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OBSERVING THE SPACE OF THE MIND

Parallels in Astronomy

For thousands of years, people have been fascinated by the night sky and observed celestial phenomena very carefully, but with the unaided eye, only a few thousand stars can be seen. Everything else remained hidden in the "subconscious" of deep space, beyond the scope of empirical research and therefore confined to the domain of metaphysics until 1609, when Galileo heard of the telescope invented by a Flemish spectacle maker, Hans Lipperhey, and swiftly constructed one for himself. His first attempt produced an eight-power telescope, which he later increased to twenty-power by grinding his own lenses, and he used his new instruments for observing the heavens in ways never before attempted. The next year he published his findings in a book, *The Starry Messenger*, in which he reported not only his observations of the moons of Jupiter but also his discovery that the Milky Way consists of a vast collection of stars that had never been seen before. In this way, the depths of the physical universe previously concealed from human consciousness began to be explored.

The science of astronomy has continuously progressed since Galileo's time, but it was more than 300 years before scientists discovered galaxies beyond the Milky Way. As a result of a series of observations in 1923–1924, the American astronomer Edwin Powell Hubble, using the newly completed 100-inch Hooker Telescope at Mount Wilson, established beyond doubt that the fuzzy "nebulae" seen earlier with less powerful telescopes were not part of our galaxy, as had been thought, but galaxies themselves, outside the Milky Way. Hubble announced his discovery in 1924, and five years later, together with another American astronomer, Milton Humason,

he formulated the empirical Redshift Distance Law of galaxies, or "Hubble's law," which states that the greater the distance between any two galaxies, the greater their relative speed of separation. This influenced the formulation of the big bang theory by George Gamow in 1948, for which the discovery of cosmic background radiation in 1965 provided empirical support.

Some of the most recent probes into deep space, made with the Hubble Space Telescope in 2003–2004, have unveiled the most detailed portrait of the visible universe ever achieved by humankind. The Hubble Ultra Deep Field, a million-second-long photo exposure taken over the course of 400 Hubble orbits around Earth, reveals the first galaxies to emerge from the so-called "dark ages," the time shortly after the big bang when the first stars reheated the cold, dark universe. The telescope was directed to a region of space in the constellation Fornax, of which ground-based telescopic images appear mostly empty. But in this long exposure from the orbiting Hubble telescope, with photons from the very faintest objects in space arriving at a trickle of one photon per minute, scientists were able to acquire a "deep" core sample of the universe, cutting across billions of light-years. By peering into a patch of sky just one-tenth the diameter of the full moon, scientists brought into view nearly 10,000 galaxies, some of them existing when the universe was only 800 million years old. The whole sky contains 12.7 million times more area than this Ultra Deep Field. Scientists expect that such observations will offer new insights into the birth and evolution of galaxies.

This brief history of astronomy gives some idea of the importance of sophisticated, penetrating observation for exploring the depths of space and the evolution of the physical universe. But such objective observations tell us nothing about the role of the observer in relation to the quantum fluctuations in the last stages of inflation after the big bang, without which there would be no galaxies and no matter in our universe.

Philosophical Resistance to Introspection

As discussed in the first chapter, since the time of Descartes, scientists have taken on the challenge of exploring the world of objective physical phenomena, leaving the world of subjective mental phenomena to philosophers. Renaissance philosophers such as Paracelsus, who advocated an organic philosophy in contrast to the mechanistic philosophy of Descartes, did emphasize the first-person observation of the mind and first-person experimentation using the power of imagination (*vis imaginativa*). But they lived in the tragically psychotic era of witch hunting, during which any

such notions were suspiciously regarded as magic. Protestant reformers were especially quick to condemn anything of that sort as impious, useless, and potentially demonic, and those who advocated such theories and methods could find their lives imperiled. In contrast, Bacon's empiricism, which was confined to the objective world, was perfectly consistent with the new Protestant work ethic and the prevalent fear of probing the depths of the human psyche.

