materiality, it would be physics, devoted entirely to finding the essential forms and patterns from which all objects coalesce. But in the course of its investigations, problematic ambiguities emerged. As the examination of atoms became more sophisticated, it became evident that the tools and systems of measurement *determined* the “objective” data. Whether one sees light as a wave or a particle depends on the mode of observation. How could the independent object (light) be both? The location and velocity of a particle in an atom can't be observed simultaneously. Therefore one can know how fast it's going, but not where it is, and vice versa. Particles orbiting an atomic nucleus can even completely disappear and reappear in the course of their progress. Does this mean that they can't be seen by the observer, or that they simply don't exist as part of their “existence”? Even the idea of a “particle” as a defined, measurable object, starts to seem less like an object and more like a pattern, potentiality, or process. Not incidental to the whole issue of how atoms function is the massive amount of empty space they occupy. Within the composition of an atom, what *isn't* an atomic particle might be more important than what it is.

Mathematics--without which there would be no science as we know it, nor any format for mapping atoms--ultimately remains analogous to what it describes. It's precise within its own system. Providing an accurate, objective understanding of atoms isn't quite what mathematics does. Instead it provides a set of numbers that represent “probabilities”--an imagination, if you will, of the atom and its particles, but not the atom itself. Hence quite a few subatomic theories have been proposed that disagree with one another. Shouldn't the “objective” world have an objective explanation, not a series of explanations that might not even overlap, or that have been thoroughly disproved over time? What physics *has* determined by probing into the heart of materiality is that there's nothing there but space and energy.

Since the human eye sees what a human eye can see of the visual world, just as a fly's

compound eye sees what it sees, even if both are viewing the same room, and a spectrophotometer reveals what a spectrophotometer can discern, so the observer and observed, try as they might, can't be separated. Wallace takes this to its logical conclusion:

The color patterns observed by humans are relational attributes that have no existence apart from the human act of observation. This is equally true of all our other sensory impressions of sound, smell, taste, and touch. All such sensations occur as interactions between the sensed objects and our cognitive instruments of detection. Photographs of traces of subatomic particles in a cloud chamber are also interactions between measured objects and the system of measurement. Thus, if for that reason subatomic particles are regarded purely as theoretical constructs, the same must be said of all the macroobjects that we think we observe in the physical world. If the former lack physical reality, so must the latter. In this case, no observational entities remain in the physical world.¹⁰

What we've deemed "truth" through the veracity of mathematical calculations establishes only a truth relative to the kind of calculations that have been made, which in turn depend on how we've conceived of the object to be studied. Without conceiving the object, we can't formulate a way to gather data about it. As physicists discovered--and this really is a great breakthrough into reality--the "external object" as perceived can't be separated from the subjective perceiver and his or her mode of measurement. Scientific inquiry itself, in its search for the subtlest, most fundamental physical properties of the universe, has shaken apart the whole paradigm of an objective, purely external physical world with one, unequivocal, measurable reality. Right here, the paradigm of scientific materialism has nothing to stand on, thoroughly refuted by *science itself*. White observes how little notice this gets:

Even now...after quantum physics, so much of the discourse of science in its public proclamations is focused on the establishment of knowledge as fact. This overlooks the paradoxical nature of scientific confirmation. Does confirmation mean positive knowledge of reality? Does it mean probability? Does it mean that something is useful? Newton's equations have never stopped being useful, even though they have been superceded by general relativity.

Scientism is intolerant of the idea that the universe depends for its being on the participation of mind. Kant's Copernican Revolution was about this single fact:

we have no simple access to the *thing in itself*. Any knowledge we have of reality is necessarily mediated by our own symbolic structures, whether they be math, philosophy, religion, or art....What we most often hear from scientism is “We scientists deal in knowledge of truth, and philosophers, artists, and religious believers don’t.” End of conversation.¹¹

3. *Purifying the Subjective Vs. Establishing “Objectivity”*

Buddhism starts at this very spot--the false belief in the separation of subject and object, which it defines as “ignorance,” the causal basis of suffering. The mahāyāna describes “reality” or, could we say, “objective reality,” as determinable only in the absence of the habitual mental projection of subject and object. Hence the subjective perceiver’s act of perception, his or her own cognitive and sensory activities, become the basis of investigation and removal of obstruction to attain insight that’s not mired in dualism.

We can take any established scientific law, say, that water freezes at zero degrees centigrade, and consider that we’ve demonstrated an unequivocal truth about reality. And so it seems to be, as long as we’re relating water to temperature and using this particular system of measurement. Science measures properties in relation to one another until it can establish reliable, reproducible measurements. Within its disciplines, it allows for a lot of examinations of those measurements and challenges to their validity as it seeks a firm set of results. This may rise to the level of a “law” in science, a way phenomenal reality truly is. But what has been established as “real” is only a predictable pattern of relative relationships, as powerful and useful as that may be. That’s the “truth” science has pinned down. To make this success in mapping relative relationships of material substances stand for the whole of what is real, as the materialist view does, requires an entirely theoretical belief in the separation of subject and object, rooted crucially in a willingness to imagine that the subjective gatherer of data has no interference in what is gathered, and that what is gathered is true and “real.”

But most of what has been discovered through the scientific method has in point of fact never shaken itself out of relative, conventional reality to catch hold of unequivocal truth. It has discovered the properties of relatively established materials--to the point of splitting the theoretical atom and destroying a city--but it hasn’t ever established that it sees “reality” as such, which in Buddhist terms would mean an unchanging absolute

that doesn't rely on theory, reification, or concept. Therefore as it has delved as deeply as it possibly can into the natural world, it's seen its own methodology and implied ideology exposed as subjective and relative.

The scientific materialist belief system is founded on the mirage of ultimate empirical objectivity. Hayward remarks how scientific discoveries get pressed--by scientists, as well as the media and society--into standing for greater realities than they actually demonstrate: "The history of science is the history of continual revelation of partial truths which have often been clung to as the whole or the absolute truth. Nowadays these partial truths are, indeed, often themselves created by science. Nevertheless, the role of science seems to lie far more in its disclosure of partiality than any steady progress toward some supposed 'truth.'"¹²

While the rigor of scientific discipline and its striving toward a disinterested, data-driven reality, accompanied by its wild successes in technology, has led to an idealized self-satisfaction, with the tacit belief that science is progressing ever closer to the "truth," the facts on the ground tell a messier tale. Thomas Kuhn, in his classic study of science history, *The Structure of Scientific Revolutions*, describes the "paradigms" that are necessary for any given area of scientific study to take place. These consist of a collection of theories, values, techniques, and technology employed by a scientific community that shapes and focuses its research, determining what it will examine and what it won't. It focuses on "anomalies" that its paradigm cannot explain, looking to fit its experimentation and data-culling to solving a problem so that it will accord with the preordained view and methodology. Though this may be how a given scientific discipline has to proceed, and certainly provides a way that it can be productive, it also narrows and potentially ossifies what becomes "reality" within a given discipline. Kuhn states that "no part of the aim of normal science is to call forth new sorts of phenomena; indeed those that will not fit the box are often not seen at all."¹³ He points out how in practice science hasn't been at all immune to received opinion, bias, or other examples of not-so-rational mind (summarized here by Richard Tarnas):

Far from subjecting [a given scientific] paradigm itself to constant testing, normal science avoided contradicting it by routinely reinterpreting conflicting data in ways that would support the paradigm, or by neglecting such awkward data altogether. To an extent never consciously recognized by scientists, the nature of scientific practice makes its governing paradigm self-validating. The paradigm acts as a lens through which every observation is filtered, and is maintained as an

authoritative bulwark by common convention. Through teachers and texts, scientific pedagogy sustains the inherited paradigm and ratifies its credibility, tending to produce a firmness of conviction and theoretical rigidity not unlike an education in systematic theology.¹³

A famous example of fixed paradigm in the history of science comes at the conclusion of the 19th century, after hundreds of years of the development of Newtonian physics, such that the famous physicists of the time felt certain that the physical universe had very nearly been entirely explained; one even felt it necessary to discourage students from a career in physics as so little was left to sort out! Of course, what hadn't been sorted out led to the theories of relativity and quantum mechanics that would soon sweep all the established certainty of their paradigm away.¹⁴

Science therefore “advances” in this sense: the previous paradigm collapses, replaced by what seems like a better, more convincing working set of theories and methods, that's now communally adhered to, replacing what was there before. When a scientific community manages to overturn an established theory, it doesn't necessarily come about through what might be called “higher rationality,” but within the conditions and influences of time, place, and personal and social interests:

The process by which that revolution takes place is far from rational. It depends as much on the established customs of the scientific community, on aesthetic, psychological, and sociological factors, on the presence of contemporary root metaphors and popular analogies, on unpredictable imaginative leaps and “gestalt switches,” even on the aging and dying of conservative scientists, as on disinterested tests and arguments. For in fact the rival paradigms are seldom genuinely comparable; they are selectively based on differing modes of interpretation and hence different sets of data. Each paradigm creates its own gestalt, so comprehensive that scientists working within different paradigms seem to be living in different worlds. Nor is there any common measure, such as problem-solving ability or theoretical coherence or resistance to falsification, that all scientists agree upon as a standard for comparison. What is an important problem for one group of scientists is not for another. Thus the history of science is not one of linear rational progress moving toward ever more accurate and complete knowledge of an objective truth, but is one of radical shifts of vision in which a multitude of nonrational and nonempirical factors play crucial roles.¹⁵

Einstein, for example, who was 26 when he published his special theory of relativity, had taken a considerable leap away from the standard Newtonian understanding of space as flat, empty, and unchanging, instead positing space and time as one continuum, and eventually that space could be curved by gravitational pull. Einstein radically re-imagined the phenomena of physical space, seeing a different reality altogether, and proceeded from there. Kuhn notes how much youth figures into revolutionary change:

Almost always the men who achieve these fundamental inventions of a new paradigm have been either very young or very new to the field whose paradigm they change. And perhaps that point need not have been made explicit, for obviously these are the men who, being little committed by prior practice to the traditional rules of normal science, are particularly likely to see that those rules no longer define a playable game and to conceive of another set that can replace them.¹⁶

While such change between paradigms can feed the popular mythology of scientific work cumulatively getting closer and closer to the reality of how the natural world really is, what has happened instead is that the paradigm transformation has abandoned much of what has come before to see something entirely differently, with its own set of formulae, methods, assumptions, tools, and interests. The space Newton saw and the space Einstein came to see are not themselves the same, so it's not a matter that Einstein built on the previous "truth" of Newton, but he replaced Newton's "truth" with a different one altogether. "Einstein's theory can be accepted only with the recognition that Newton's was wrong."¹⁷ In another, example of radical paradigm change, Ptolemaic geocentric (Earth-centered) astronomy got replaced by Copernicus' heliocentric (Sun-centered) astronomy. The rules of the game had to change because it had become an entirely different game, working from a profoundly shifted basis.

No scientific paradigm, current or past, has ever fully explained the facet of the material world it studies. Kuhn says of this, "The puzzles that constitute normal science exist only because no paradigm that provides the basis for scientific research ever completely resolves all its problems."¹⁸ When the paradigm becomes inadequate for continuing to understand what's under study, it gets replaced by another that starts over from a fresh angle, with a fresh set of puzzles to solve.

The veracity of scientific paradigms becomes ensconced in the minds of science students

and the public at large through their textual presentation that at best glosses the discredited paradigms, though in the main omits them, as it presents in detail the current thinking and praxis. Kuhn:

As the source of authority [for understanding the view of a scientific discipline], I have in mind principally textbooks of science together with both the popularizations and the philosophical works modeled on them. All three of these categories...have one thing in common. They address themselves to an already articulated body of problems, data, and theory, most often to the particular set of paradigms to which the scientific community is committed at the time they are written.¹⁹

Because the textual presentation of science focuses on what are deemed the current successes, discoveries, and designated frontiers of a scientific study, these come to seem like a cumulative crescendo of the scientific effort to reach the truth of the material world.

From the beginning of the scientific enterprise, a textbook presentation implies, scientists have striven for the particular objectives that are embodied in today's paradigms. One by one, in a process often compared to the addition of bricks to a building, scientists have added another fact, concept, law, or theory to the body of information supplied in the contemporary science text.

But that is not the way science develops. Many of the puzzles of contemporary normal science did not exist until after the most recent scientific revolution. Very few of them can be traced back to the historic beginning of the science within which they now occur...

...Those theories [presented in textbooks], of course, do "fit the facts," but only by transforming previously accessible information to facts that, for the preceding paradigm, had not existed at all. And that means that theories too do not evolve piecemeal to fit facts that were there all the time. Rather, they emerge together with the facts they fit from a revolutionary reformulation of the preceding scientific tradition, a tradition within which the knowledge-mediated relationship between the scientist and nature was not quite the same.²⁰

The conceptual constructs necessary to scientific investigations do not arrive at an unequivocal truth, only a modality for investigation, which can in turn be replaced by the invention of a new set of concepts and approaches, leading to a different set of

discoveries and understandings. Therefore there's a gap that science can't bridge between its own changing, relative conceptualizations that result in partial truths about a continuously in flux material world it purports to describe. Buddhist teacher Thinley Norbu Rinpoche addresses this point, saying, "Countless new conditioned phenomena can be discovered because phenomena are endless, but whatever is found exists within the root and contributing circumstances of temporary compounded substantial phenomena. Although scientists may think they have found what is ultimate, it will not last, because it only exists within the circumstance of conception."²¹ Kuhn actually questions the quest to establish some final scientific explanation, by implication accepting that science simply cannot accomplish this: "Does it really help to imagine that there is some one full, objective, true account of nature and that the proper measure of scientific achievement is the extent to which it brings us closer to that ultimate goal?"²²

This connects us to the basic Buddhist view of knowledge: that "subjective" and "objective" comprise interdependent poles of conventional, conditional reality. Since the objective world as scientism (and science) conceives of it can't be found on careful inspection, the area most needing inquiry has to be individual subjectivity. Since individuals can't remove themselves--or the various conditions they operate within--from scientific inquiry or any other perception or activity, it's the process of subjectivity that must be understood and clarified--precisely the purpose of spiritual practice in the Buddhist sense.

It's Buddhist commonplace that consciousness perceives phenomena filtered through beliefs and emotional impulses. It shares with science the recognition that received, unexamined belief and emotional reaction can completely shroud knowledge of an object. If two people see a plate of escargot and one salivates while the other becomes nauseated, we learn about their subjective reactions, not the food. The same level of subjectivity that takes place in cultural and historical situations can be equally idiosyncratic and subjective. Chinese men had an extended era of rhapsodic fascination with women who practiced foot-binding, but this seems not to have caught fire with the contemporary American porn industry. If this kind of conditioning adheres in scientists just as it does in everyone else, and, as we've seen, affects their theories and the interpretation of data, then would it not behoove them to examine their own subjectivity as part of scientific practice?

Fundamentally, the Buddhist path engages the individual in a process of removing

distorting concepts and undue emotionalism from perception itself. Its goal is to uncover reality, the truth of how things are, not what we unconsciously impose upon it. To that end, Buddhism employs mindful, deliberate attendance to one's own psychological events and sensory experiences as they happen, training in letting them arise and subside without subjective distortion. It utilizes meditative techniques to look deeply into the mind of the perceiver and illuminate the workings of consciousness. It demands a disciplined, non-aggressive interaction with other beings and the phenomenal world as a way of learning both compassion and equanimity. It utilizes an array of analytic and religious techniques to sharpen the intellect, open the heart, and expand the vision of the individual beyond the conditioned limitations of time, place, family, psychological predilections, and so on. Quite an extraordinary, long-term commitment to education, vigorous discipline, and rigorous introspection is a basic requirement to high accomplishment in this field.

That authentic, unbiased truth can be known through direct individual experience is intrinsic to the Buddhist view, and it subjects its practitioners to an effort at many levels to strip away the filtering mechanisms from consciousness. Among its central discoveries, it recognizes phenomena as conditional, interdependent, and transitory. The so-called external world has proven to be a product of consciousness itself, projected dually as a perceiver and perceived, both inextricable aspects of mind. The nature of mind, and both internal and external appearances that depend upon it, can't ultimately be located as a thing, a form, a material or collection of materials--it eludes any such reification, and therefore scientific methods have no way to measure it. The result of purifying an individual's subjectivity becomes the collapse of the distorting projection of subject-object duality. It frees the individual of confusion and suffering, while vastly expanding his or her compassionate impulse toward other beings. Importantly, it illumines a phenomenal world of fluid, dynamic interdependence, liberating a penetrating clarity of intellect and intuition capable of guiding meaningful action within the matrix of cause and effect. One can then communicate and interact in ways that are harmonious with the world and deeply helpful to other beings.