Since that time, instead of developing rigorous means to experientially explore the subjective dimensions of the natural world, generations of philosophers have devised ingenious arguments for denying that the mind can be explored from a first-person perspective. Immanuel Kant, for instance, claimed that due to the subjective nature of mental phenomena, any introspective observations could at most provide a *historical* account, not a true, "objective" *science*. But if "real-time" observations were a requirement for any objective science, the whole of astronomy would fail to meet it. Even observations of the moon entail a time lag of more than a second, observations of the sun and planets record events minutes after they have taken place, and our knowledge of distant galaxies is billions of years old. Due to delays caused by the speed of light, astronomers may be regarded as "celestial journalists" with regard to the solar system and "historians" with regard to their observations of the rest of the universe. In twenty-first-century astronomy, historical accounts of the universe are the most we can ever hope for. In the introspective study of the mind, there are certainly many mental phenomena, such as emotions, that may be "observed" only retrospectively by way of memory. But there are many other mental phenomena, such as mental chit-chat, deliberately induced mental images, and dreamscapes, that are observed in real time. Arguably, the introspective observations of mental events as they occur are the only truly "real-time" accounts available to us. For even the visual and auditory perceptions of nearby colors and sounds are slightly delayed due to the speeds of light and sound.

Kant further argued that there could be no true science of the mind based on introspection since the observed mental phenomena are altered and transformed by the very act of observation.[1] Niels Bohr was among the first physicists to note the observer participancy parallel between examining mental phenomena and examining quantum processes. In quantum measurement, the act of observation invariably alters the observed phenomena, but that has not prevented quantum mechanics from becoming the most successful physical theory in the history of science.

In many experiments, it has been demonstrated that objects do not exist in a well-defined way prior to the act of measurement. For example,

when single photons are emitted by a source so low in intensity that the probability of the simultaneous arrival of more than one photon at the detector is negligible, it is possible to count the number of detector actuations and thereby find the number of arriving photons. But it turns out that a light field cannot be represented as a collection of a definite number of photons, for the number of photons in it is not defined prior to the instant of measurement![2]

Moreover, the extent to which mental events are altered and transformed by the very act of observation is variable. One testable hypothesis is that with training, one may observe mental phenomena more and more "objectively," so as to exert less and less influence on what is being observed. This may occur in the dream state as well as the waking state. For example, one may observe events in a lucid dream (in which dreamers are aware that they are dreaming) without overtly altering them. Of course, there is still observer participancy, so the comparison with quantum mechanics is an excellent one, but in neither case does this imply that the objects being observed are mere artifacts of the method of observation.

Among cognitive scientists, William James took the bold step of emphasizing the primacy of introspection for the scientific study of the mind,[3] and among philosophers, Edmund Husserl made a worthy attempt at developing a phenomenology of consciousness with his method of "bracketing" consciousness from its object.[4] But twentieth-century philosophers have continued to raise serious questions about the possibility, let alone the efficacy, of developing a science of the mind based on the direct observation of mental phenomena.

Ludwig Wittgenstein, for instance, divided mental vocabulary into two classes: world-directed concepts and mind-directed concepts. Regarding the latter, he challenged the very possibility of a "private language" conveying meaningful information about internal experiences of being conscious.[5] In support of this argument, it is true that science requires theories to be intersubjectively re-testable by replicating experiments with suitable instruments. But in addition, to test any sophisticated theory, the experimenters must have professional training in the use of those instruments and in interpreting the data produced. In modern scientific research, an untrained person called in from the street rarely qualifies as a suitable "third person" who can either validate or invalidate a previous finding.

A crucial element of scientific inquiry since the time of Pythagoras has been mathematics, which has taken on an especially prominent role since the scientific revolution. In 1623 Galileo famously wrote: "Philosophy is written in this grand book—the universe—which stands continuously

open to our gaze. But the book cannot be understood unless one first learns to comprehend the language and interpret the characters in which it is written. It is written in the language of mathematics, and its characters are triangles, circles, and other geometrical figures, without which it is humanly impossible to understand a single word of it; without these one is wandering about in a dark labyrinth."[6] And the practice of higher mathematics takes place within the mind of the mathematician and is then communicated to other mathematicians. Writing equations on a chalkboard is simply a kind of public behavior that may or may not result from the internal process of understanding proofs and devising theorems. A mathematically uneducated person may be taught how to write down the same equations, but when subjected to interrogation by a qualified mathematician, will clearly not understand what he has written. Mathematicians do commonly converse among themselves in a kind of language that is unintelligible to nonmathematicians, and the same is true of experts in all fields of science. So there is no reason in principle that researchers could not receive professional training in observing mental phenomena and learn to communicate among themselves about their experiences. However, this is a major undertaking that neither philosophers nor cognitive scientists have yet tackled.