Whatever moral compass scientists may have, it doesn't necessarily come about through their own scientific training. The psychological filters they contend with as subjective perceivers aren't removed in their formal education through any other means than cultivation of scientifically-oriented intellect. The data they gather and the established formulae used to collate and shape it function to impose objectivity. But of course the data still has to be interpreted by the subjective perceiver, and the data themselves can't

be separated from the methods employed to gather them. Hence there are built-in limitations to the objectivity of science, and quite a limited set of methods for helping the scientist to look at his or her own subjectivity. While much is certainly gained from this narrow focus, myopia can accompany it as well, in which the knowledge and power unleashed in laboratories seem little understood by those setting them loose on the world.

It's redundant here, in the 21st century, to make an elaborate analysis of the toxic side effects of scientific inventions. The pollution of air and water, the extinction of species, denaturing landscapes to raise brutal urban environments, the menace of nuclear war and the immensity of devastation wars can now effect, with the world eco-system on the brink of global collapse, ought to be enough to remind us that science hasn't provided the panacea it still promised not long ago. It does not seem in command of the "reality" it has reputedly established and understood. Neither does it engender confidence in its ability to correct the catastrophic results of its innovations. Corporate greed easily coopts "wholly rational, disinterested science," while scientific effort often proceeds blinkered by ignorance toward the potential side effects of its work. As Tarnas observes, "The scientifically unfathomed complexity of all relevant variables --whether in global or local environments, in social systems, or in the human body --[has] made the consequences of technological manipulation of those variables unpredictable and often pernicious."¹⁵

Discoveries about the mechanics of the material world may have tremendous human utility, as well as "pernicious" consequences. This points clearly to the interdependence of the "objective" world and the human, subjective use it gets put to. Science, as incredibly powerful as it is, remains in the hands of imperfect people susceptible to pressures, conditioning, lack of foresight, and poor decision-making--just like the rest of us are. It's a mistake to elevate science, as scientific materialists can, to some Olympian height as the only authentic light of truth we can rely on, that it is truly and firmly explaining the world we occupy. The incredible power science wields has to be explored and applied with discernment, and that inevitably relies on the very human, very subjective qualities of compassion and insight residing in the scientists themselves.

4. *Consciousness as Mechanistic Accident*

'You,' your joys and sorrows, your memories and ambitions, your sense of personal

identity and free will are, in fact, no more than the behavior of a vast assembly of nerve cells.

--Francis Crick,
Nobel laureate¹⁶

It's interesting to consider that alchemy, a proto-science which provided an early framework for what became chemistry in the West, was understood both as an investigation and manipulation of the material world and as a process of spiritual transformation. It's an example within the Western tradition (alchemy has its own versions in Asia, including in vajrayana) of the scientist as one who joins the material with the immaterial, thus transforming both subject and object. It involved a very personal commitment on the part of the alchemist to undergo a "radical deconstruction and 'rebirth,'" modeled on "myths that deal with the life, death, and resurrection of a god," and passing through a sequence of labors both at the laboratory with physical materials and inwardly as spiritual work. According to this tradition, the transformation of the external metals could not be accomplished without realizing the necessary agent of spiritual purification.¹⁷ "Both Eastern and Western alchemy have a psycho-spiritual esoteric component based on the essential idea of inner transformation. The material dimension of alchemy may have been concerned with such matters as the immortality of the body or the production of gold, but from an esoteric perspective these were ultimately not separate from the Great Work of inner transformation."¹⁸

"The Great Work of inner transformation" as a formal aspect of scientific discipline has faded out so completely that today scientific ideology doesn't even acknowledge the existence of spirit. "Spirit," "mind," or "consciousness" constitutes the mercurial, non-material element of *lived* subjective perception, as distinguishable from plants or minerals, or anything else we think can't possess subjectivity. Francis Crick, a neuroscientist, neurobiologist, and physicist declares this view of mind quite clearly: "The scientific belief is that our minds--the behavior of our brains--can be explained by the interactions of nerve cells (and other cells) and the molecules associated with them." To say "mind" is to say "the behavior of our brains," which he understands wholly as the interaction of nerve and other biological cells, sufficiently trackable in their activities at the molecular level to explain consciousness. (At least he describes this as a "belief," but note also that he declares this as no different than *science itself*.)¹⁹

Cognitive science has investigated how the brain governs various aspects of conscious

experience, how damaging it impedes its functions, how stimulating it in other ways seems to produce certain kinds of thoughts and mental states, and how electrical activity in one part of the brain or another signals the presence of certain kinds of thoughts and feelings. Cognitive studies can map the physical functions of the sense organs, nervous system, and the brain, accounting--from the biological angle--for an array of perceptions. However, to view the brain as the whole extent and reality of mind again forces a mechanistic model on something essentially non-material: subjective cognition and thought process.

That mind or consciousness can be no other than the brain and relatable entirely to physical processes is nevertheless the dominant paradigm in scientific studies of cognition. Daniel Dennett, a professor of cognitive studies, states in *Consciousness Explained*:

The prevailing wisdom...is *materialism*: there is only one sort of stuff, namely *matter*--the physical stuff of physics, chemistry, physiology--and the mind is somehow nothing but a physical phenomenon. In short the mind is the brain. According to materialists we can (in principle!) account for every mental phenomenon using the same physical principles, laws and raw materials that suffice to explain radioactivity, continental drift, photosynthesis, reproduction, nutrition, and growth.²⁰

"The mind is somehow nothing but a physical phenomenon," he says (though the "somehow" opens like a chasm in his sentence), and goes on to describe the non-materialist view as "dualism." "Dualism," defined in this way, refers to the belief that an immaterial mind or soul exists as separable from the material world of the brain and the body. The immaterial mind is the self that registers the information provided by the brain and body. Dawkins defines the two views as dualist and monist: "A dualist acknowledges a fundamental distinction between matter and mind. A monist, in contrast, believes that mind is a manifestation of matter--material in a brain or perhaps a computer--and cannot exist apart from matter."²¹ "Monism" means that only the material world is acknowledged as real, and mind or consciousness is a construct of the physical and nothing else. "Selves and minds and even consciousness itself," Dennett says, "are biological products."²²

Dennett, in his refutation of dualist views, criticizes the vagueness of dualist statements (much like a Buddhist might) about a mind/self, felt intuitively by dualists to exist

outside of material conditions, without their offering direct proof. He observes that among scientists, "it is surely no accident that the few dualists to avow their views openly have all candidly and comfortably announced that they have no theory whatever of how the mind works--something, they insist, that is quite beyond human ken." He finds dualism to be an habitual assumption human beings widely share, but a tendency to regard the immaterial mind's mysterious nature as sacrosanct--an indescribable mystery that must be left that way--as wholly inadequate. The "fundamentally antiscientific stance of dualism is...it's most disqualifying feature....Given the way dualism wallows in mystery, *accepting dualism is giving up.*"²³

Representing the materialist/monist position, he argues, on the one hand, with the kind of common religious dogmatism that asserts the existence of a soul but offers only faith without direct proof, while, on the other, he criticizes cognitive scientists who avoid addressing the issue of mind altogether. He seems to feel that the immaterial must be somehow measurable in the same way the material can be measured. That would make the immaterial *material*, wouldn't it? By definition, the immaterial has no substance conventional instruments could measure, no matter how sophisticated they happen to be. What he doesn't consider is that if we're to explore and somehow "chart" the immaterial, it must be done subjectively and personally. (Neither does he consider the view that material and immaterial could be inseparable--the view of *non-duality*, which we'll discuss below.) What neuroscience can measure directly is brain activity, not thought itself.

Vajrayayāna mahāmudrā meditation provides a method of examination and direct inquiry into the ultimate nature of mind: Where are thoughts located? What are their sizes and dimensions? What are they made of, what materials? How much do they weigh? Where does a thought begin and a thought end? If you can't locate actual thoughts as physical objects, in what sense can they be considered physical? If someone subjectively reports experiencing a puzzled thought while electrical activity occurs in the neocortex, what demonstrates that this activity precedes thought rather than is a product of thought, or simultaneous with it? However elusive thought may be--and it can't be established as a physical object with identifiable physical dimensions, even on the level of mathematical probability--how much more so the subjective consciousness, the experiencer? What are the dimensions of that? Where precisely is it located? What's it made out of? Etc.

Cognitive science could potentially turn Buddhism on its head by demonstrating the

physical existence of a thought, as distinct from chemical and electrical brain processes. When it can establish material parameters to a thought, its dimensions in space, its physical composition, and so forth, then it will finally make good on the materialist operating assumption that the brain alone creates thoughts and their thinker, which are themselves purely material. The only other theoretical position on this in cognitive science regards the material processes of the brain as producing the immaterial level of thoughts and consciousness, but remains mired in the peculiar theoretical position that matter generates the immaterial, what they call “epiphenomena.”