Sigmund Freud raised a formidable practical concern about the prospects for making unbiased observations of one's own mind: there are conscious and unconscious impulses in the mind that may sometimes conceal thoughts, memories, emotions, and desires we would prefer not to acknowledge, and we may imagine such mental processes even though they are not present.[7] Albert Einstein is credited with the statement, "Only two things are infinite, the universe and human stupidity, and I'm not sure about the former," and this is a serious concern for raising introspection to a scientifically rigorous status. What is required is relentless self-honesty, which may be cultivated with intensive, prolonged training in introspection. This is where the validity of introspective observations may be cross-checked with sophisticated ways of evaluating behavior and determining the neural correlates of mental states and processes. This threefold approach is precisely what William James advocated when he set forth his strategy for the scientific study of the mind.

Psychologists have a lot of evidence to show that perception is a function of expectation, and introspective perception is clearly not immune to such influences.[8] Both sensory and introspective experiences are precognitively structured; those structures enable us to perceive things in terms of specific aspects; and those aspects are constrained by our familiarity with sets of categories that enable us, in varying degrees, to assimilate our

experiences, however novel, to the familiar. Making genuine discoveries in the space of the mind by means of introspection will evidently require months or years of rigorous training, and once again, cross-checking findings with behavioral and neural analyses.

Subtle distinctions must also be made, for example, between *imagining* that one desires something and *actually* desiring it. Within the space of the mind, superficial appearances do not always correspond to reality, especially when they have been sifted through complex and often subliminal processes of interpretation. In addition to this pragmatic psychological question, Gilbert Ryle raises the philosophical concern about making ontological inferences about the way mind *is* from the way mental states *seem*.[9] This relates to an issue discussed in the first chapter: the fact that mental phenomena appear to bear no distinctively physical attributes at all. But if one assumes that everything that exists must be physical, then the appearances of mental phenomena must be illusory.

This is precisely where the Baconian and Cartesian approaches to scientific inquiry diverge. If we follow Bacon's emphasis on empirical induction and apply it (as he did not) to the examination of subjective experience, we will be inclined to learn as much as possible about the mind by observing mental phenomena themselves. But if we follow Descartes' deductive, rationalistic lead as it has been adapted by scientific materialists, then we will focus almost entirely on the physical correlates of consciousness, while marginalizing the observation of mental phenomena. Evidently, mainstream philosophy, psychology, and neuroscience have embraced the latter option. There are strengths and weaknesses to this approach; I am suggesting that it may be well complemented, not supplanted, by the incorporation of refined introspection into the scientific study of the mind.[10]

Developing a Telescope for the Mind

Philosophers have been debating the merits, limitations, and defects of introspection for centuries, but they do not seem to have refined our capacity for observing mental phenomena. We are as far as we ever were from developing a telescope for the mind. A thesis can in principle be proved or strongly argued, whereas a stance—such as a particular approach to scientific inquiry—can be adopted only by a sort of "Gestalt-switch." And this is what I am proposing: a Gestalt-switch *away* from the common tendency to empirically and theoretically marginalize introspection *to* accepting the formidable challenge of enhancing introspection in ways that are unprecedented in the history of modern science. This implies a return to empiri-

cism: taking the *methods* for making penetrating observations of all kinds of natural phenomena to be of the highest value, instead of assuming that the materialist *ideology* in its present formulation already provides a key to unlocking all the remaining mysteries of nature.

Scientific empiricists since Francis Bacon have generally confined their stance to observations of objective physical phenomena, whereas contemplative empiricists claim to have developed their faculty of mental perception to observe the space of the mind. To someone who has not utilized or refined this faculty, which the ancient Greeks called *noētos*, contemplatives' experiential reports may sound like nothing more than speculation. The semiprivate language of highly trained contemplatives, like that of professional mathematicians, therefore becomes either unintelligible to or misinterpreted by laypeople.

Over the past three millennia, contemplative traditions of varying degrees of sophistication have developed in the East and West, and one point on which they all seem to agree is the need to refine one's attention skills in order to make reliable observations of mental phenomena. Specifically, the deeply habituated tendencies of mental agitation and dullness need to be overcome through the development of attentional stability and vividness. These skills may be strengthened in a separate set of mental exercises[11] or in the very process of learning how to observe the mind. Both approaches have been explored in the Hindu, Buddhist, and Taoist traditions of India, Southeast Asia, East Asia, and the Himalayan plateau. In the spirit of healthy, open-minded, scientific skepticism, the alleged discoveries of contemplatives in these traditions should be treated with the same attitude with which scientists respond to any other claim of discovery: see if you can replicate their findings in your own laboratory.