If we assert that brain activity is identical to thought or emotion or any other subjective cognition, we are in effect *theorizing* that one is the other, ensconcing it in a convenience of *language*, thence establishing it as firm *belief*. This is not in any way established scientific fact. It’s an ideological position we’re not meant to question. As Wallace points out, we only know about the activities of consciousness subjectively, just as we only know about brain activity through objective measurement:

When instruments detect the brain and its various electrochemical functions, however, they do not detect mental events; and when we introspectively observe mental events, we do not detect the brain or its functions. Despite this problem, [the materialist] view might have some credibility if it entailed a clear understanding of the manner in which the brain or any other physical system produces consciousness and unconscious mental events. But in fact, modern neuroscience has no idea how the brain gives rise to the purported emergent property of consciousness. Proponents of this view frequently acknowledge this fact, but they call upon others to join them in their faith that such scientific knowledge will soon be forthcoming.²⁴

They have great faith that they can resolve this anomaly in their paradigm. We can connect the development of this view of cognitive science to the theory of evolution, which provides a parallel case of scientific belief adopting the view that life itself can be fully explained through mechanically charting the evolution of life-forms. In this model of planetary species arising from the single-celled, chemical soup up to the hyper complex “computer” of the human brain, the assumption follows easily that consciousness, such as it is, arises as a kind of symptom of biological evolution. It’s a product of the hard-wired struggle for survival. Science charts the evolution of genetic coping mechanisms developed to deal with the existential uncertainty of being somehow a sentient, embodied life-form on planet Earth. Since life and consciousness

are a result of long-term biological evolution, then they must be either a trick of material phenomena somehow producing animate, conscious materiality, an “emergent property,” or it is somehow an “epiphenomena,” something that arises with the right chemical combination in the cosmic soup.

Eric Chaisson, in his study of evolution, states this plainly, something almost universally accepted by scientists generally: “The central tenet of chemical evolution is straightforward enough: Life has evolved from non-life.”²⁵ Chaisson, an astro-physicist, approaches evolution not merely from an earthly perspective, but by going back to the origin of the universe itself, mapping the generation of matter from the Big Bang through the development of galaxies, stars, and planets, before arriving at the place where non-life turned into life. His angle and interest quite clearly are to measure the development of the physical properties of the universe and when he examines the issue of life appearing on Earth, his expectation is that it unfolds solely and directly from the available chemicals charged in some way with energy. He remarks the gap in evidence between a planet with only inanimate matter and the eventual appearance of living cells, neither discovered in nature nor demonstrated in the laboratory, even 36 years after he first published a major explication of this view in *Cosmic Dawn* (1981). Tellingly, he admits that “life itself is nearly impossible to define.”²⁶ That is, how can it truly be distinguished from inanimate form since it shares the same essential materials and engages in similar chemical functions?

A careful examination of even the most rudimentary life-form finds something dynamic, creative, and hard to fathom that doesn’t fit well into the purely material explanation forced upon it. Ron Frost:

Life is an emergent property. We all know that life forms are made up of a series of complex organic chemical compounds. However, even the simplest bacterium in a drop of swamp water is much more than merely the sum of all the proteins and organic compounds from which it is made. It is alive. It has the ability to obtain nutrients from its surroundings and to extract energy from them by way of metabolism. In addition, it is able to reproduce (almost) exact copies of itself. These properties that we consider to be characteristic of life can, therefore, also be considered emergent properties. This is the reason why the question of how life began is so intractable. Scientists can model the processes that may lead to the formation of life, but so far, duplicating the emergent property of life has been elusive

Chaisson's major distinguishment of life from non-organic materials rests in its "complexity": "Cells...are the simplest forms of life. However, they are vastly more complex than the simplest forms of matter--elementary particles within atoms."²⁷ Life evolved all the way up to the human brain, "the most complex clump of matter known....The ultimate extent to which matter has evolved in the *known* Universe."²⁸ The human brain, in his view, would seem to be the universe's shining achievement, albeit an accidental one produced by the random mechanics taking place in earthly evolution. As far as human life goes, the brain is absolutely determinative. "The body's nervous system, of which the brain is the paramount part, controls all mental and physical activity. In fact, every thought, feeling, or action begins in the brain. All human behavior is controlled by it."²⁹ Wallace notes how Chaisson skips the arising of consciousness in animals entirely, though it would have to prefigure the arising of consciousness in humans: "The stupendous, cosmic event--the birth of consciousness --unfortunately slips by unnoticed in Chaisson's account of the universe. The subject is never addressed, and consciousness is vaguely attributed to a certain 'complexity' of configurations of matter and energy."³⁰

While Chaisson sees energy as basic to materiality and life, he finds nothing special in the *energy of life*: "Life likely differs from the rest of clumped matter only in degree, not in kind. We admit no vitalism, no special life force that would set animate beings manifestly apart from all other forms of inanimate complexity."³¹ He describes how living organisms dynamically maintain organized systems of energy that resist entropic dissipation into the universal mean (as accords the second law of thermodynamics). When the dynamic maintenance of energy comes to a halt--"the 'static' steady state known as death"--the organism's order and energy succumbs to complete entropy.³² This demonstrates the laws of physics but fails to recognize anything more to life than it systemically falls into disorganization. Does it seem beyond the pale to consider life-force vitality as what held the system together to begin with and made it *life*? Would it not cease to be *life* once life-force energy exits the system? He concludes, ever confident in the truth established by scientific measurement, "Life does seem to be a truly wondrous phenomenon even if, in our modern day and age, largely devoid of mystery."³³

So life, the animating spirit, and the subjective consciousness easily get reduced in these disciplines to the merely mechanical ("largely devoid of mystery"), while at the same time the commentators ask us to look no further than the materialist paradigm that

shapes scientific investigations. Like physics and evolutionary biology, neuroscience studies a physical, measurable aspect of human life, and scientists like Dennett and Chaisson seem to have developed an expectation that it will eventually measure it so thoroughly it will establish a fixed, objective truth, in this case of human consciousness. Nevertheless, there's no way to physically extract subjectivity and conclusively measure all its dimensions, nor, for that matter, a way to wholly obviate the scientist's own subjectivity from the process of examination. Since subjective consciousness can't directly be measured and delineated by these methodologies, neither can its potentialities and deeper vistas be explored. Since they have no way to get at the supposed materiality of what they're studying, they must use secondary, *subjective* reportage of people's thoughts and perceptions. This is the only method that makes thoughts available for study.

Recently, neuroscience studies of the effect of meditation on the brain have gotten a lot of press. Bernard Faure, examining the evidence so far and finding it inconclusive, points out basic disjunctions between scientific and Buddhist interests. "While mental states achieved by meditators may be interesting for neuroscience (as are all unusual psychological phenomena, such as, say, autism) their soteriological context--liberation from samsara, pursuing the bodhisattva path, and so forth--which is to say, the kind of context that matters most to Buddhists--is deemed irrelevant by scientists."³⁴ One can learn a lot about the brain by focusing tightly on its functions, but does this necessarily tell us so much about human life or even consciousness? Even the Dalai Lama, who has had a lifelong interest in science and in neuroscience studies of meditation and the brain, observed, as Faure reports, that "enlightened states of mind may not have a neural signature or neural correlates, and it would therefore be a waste of time to search for the 'Buddha-spot' in the brain." Faure observes, "This view flies in the face of basic neuroscientific beliefs about the physical closure of the world, according to which there can be no mental event without a neural correlate."³⁵

Thinley Norbu Rinpoche, in regard to searching for the wisdom mind with scientific instruments, states, "However good and reliable technology may be, since it is inert compounded substance, it cannot know the true nature of mind. If it does not know the true nature of mind, it will not become the qualities of enlightenment."³⁶ Scientific investigation, based on technological measurement, can't directly contact or reify or experience the mind's wisdom qualities, which exist beyond material conditions, but they can be contacted and known directly by human beings through in depth, subjective knowledge of themselves.

While it's apparently tempting for some Buddhists to adopt the view that the brain is the mind, accepting that meditation works to harmonize its various segments while rejecting the aspects of Buddhism that don't fit the materialist paradigm as "religious mythology," we lose something essential, as Buddhists or simply as human beings. Wallace:

The reduction of the mind to the brain is scientifically unjustified and pragmatically disastrous. What are the effects of conceiving all our emotions, hopes, ideas, and perceptions--indeed our very personal identity--as coemergent properties of chemicals and electrical circuitry? By adopting such a view, people may feel that the source of all psychological afflictions lies fundamentally in the neural system. As a result, they may reasonably seek only material remedies for such problems, such as drugs and tranquilizers. Similarly, issues of a spiritual nature dealing with fundamental questions of our existence are also reduced to physics and chemistry, closing the door on any truly spiritual quest for truth and personal fulfillment. We have paid a severe price for the materialist ideal of reducing life and mind to matter, and we have received very little in return.³⁶

It's this nihilistic model of humanity that so vexes fundamentalist Christians, but it stands as a crucial intellectual blockage to spirituality in general, while it now implicitly occupies and shapes our social and cultural vision. Hayward concisely sums up the many ills embracing the distortions of scientific materialism have visited upon us:

We live as if our bodies were isolated objects; therefore, we lose our health-giving connection to the earth. We live as if we existed in dead, empty space; therefore, all our energy and insight come from within, and we constantly feel overcome with anxiety lest our energy run out. We live as if time did indeed flow from past to future; therefore, we do not rest in the moment at all. We live as if our minds were located somewhere in our bodies and arose from them; therefore, we fear death as terrible extinction. We live as if we were observers in a world of objects which are unchanging from moment to moment and which we perceive as a camera takes a photograph; therefore, we never really look, listen, taste, smell, touch. We live as if our bodies, emotions, and environment obeyed mechanical laws which we can only go along with or struggle against futilely, as if there were no way we could open beyond this;

therefore, there is no point in training except for survival or entertainment. Our perception becomes reduced, we live as if our conditioned beliefs were the only truth, and we feel the notion of unconditioned goodness as a threat to our sanity.³⁷

And therefore, personally, individually, we find ourselves unconsciously trapped, not by *science itself*, but by its *dogmatic outgrowth* that constricts us in what it means to be human. In relation to the Shambhalian view and practice, scientific materialism offers no believable ground for the basic goodness of humans, nor the primordial goodness of the universe. Its theology narrows and blocks the full array of perceptual dimensions available to human beings. Thinley Norbu:

Buddhism distinguishes between compounded phenomena and the un-compounded. Compounded phenomena arise from root and contributing circumstances gathered within substance, whereas the un-compounded is not gathered within substance and therefore does not appear as ordinary material phenomena. Nihilists only believe in the compounded phenomena of circumstances they can perceive, and think that the un-compounded that is not gathered within substance is non-existent. There is no expectation to see or believe in anything beyond the compounded. In Buddhism, even though the un-compounded is not seen by those with obscured senses, any phenomena can potentially arise whenever root and contributing circumstances meet, which can appear in the mind and also to the senses. Phenomena cannot be limited by imposing the idea that something cannot exist. Belief in what is beyond obvious substantial existence is spiritual, and causes spiritual phenomena to become apparent.³⁸

The exclusive focus on “compounded,” i.e., *material* phenomena automatically narrows the potential for seeing beyond it. Thinley Norbu makes the point here that not only are phenomena not limited to material substance, the willingness to *believe* so becomes a channel for direct perception of other kinds.

Terma in Tibetan or “treasure” signifies in Tibetan Buddhism dharma teachings intended as spiritual potency to stimulate awakening most especially for the time and place they appear. Chögyam Trungpa’s terma cycle of Shambhala teachings—arriving at this juncture in human history as a spiritual antidote to the afflictions of modernity—features several principles of inherent human potential as key medicine for what ails us,

particularly basic goodness, windhorse, drala, and sacred outlook. *Basic goodness*, the unconditional sanity, compassion, and wisdom of human beings, manifests in daily experience but exists innately and irreducibly at a level much subtler than the physical body or even manifestations of mental consciousness. It stands in contrast to the reductive nihilism that sees human beings essentially as machinery. *Windhorse* is the powerful, awake, expressive energy of this baseline of being, usable and necessary in daily living situations; science, mired in a purely biological view of ontology, would not recognize its existence, much less know how to access it. *Drala* is the divine or transcendent energy of both the phenomenal and trans-material worlds; since it can't be measured it can't be acknowledged, yet it is in the modern world a great untapped power of auspiciousness and interdependence, capable of healing both environment and psyche. *Sacred outlook* means perception liberated from the dualism of imposed subject and object, that sees the brilliance of reality in all its many dimensions, outer and inner, freeing us from the depreciatory, dulling entrapment of materialist society.

Hence scientific materialism in its view of the human and the universe creates conceptual and therefore emotional blockages to the conduits of these liberating principles, effectively cutting us off from or at least clouding over various aspects of ourselves and the phenomenal world that are part of its magic, part of its healing, and part of its revelation of what it means to be human.

5. *The Terror of Ghosts and a Supplication for the Dralas to Reappear*

A purely material world that functions as the only reality of human beings isn't the one we actually live within, it's just the one we're taught to *believe* in. Subjective human perception has the ability to see dimensions beyond the physical world and evidence only available to one's immediate physical senses. Here are a couple of routine examples normally filtered out by the materialist paradigm.

Of all the human cultures on Earth for thousands of years that we know of, only scientized modernity has rejected the existence of the spirit world. We can find accounts of spirits, demons, and gods across the board. Though if we can't measure a ghost, it must not exist (even as the crew of the TV show *Ghost Hunters* still manages to produce data arguing for them), yet consider what the appearance of just one ghost might mean. Since the materialist view can only countenance consciousness as generated and wholly dependent on biology for its existence, if a body dies the consciousness must necessarily

disappear with it. It has no basis whatsoever to exist without the body, according to this logic. But it's not unusual for people to report seeing ghosts, and even if we discount some of this as purely excited imaginations, there exist many accounts of people who see someone "that couldn't be there." For example, images of people appear in the dress of another time, who seem vividly present but then pass through a wall. Sometimes the witness later locates an old photo of someone who died in the house who looks the same as the apparition.

The answer to this from the scientific ideological perspective inevitably questions the reliability of the subjective perception. "You must be hallucinating or imagining or dreaming." That, to my mind, is not a "scientific" reaction, even if it superficially resembles scientific skepticism. It seems more like forcing a tightly held belief onto someone else's perception than an objective investigation. If we allow for a moment that the person really did see a ghost, with no reason to reasonably doubt what happened, then the whole basis of consciousness as an invention of the brain collapses because consciousness isn't supposed to exist immaterially apart from the body—and then the whole spirit world comes crashing back into conjunction with the physical one because we've removed the belief that kept them separate.

To take another simple, ordinary example that undermines the materialist paradigm, a woman suddenly has the strongest, most overwhelming feeling that something bad has happened to her father, and a few minutes later her phone rings with the news that he's had a heart attack in his home on the other side of the country--a very common moment of intuition, not in any way explainable by consciousness being bound within one's physical being. It would take mind not limited to the material level to feel something not located in immediate physical consciousness, just as atomic particles can affect each other across vast amounts of space, farther than light can reach to connect them.

I'm using these everyday examples to point to how the world we live in now and the bodies and minds we currently inhabit don't necessarily go along with the materialist paradigm. The disjunctions between materialist beliefs and personal, subjective experience indicate both materialism's essential fragility as "truth" in our lives, and the availability of dimensions (the spirit world) or powers (intuition, not only rationality) that could inform our act of living. Just as we can be trained into scientific methods and all their rigors of discernment and the powers of technological tools, we can also be trained to develop our intuition, our healing powers, our windhorse, and our wisdom. Just as there are scientific methodologies for great (magical?) abilities to manipulate the

external world, there are spiritual methodologies—ritual, mantra, visualization, devotional expressions, subtle body practices, as well as the use and manipulation of material properties, and many other modalities—that can be learned by applied effort. Methods exist to take advantage of the potentials of the greater subjective mind, ones that might even go beyond what we ordinarily take to be subjective and objective, into *magical* enactments of physical and spiritual transformations.

Of course, I don't need to argue this point with Buddhists, or do I? For Western Buddhists aren't immune to scientific materialism, and it's not unusual that some don't accept things that define the Buddhist view, like rebirth, the pervasive force of karma, the spirit world, the dimension of deities, the possibility of *siddhis*. Along this line, there's some interest among western Buddhists for a Buddhism that's stripped of its uncompounded, immaterial elements in favor of a kind that fits well into an acceptable materialist format. A philosophy professor at Duke, Owen Flanagan, an unapologetic promoter of scientific materialism (what he calls "naturalism"), published *The Bodhisattva's Brain: Buddhism Naturalized* (2011) to accomplish this synthesis of Buddhism into the materialist view.