For a minute fraction of the expense of building, maintaining, and operating the Hubble Space Telescope, contemplative observatories could be created for empirical research into the trainability of attention and the possibility of observing the space of the mind with scientific rigor and replicability. Such laboratories would ideally include facilities for conducting behavioral and neuroscientific research, together with simple, individual accommodations for people to devote themselves to mental training for months and years on end. This would be tantamount to creating a new profession of highly trained observers and experimentalists of the mind.

One valuable kind of mental training that I have explained elsewhere entails focusing one's attention on the space of mental events, distinct from appearances generated by the five physical senses.[12] Expertise in this mode of observation may require as much as 5,000 to 10,000 hours of training, 8 to 12 hours a day, 7 days a week, for months on end. In addition

to this formal practice of observing the mind and whatever events arise within it, the practitioner must take all necessary steps in terms of lifestyle and emotional regulation to ensure mental health throughout the course of this extremely demanding discipline. Contemplative traditions that have developed such introspective practice have much sound advice to offer in these regards.[13]

As the faculty of mental perception is refined, one may begin probing the nature of the thoughts, images, emotions, and desires that arise in each moment. Specific questions may guide these observations, such as:

- Are any of these mental events, including one's awareness of them, static, or are they constantly in a state of flux?
- Are any mental phenomena inherently satisfying or unsatisfying, or do these qualities arise only relative to one's attitudes and desires?
- Is the space of the mind, any of its contents, or the awareness of them inherently "I" or "mine," or is one's sense of personal identity and possession of one's mind purely a conceptual projection?

Hypotheses

When a large number of researchers engage in such empirical inquiry in different laboratories, running their experiments with different sets of assumptions and expectations, it may turn out, contrary to Kant's expectations, that they can extract features of the mind independent of the acts of observation. They may be able to identify universal qualities and regularities among mental phenomena and thereby formulate laws of the mind analogous to the rest of the laws of nature. As in any other branch of science, this research will require controlled experiments, repeated iterative evolving cycles of hypothesis formation, controlled testing, hypothesis revision, and prediction.

The above method of observing the space of the mind and everything that arises within it has been practiced in Tibet for more than a thousand years. Those engaged in this practice within a context of religious belief, which certainly colors experience, claim to have made many discoveries that can be replicated by any open-minded individual willing to devote the time and effort to putting their findings to the test.[14] The following discussion highlights some of the alleged discoveries about the mind that may be scientifically treated as hypotheses that can be tested through experience. Such scientific research is already in progress, with one notable project being conducted by the Santa Barbara Institute for Consciousness Studies in

collaboration with a team of psychologists and neuroscientists at the University of California, Davis.[15]

With regard to Wittgenstein's concern about the unfeasibility of any private language, Tibetan contemplatives claim that a shared, highly specialized language concerning rarified subjective experience has been developing within a community of professionally trained observers of the mind. Throughout such training, participants converse among themselves and with their mentors and in this way learn to communicate their inner experiences. Nonparticipants overhearing such communication may believe they understand the kinds of experiences being narrated, but in fact most of what is said will be beyond their imagination, for they have never experienced the states of consciousness that are being probed.

Freud's concern about the obscuring and distorting influences of unconscious mental impulses has long been a major concern among Tibetan contemplatives. The remedy they have settled on is relentless, passive but vigilant observation of whatever arises in the space of the mind, without being carried away by or identifying with it. It is imperative not to respond to discursive thoughts, mental images, emotions, and desires with either aversion or craving. Rather, one must simply let them arise and pass of their own accord, without intervening or attempting to suppress or augment them. Metaphorically, one must rest in a "space of awareness" that is larger than the "space of one's own psyche." Whatever arises within the psyche is observed closely and with discerning intelligence, but without modifying, censoring, or editing in any way. This is an extraordinarily demanding endeavor, and it is pursued in close collaboration with an experienced and accomplished mentor who is well versed in such practice.