"Some parts of Buddhism," he's quick to tell us, "are superstitious nonsense."³⁹ He would like to "subtract" from it "the hocus pocus about rebirth and karma, and the bodhisattvas flying on lotus leaves, and Buddha worlds, and nonphysical states of mind, and deities...and heaven and hell realms, and oracles, and lamas who are reincarnations of lamas..."⁴⁰ One thing he does find quite agreeable with scientism is the Buddhist deconstruction of self as no more than impermanent, component parts, which dovetails with the view that self is a construction of the impermanent, component parts of the brain. He spends much of his work on the principle of virtuous action, primarily focused on the idea that the cause and effect of virtuous action in daily life can be observed and understood, with the potential at least for a life with happiness. He pays some lip-service to the utility of meditation at the end.

And, in truth, if one excluded the "hocus pocus" of Buddhism and focused on a view of selflessness, engaging in virtuous action, and practicing mindfulness, there would certainly be positive outcomes, just as understood within Buddhism. (It can accommodate this as an adaptation of the teachings to the constrictions imposed by modern culture.) Flanagan excludes the potential of any further dimensions of reality or of the higher wisdoms and powers of enlightenment because things of this nature are "epistemically unwarranted beliefs."⁴¹

Believing such things within Buddhism isn't an automatic given in any case, but examining them is part of the practitioner's inquiry into scriptural dharma and its veracity, and into personal experience. So even within the seemingly closed field of Buddhist religious dogma, a Buddhist path and life has to participate in rigorous inquiry. It's a necessary part of evolving one's spiritual health, one meant ultimately to go beyond belief into direct experience. Subjective belief, even when based in Buddhism, has its limitations, while reality or dharma or truth, based on the definitions provided by the Buddha, has no such fixed boundaries.

Flanagan pays virtually no attention to the discoveries of meditation, whose states of mental experience Buddhist texts chart with extraordinary subtlety and considerable detail. It's primarily through this methodology that other worlds, other lives, spiritual beings, and so on become seen. If we can stop and imagine for a moment something like the ideal "naturalized" Buddhist, selflessly practicing virtue and mindfulness, how does Mr. Flanagan know that he or she might not eventually start seeing "bodhisattvas flying on lotus leaves," thanks to the resultant purification effected on their subjective perception?

Science has discovered through its own methods certain understandings that Buddhism shares, like the interdependence of perceiver and perceived or the interdependent web of a biosphere, even that the apparent forms of the universe are more space than they are form. Buddhism and science overlap mainly in their mutual interest to get beyond received opinion--or investment in any agenda--to ascertain things as they are. Science uses various instruments to empirically determine relations among material objects, while Buddhists use their minds to experience the unseen world. Buddhism relies on lived personal experience as maintained through lineage and its transmission of spiritual disciplines to come to reliable truth that's free of bias. It endeavors to penetrate reality in ways that science has no methodology for but that an individual can come to know directly and personally.

At this point, global spiritual wisdom traditions have been weakened, outright destroyed, or shaken to their foundations for a number of reasons (some of their own making), not the least being their displacement as organs and purveyors of truth. In a world where we can't recognize that this truth actually does still reside in human beings who can use it skillfully to address our problems, scientism grows a demonic shadow that obscures what might most help us.

In a good example of how the materialist view becomes pragmatically limiting, the current trend among psychiatrists to interpret their primary role in healing mental suffering as dispensing psychoactive drugs to control symptoms of neuroses creates--despite whatever its utility might be--an over reliance on pharmaceuticals that spells a dead end to any genuine healing of the psyche, now reduced to brain chemistry. From a holistic or Shambhalian view of health, one must first be able to accept that goodness exists in people, in the healer and the one being healed, before it can be seen and cultivated in the person who needs healing. This was Chögyam Trungpa's over-riding message, proclaimed like a drumbeat by his spiritual successor Mipham Rinpoche in recent years. Cultivating basic goodness as experiential ground means that a person has value, to him- or herself and to others. That kind of respect and awareness enables a lot of further opening. Developing basic goodness comes out of meditative techniques where people can start to feel settled in their bodies and in their world, feeling good in themselves just being.

The expression of basic goodness, windhorse or *lungta* in Tibetan, can be understood from the angle of subtle energy that arises from a consciousness loosened up from grasping and fixation onto concepts and is liberated into its own natively joyous life-force. The person's aspect can brighten and radiate, and the energy can carry him or her forward even into difficult challenges. There are many ways to raise windhorse, from singing to yoga to simply talking honestly. The point here is to know what it is and how to spark it. From another angle, windhorse relates to subtle energy in the "subtle body," of the kind cultivated and fully apparent to Chinese and Ayurvedic medicine practitioners, and to many kinds of yogic systems, but largely evading the observation of normative Western medicine. Recognizing where the energy's stuck that's producing the symptoms of psychological and physical illness, and then encouraging it to move into harmony with the person's total system, heals in a causative rather than purely symptomatic way.

Crucial to Chögyam Trungpa's vision of healing society and the Earth at large is reintroduction to the subtle energy that circulates through phenomena, abiding within landscapes, trees, bodies of water, and the elements themselves, called *drala*. Drala abides as well in the human body at a subtle level, and in the sphere of space beyond material form. It's an awake energy that if invited, shines forth from the environment, from a person, from mind itself. To the ancients, this appeared in the form of gods, personifications of awake energy; we understand it here to have that visionary potential

on the relative plane through an appearance of beings at a subtle or celestial level, expressing the underlying brilliance of reality itself. The dralas are invited to appear through ritual and mantra, art, geomancy, and architecture, but most of all through human conduct that's in tune with basic goodness and uplifted by windhorse. Drala is experienced through the luminous nature of the senses, the infamous "material" world, here understood more as forms of energy interdependent with human consciousness --more like physics might see it if it had some personal way to look that wasn't purely calculating numbers--called the "sacred world." Experiencing sacred world means spirit or wisdom is directly felt and immanent, and the human being, re-harmonized into its web of interdependence, becomes a medium of vision into its endless wonder and infinite splendor.

6. *Joining Science and Spirit*

In his book on the debate about evolution between Creationists and science, Frost states that "the basis of the Creationists' opposition to evolution ultimately derives from their experience that we are surrounded by a loving presence and this experience gives an ultimate purpose to life. Unfortunately, there appears to be no room for this experience in the materialistic view espoused by many scientists."³⁸ Karen Armstrong, in her historical study of religious fundamentalism, argues that Christian fundamentalism itself arose in the 19th century as a reaction to science, with Protestant theologians interpreting the Bible in an "impartial and scientific" way, imitating the scientific approach by looking to establish a literal, clear, unequivocal meaning to the Bible's heretofore figurative and symbolically layered language. A theology chair at Princeton "insisted" that "the theologian's task was not to look for meaning *beyond* the words...but simply to arrange the clear teachings of scripture into general truths. Every word of the Bible was divinely inspired and must be taken seriously; it should not be distorted by allegorical or symbolic exegesis." They were responding to a world overwhelmed by science and its literalistic, one-to-one measurements that were stripping society of its religious moorings. "This lust for certainty," she writes, "was an attempt to fill the void that lurked at the heart of the modern experience, the God-shaped hole in the consciousness of wholly rational human beings."³⁹

Remarkably, then, Christian fundamentalism came about as a shadow of science, struggling to assert the value of religious observance and the meaningfulness of its principles in the face of a tide that was sweeping away its place in society. It's a

struggle that fundamentalist Christians continue to pursue in the 21st century with energetic desperation, as if battling an implacable foe.

In his TV series on the evolution of science and its exploration of the universe called *Cosmos: A Spacetime Odyssey* (2014),⁴⁰ Neil deGrasse Tyson engages what can be so wonderful about science: how it can show us our world anew, the wonder of its vastness in the arc of time or the surprising intricacies of life-forms and phenomena. His appreciation for its unfolding of understandings and its accomplishments of detail and breadth invokes what an adventure science can be. In the opening episode, he examines the 16th century case of Giordano Bruno, a mathematician and hermeticist who in a dream had a vision of the universe that saw our world as heliocentric--the Earth revolving the sun rather than vice versa--and beyond this, a universe of many suns orbited by other planets, spreading out endlessly through space. Bruno commented, "The revelation of this immensity was like falling in love." For this he earned a great deal of derision from contemporary scholars and eight years of prison, torture, and persecution trials by the Catholic Church. Extraordinarily, he stood up to this and maintained with unwavering conviction that his vision was true, with the inspiration that God sent him a vision so that he could know the full glory of God was indeed limitless, and that it was his duty to share this with others so that they could understand this truth for themselves. Finally, in the only way they could truly shut him up, they incinerated all his books and burned him at the stake.

Tyson comments that Bruno had made "a lucky guess" about the universe, describing what would soon become and remains scientific fact. Since Bruno couldn't, as Galileo did, provide unequivocal data for the heliocentric Earth, Tyson regards his mystic vision--that filled him with so much certainty he stuck by it under intolerable pressure and then died for it--as a "lucky guess" and not genuine knowledge.

It does humanity and the Earth no good at this point if we're oppressed by theology on one side and scientism on the other. While science embodies a profound set of skills and many tremendous fields of knowledge, where our species has shined, if we proceed in a way that doesn't acknowledge human interdependence with the natural world, the unified field of subject and object, and the power and possibilities of mind often elided by materialism, we will have no way to regain balance in the face of the many coming environmental and social convulsions.

In their book *Sacred World*, Jeremy and Karen Hayward cite a Huichol shaman, Don José

Matsuwa, who came to drought-ridden California and performed a successful ceremony to bring rain. He later described the various natural disasters occurring, like droughts and floods, saying, "There is a reason for this misfortune, for you have not been doing ceremonies, gathering together, thanking the earth, the gods, the sun, the sea for your lives." There's nothing whatsoever in this statement a scientific materialist can get behind. There's not the slightest scientific basis for this to make any difference whatsoever, but then again, there's no scientific way to generate rain in a drought either. He goes on to say, "I see that many people here are so caught up in their own little lives that they are not getting their love up to the sun, out to the ocean and into the earth. When you do ceremonies, sending out your love in the five directions--the north, the south, the east, the west, and the center--brings life force to you. That love brings rain."⁴¹

Ceremonial observance and the expression of love for the world has no place in scientific "fact," seemingly, but it may have a very real, practical result in our increasingly exacerbated planetary ecosystem. This view only makes sense when we can put aside the narrowness of our subjectivity--caught up in our own little lives--to see the interdependence between subject and object, and that the external world isn't really external, nor is it merely a random display of dead objects. Quite the opposite: even aspects of reality that seem the most far away, the most inhuman and untouchable, like the sun, are unavoidably part of who we are and reflections of our field of awareness, empathy, and gratitude--something present we have to wake up to, not something we're sentimentally fabricating on blind mythological belief.

Certainly many scientists aren't in any way as limited in their thinking as the paradigm in this discussion suggests. Still, one can find many examples anecdotally. Recently I was at our local courthouse for jury selection for a child pornography trial. When asked if he could be objective about the case they were trying, a man who identified himself as a scientist replied, "I'm not religious, so I can be objective." Bias, in his view, belongs to religious people, while objectivity belongs to scientists. What's more important is that the paradigm here goes well beyond the beliefs of individual scientists and modern philosophers to pervading our culture at large, reinforced and championed in many ways by popular media, that holds humanity back from a much deeper appreciation of reality, and it often exerts an unexamined influence. Sheldrake notes, "Many scientists are unaware that materialism is an assumption; they simply think of it as science, or the scientific view of reality, or the scientific world-view. They are not actually taught about it, or given a chance to discuss it. They absorb it by a kind of

intellectual osmosis.”⁴² I have no desire here to abandon science or somehow exclude it from dharma. We, in fact, need science and its powerful array of tools to help understand and cope with our world, for the sake of humanity, and for the sake of its animal and plant life, its arctic poles, its seas, our food sources, and many, many other things. What needs to come about is an overthrow of its ideological dominance accompanied by a re-envisioning of its place within knowledge and its relationship to reality.

If, as a planetary culture and society, we no longer operated in the thrall of materialist assumptions, we could regain some balance we’ve lost as a global species. The Shambhalian principles I’ve discussed have no presence or validity in scientific materialism, but if we ease its tight strictures, then the goodness and wisdom of human beings becomes part of the equation. This, more than any other view, can function as a binding and communalizing factor for the ever-fractional global population. It also indicates the power of the much minimized human spirit or subjective consciousness, which is a gateway to healing, sanity, and greater vision. The problem humans have within themselves is the problem they have with the each other and the planet, so cultivating this wisdom in them is of utmost importance. By the same token, scientists need to accept that their own subjective consciousness comes into play even in their scientific work, and that needs the same kinds of refinement. We can’t merely hope for the externalized panacea that both materialism and theistic religion like to dangle before us. As much as we might need to develop, say, alternative forms of energy, we also need alternative views of ourselves and ways of relating to one another that only come about through internal spiritual work. The myopic qualities of materialist culture that degrade the natural world reflect the same myopia we have towards our own minds and how they work.

If we regard rites and ceremonies meant to induce sacredness and cultivate relationships with trans-material energies as purely “superstitious ritual,” while viewing science as providing us with the only truth and practical action we can take, we’re simply cutting ourselves off from the sacred and from our birthright as spiritual beings. Opening to this further dimension aids and transforms our lives; regarding it as purely fictional, based on methods that have no way to acknowledge or relate with it, merely deadens and weakens us. If we can’t appreciate the goodness and oneness of our senses as we rush toward the next thing we’re supposed to acquire, regarding this planet as an externalized collection of dead objects, then we’ve killed the planet in our minds in advance of actually killing it with materialist pursuits.

Scientific materialism has provided a persuasive basis to excuse capitalist excesses, social Darwinism and its class oppressions, and the debasements of consumerist culture. While it would be quite enough to break through this belief system and remove the cover it supplies to social aggression, we could look back passed the Cartesian divorce between the spiritual and material—where the spiritual was pushed aside and eventually eradicated from “reality” by the “material-only” view—to the example of alchemy where to investigate and work with the outer, natural world reflected working with the inner, spiritual one, and vice versa. Science could be as much of a spiritual path as any other discipline if approached that way. Scientific discovery could be seen within a much larger, resonating context of mental and physical interdependence.

Science can operate out of a sense of innate human goodness that’s empathetically connected to what’s being studied, more conscious of the limitations of scientific methodology for illuminating the full spectrum of knowledge, and more open to the play of mind and the non-material as further dimensions of phenomena and its activities. While science as a collection of methods has to be data-driven, the narrowness of its epistemology no longer has to determine “reality” as such. Then the crucial basis for scientific materialism gets uprooted, while the interdependence of perceiver and perceived becomes established and sympathetically explored.

Therefore science can shift to a more non-dual view of phenomena, and help us see that we participate in creating the world we’re in. We’re not just accidents of it; we’re active agents in the reality we perceive, and that reality’s not merely an exterior world of inanimate objects subject to whatever technologies we can craft to exploit it. It’s reflecting back to us our own awakened wisdom, if only we had the eyes to see it. We gain those eyes by exploring and purifying subjective cognition, by revitalizing and using subtle energy, and engaging with the magical properties and potential for auspiciousness of mind, body, and environment. Science has proven it can do tremendous things based on its studies of the natural world, but it doesn’t function as the only genuine arbiter of truth, and that discovery of truth remains very much in our hands as individuals. Whether we have a scientific education or not, we could be empowered to engage other dimensions of ourselves and our world and make use of them. Scientific methods could be re-envisioned as means of uncovering sacred outlook, seeing scientific discoveries as attunements in the greater field of sacredness, ways of harmonizing humanity with heaven and earth. Instead of feeding into the materialist view that traps us in fixed theory and walls us off from the total ambit of reality as it is, scientific exploration could fulfill its potential to act as a fluid tool of universal

connection.

7. *The Unified Field & Its Manifest Brilliance*

Science can be contained within Buddhist theory, but Buddhism cannot fit within scientific explanations, because Buddhism explains both physical and metaphysical phenomena....All theories of physical phenomena are conceptions created by mind, but nihilists generally depend on substance as though it had a separate existence apart from mind, whereas Buddhist metaphysical theories do not consider substance as existing apart from mind.