Buddhist contemplatives throughout Asia have taken special interest in the possible differences between the way mental processes appear and the way they exist, a concern raised more recently in Western research by Gilbert Ryle.[16] Specifically, they have found that although mental states and processes often appear to be relatively static, upon close examination, all the immediate contents of the mind as well as our awareness of them are constantly in flux, arising and passing many times per second. A relatively homogenous continuum of a mental state, such as depression, may endure for seconds or even minutes, but that stream of emotion consists of discrete pulses of awareness, each of finite duration. There is nothing static in the human psyche, though habits may become deeply ingrained over the course of a lifetime.

A second discrepancy between appearances and reality is that certain mental states, such as joy and elation, may appear to be intrinsically satisfying, but upon more careful examination are found to be misleading. No

mental state that arises from moment to moment in dependence upon sensory or intellectual stimuli is inherently satisfying. Every affective state is experienced as pleasant, unpleasant, or neutral only in relation to a complex of attitudes and desires. When these affective states of mind are passively observed from the wider perspective of the space of awareness, without identifying with them, they have no absolute, independent attributes of either pleasure or pain.

A third disparity between mental appearances and reality pertains to the fact that thoughts, emotions, and other mental phenomena seem to have an inherent personal quality. When strong identification with these processes occurs, one may feel that one's very identity has become fused with them, and momentarily have the sense "I am angry, " or "I am elated." But with some skill in observing the contents of the mind, one finds that thoughts and mental images arise by themselves, with no voluntary intervention or control by a separate agent or self. Psychophysiological causes and conditions come together to generate these mental events, but there is no evidence that a separate "I" is among those causal influences. To be sure, some thoughts and desires do appear to be under the control of an autonomous self, but as expertise is gained in this practice, this illusion fades away, and everything that arises in the mind is seen to be a natural event, dependent upon impersonal causes and conditions, like everything else in nature.

As noted previously, all usual kinds of experience, both sensory and introspective, are structured by memories, language, beliefs, and expectations, which cause us to assimilate even novel experiences, whether we want to or not. One of the names for the meditative practice I am describing here is "settling the mind in its natural state," which implies a radical deconstruction of the ways we habitually classify, evaluate, and interpret experience. The Buddhist hypothesis in this regard is that it is possible to so profoundly settle the mind that virtually all thoughts and other mental constructs eventually become dormant. The result is not a trancelike, vegetative, or comatose state. On the contrary, it is a luminous, discerningly intelligent awareness in which the physical senses are withdrawn and the normal activities of the mind have subsided.[17]

The culmination of this meditative process is the experience of the *substrate consciousness* (*ālaya-vijñāna*), which is characterized by three essential traits: bliss, luminosity, and nonconceptuality. The quality of bliss does not arise in response to any sensory stimulus, for the physical senses are dormant, as if one were deep asleep. Nor does it arise in dependence upon a pleasant thought or mental image, for such mental features have become subdued. Rather, it appears to be an innate quality of the mind when set-

tled in its natural state, beyond the disturbing influences of conscious and unconscious mental activity.[18] A person who has achieved this state of attentional balance can remain effortlessly in it for at least four hours, with physical senses fully withdrawn and mental awareness highly stable and alert.

The quality of luminosity is not any kind of interior light similar to what we see with the eyes. Rather, it is an intense vigilance that has the capacity to illuminate, or make consciously manifest, anything that may arise within the space of the mind. To get some idea of what this is like, imagine being wide awake as you are immersed in a perfect sensory deprivation tank so that you have no experience of any of the five senses, or even of your own body. Then imagine that all your thought processes involving memory and imagination are put on hold, so that you are vigilantly aware of nothing but your own experience of being conscious. This is also analogous to "lucid dreamless sleep," in which one is keenly aware of being deep asleep, in a kind of wakeful vacuum state of consciousness.[19]

The empty space of the mind of which one is aware, once the mind has been settled in its natural state, is called the *substrate* (*ālaya*).[20] Due to the relatively nonconceptual nature of this state of consciousness, there is no distinct experience of a division between subject and object, self and other. Relatively speaking, the subjective substrate consciousness is nondually aware of the objective substrate, an experiential vacuum into which all mental contents have temporarily subsided. The mind may now be likened to a luminously transparent snow globe in which all the normally agitated particles of mental activities have come to rest. To draw an analogy from classical physics, virtually all the kinetic energy of the human psyche has been turned into potential energy, stored in this nondual experience of the substrate.