--Thinley Norbu Rinpoche⁴³

Within Buddhism, the teaching that most actively embraces and employs science is the *Kalachakra Tantra*, the *Wheel of Time*⁴³ (and, further, it's the ultimate source of teachings on Shambhala). The *Wheel of Time* is a tantra unique in its extensive employment of mathematics. Vesna Wallace, in her study of it, finds "disciplines analogous to cosmology, astronomy, astrometry, chronometry, embryology, physiology, psycho-physiology, anatomy, medical therapeutics, pharmacology, alchemy, botany, psychology, and philosophy [which] are either directly or indirectly incorporated into the *Kalacakra Tantra*."⁴⁴ These would be "scientific" in a medieval Indian sense, of course, but understanding the Kalachakra's vision, we don't have to regard even its science as some kind of glued in place thing, but as various skillful methods of relating to the human body and mind, to the environment, and to the universe at large. Its interest is to bind together as many fields of knowledge and levels of human perception as it can into an all-encompassing fabric of awakening. But its core, its essential understanding of reality, abides as the unity of emptiness and clear light. Therefore, the modes of expressing that and the methods of exploring the universe need not be affixed to one time and place, nor really to have any limitation at all. It sees the multitude of inner characteristics of a human body and mind and the outer characteristics of the phenomenal universe as reflections of one another, with one's bodily, social, and spiritual activities aimed at aligning the inner and outer, subjective and objective, into a total field of harmony. There's no reason to feel, within the epic arena of the *Kalachakra*, that its previous methods and understandings can't evolve, or that further ones can't be brought into its vast, inclusive vision. It's almost eerily modern in its myriad areas of knowledge and *timely* in its syncretic effort to join human experience at all levels to a fully awakened universe.

Einstein, whose *raison d'être* was discovering the unified field, couldn't find it because he sought it in form. Physics as a discipline has come right up to the soluble boundary between form and space to watch form go wobbly, mercurial, and indistinct. It's taken the objective universe as far as analysis, high-form mathematics, and the most sophisticated instruments of measurement possibly can, only to puncture the conceptual canard of perfect objectivity and be brought into the much more accurate realm of subject-object interdependence. It's here that Nagarjuna⁴⁵, called "the second Buddha" by the mahāyāna tradition, established the emptiness of them both, as well as any other variations of beliefs about reality one might cling to, using the devastating tool of unwavering rationality. It was a tool intended to so thoroughly strip away theories held by the subjective consciousness about "reality," that only "reality" itself would remain: the empty nature of all phenomena, characteristics, views, states, or whatever else we premise as solid, objective, and innately existent. Not seeing the emptiness of subject and object, Einstein missed the unifying principle of the field of reality: *shunyata*⁴⁶. In the higher Buddhist tantras, the *direct experience* of the unity of all phenomena is called "one taste," and it's accessed through yogic means developed in order to tune one ever more finely to the intrinsically empty nature of the utterly limitless displays of phenomena.

Phenomena arise because the voidness of reality is imbued with luminosity or clear light. This means that there's an active display of perceptions, an on-going energetic dynamic arising from space that's so overwhelming, so confounding and vast, that the mind normally becomes overpowered and fixated on the display, in its confusion seeing its own luminous nature as *other* as a way to affirm a fixed self. It's in this sense that the skillful means of the vajrayana gives birth to deities and their visualizations as a way to realign the mind with its inherent wisdom: that there's a basic space, an open, unconditional, empty ground of phenomena, and the luminosity that arises from that is the brilliant, ungraspable nature of that space, an infinite expression of its wisdom.

So the vajryāna trains its practitioners to recognize emptiness, the luminous form arising from it, and their unity, accomplished by meditating on emptiness, visualizing body and mind arising as a deity that's the clear light expression of wisdom, and then the eventual reabsorption into emptiness of that form. In the iconography of the higher tantras, as a way to enable the practitioner to overcome epic obstacles of afflictive emotions, frozen misconceptions, and profoundly deep-rooted grasping to egotism, varjayāna placed furious-looking wrathful buddhas poised on top of corpses

representing the very things they have to conquer. Usually these are the corpses of gods, symbolizing the most powerful principles of worldliness and ego, and those gods can represent the “extremes” of samsara and nirvana, or eternalism and nihilism, and any other dualistic clinging to materialism.

If the reader will permit me some improvisational iconography, I’ll propose a tantric deity to facilitate envisionment of enlightened science. Imagine a heruka—a powerful, wrathful, masculine deity glaring with fangs and waving weapons—because he’s going to have to overcome a lot of stubborn misconceptions. He’s the blue of the vajra buddha family, since science seems very much aligned with its energy of cool intellect, and the vajra family’s mirror-like wisdom embodies the perfect objectivity that science seeks, reflecting with complete, unbiased accuracy what’s there and what is not. He stands on the corpse of a robot, representing the attempt to reduce reality to the mechanistic level, and a second cyborg corpse, symbolizing the invasion and subjugation of the human by the inanimate and technological. Appropriately, he’s an emanation of Mañjushrī, who embodies *prajñā* or superior knowledge. Thus our heruka, like Mañjushrī, raises a blazing sword of *prajñā* illuminating not just what is true and what is false, but non-dual reality itself, and cutting away any distortions. He has many arms to hold symbols of the major skillful means of science. For instance, in one hand he holds a medicinal plant representing medical science; in another, the old image of the atom (even if it is antiquated and obsolete), a nucleus orbited by particles to symbolize physics; an animal like a deer kneeling on a lotus representing biology; a star symbolizing astronomy; and so on. He also needs some countervailing arms holding up symbols of powers or principles science won’t normally acknowledge, that are accessible immaterial principles within an individual, like a flame symbolizing the heat of the subtle body, a vajra scepter representing the skillfulness of love, a lasso for binding the outer and inner worlds, as well as samsara and nirvana into a unified field.

He possesses a third eye in his forehead to represent seeing subtle energy, the spirit world, divine realms, and any other aspect of reality that science can’t measure or doesn’t acknowledge. In good tantric fashion, he copulates with a dakini, a wrathful female buddha, to show the unity of all phenomena with emptiness, and further, that this unity is ecstatic! He’s the potent force of egolessness expressing the many skillful means of science and knowledge, and stamping beneath his feet, utterly conquering the materialism that would obscure the full brilliance of the mind and subjugate science to ego. That’s the spirit of Buddhist tantra--vigorous, alive, illuminating, using whatever energies arise--positive or negative--as the expressions of wisdom, fearless in applying

them for compassionate ends.

NOTES

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 3. White, Curtis. "The Science Delusion: An Interview with Cultural Critic Curtis White." Linda Heuman, ed. 6/30/2014. 2 of 17.
<http://www.tricycle.com/feature/science-delusion>
 4. Wallace, B. Alan. *Choosing Reality: A Buddhist View of Physics and the Mind*. Ithaca: Snow Lion, 1996.
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 7. Deism was a transitional view between the ebbing influence of Christianity and the rise of science and Enlightenment era thinkers extent in the 17th-18th centuries. Deists saw God as the first cause of the universe, setting it in motion like a smoothly running machine--along the lines of Newtonian physics that understood the universe as a perfectly balanced, rational construction--and then stepping back from His work to leave it humming along in its own sublime symmetry. Humans couldn't know what took place on God's part, but they could now, thanks to science, study and understand the natural world to appreciate the perfection of His design.
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 16. Kuhn, Thomas S. *The Structure of Scientific Revolutions*. Chicago: University of Chicago, 2012, 90.
 17. Ibid., 99.
 18. Ibid., 79.
 19. Ibid., 136.
 20. Ibid., 139-40.
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20. Dennett, Daniel C. *Consciousness Explained*. Boston: Little, Brown and Company, 1991, 33.

21. Dawkins, Richard. *The God Delusion*. Boston: Houghton-Mifflin, 2006, 179-80.

22. Dennett, Daniel C. *Consciousness Explained*. Boston: Little, Brown and Company, 1991, 421.

23. Ibid., 37.

24. Wallace, B. Alan. *Choosing Reality: A Buddhist View of Physics and the Mind*. Ithaca: Snow Lion, 1996, 174.

25. Chaisson, Eric. *Cosmic Dawn: The Origins of Matter and Life*. New York: Berkely Books, 1984, 168.

26. Ibid., 165.

27. Ibid., 151.

28. Ibid., 200.

29. Ibid., 199.

30. Wallace, B. Alan. *Choosing Reality: A Buddhist View of Physics and the Mind*. Ithaca: Snow Lion, 1996,

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41. Ibid., 60.
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43. Tantras are equivalent to sutras for vajrayana Buddhism.

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45. Arya Nagarjuna (1st-2nd century C.E. India). There are many books available nowadays on Nagarjuna and his Madhyamika method of analysis, in both classical style Buddhist presentations and by western scholars. The one I find the most lucid and readable is *The Sun of Wisdom* by Khenpo Tsultrim Gyamtso, Shambhala Pubs., 2003.

46. *Shunyata* is Sanskrit for “emptiness,” and refers to appearances as having no core, continuous self or essence, constituted instead by conditions that cause them to appear temporarily but not to exist absolutely.