This natural, or relatively unstructured, state is permeated with an extraordinary amount of "creative energy" that has the capacity to generate alternative realities, such as whole dreamscapes that emerge from a state of deep sleep. To draw another analogy from contemporary physics, the substrate may be likened to the zero-point field, a background sea of luminosity permeated by an enormous amount of energy. This is the lowest possible energy state of the mind that can be achieved through such straightforward calming practices, and the energy of all kinds of mental activity is over and above that zero-point state.

For the normal mind, enmeshed in a myriad of thoughts and emotions, this zero-point field—substrate—of consciousness is unobservable, for we see things by way of contrast. Our attention is normally drawn to appearances that arise to the physical senses and mental perception, and they

alone are real for us. But all such appearances originate from this zero-point field, which permeates all our experience. We are effectively blind to it, while the world of appearance arises over and above it. When sensory and mental appearances naturally cease, as in deep sleep, the mind is normally so dull that we are incapable of ascertaining the substrate consciousness that manifests.

The experience of the substrate is imbued with a relative degree of symmetry, and in this vacuum state reality does not appear in a structured form, either as a human psyche or as matter. This unstable equilibrium is perturbed by the activation of the conceptual mind, which creates the bifurcations of subject and object, mind and matter, which may be regarded as *broken symmetries*. When the fundamental symmetry of the substrate manifests in dreamless sleep, it is generally unobservable, and can only be retrospectively inferred on the basis of the broken symmetries of waking experience. But as mentioned before, as a result of continuous training in developing increasing stages of mental and physical relaxation, together with attentional stability and vividness, it is said that one may directly vividly ascertain this relative ground state of consciousness and observe how mental and sensory phenomena emerge from it in dependence upon a wide range of psychological and physical influences.

The mind gradually settles into the substrate consciousness as mental activities gradually subside, without suppression, throughout the course of this training. And in this process, memories, fantasies, and emotions of all kinds come to the surface of awareness. Our usual experience of our mental states is heavily edited and processed by the habitual structuring of the mind, so we tend to experience them in a way we regard as "normal." But in this training, the light of consciousness, like a probe into deep space, illuminates bizarre mental phenomena that seem utterly alien to one's past experience and sense of personal identity. As an analogy from contemporary astronomy, recall the million-second-long exposure of the Hubble Ultra Deep Field. Astronomers discovered in that region of deep space a zoo of oddball galaxies, in contrast to the classic images of spiral and elliptical galaxies. Some look like toothpicks, others like links on a bracelet, and a few of them appear to be interacting. These bizarre galaxies chronicle a period when the universe was more chaotic, when order and structure were just beginning to emerge.

Likewise, consciously exposing the deep space of the mind to thousands of hours of observation reveals normally hidden dimensions that are more chaotic, where the order and structure of the human psyche are just beginning to emerge. Strata upon strata of mental phenomena previously concealed within the subconscious are made manifest, until finally the mind

comes to rest in its natural state, from which both conscious and normally subconscious events arise. This is an exercise in true depth psychology, in which one observes deep core samples of the subconscious mind, penetrating many layers of accumulated conceptual structuring.

Just as scientists expect that observations of the Hubble Ultra Deep Field will offer new insights into the birth and evolution of galaxies, so do Tibetan contemplatives believe that the experience of the substrate consciousness offers insights into the birth and evolution of the human psyche. Drawing on an analogy from modern biology, this may be portrayed as a kind of "stem consciousness." Much as a stem cell differentiates itself in relation to specific biochemical environments, such as a brain or a liver, the substrate consciousness becomes differentiated with respect to specific living organisms. This is the earliest state of consciousness of a human embryo, and it gradually takes on the distinctive characteristics of a specific human psyche as it is conditioned and structured by a wide range of physiological and, later, cultural influences. The substrate consciousness is not inherently human, for this is also the ground state of consciousness of all other sentient animals. Contrary to the hypothesis that consciousness ultimately emerges from complex configurations of neuronal activity, according to the Great Perfection (Dzogchen) tradition of Tibetan Buddhism, the human mind emerges from the unitary experience of the zero-point field of the substrate, which is prior to and more fundamental than the human, conceptual duality of mind and matter.[21] This luminous space is undifferentiated in terms of any distinct sense of subject and object. So this hypothesis rejects both Cartesian dualism and materialistic monism, and it may be put to the test of experience, regardless of one's ideological commitments and theoretical assumptions.

While resting in the substrate consciousness, one may deliberately direct attention to the past, gradually exercising memory until one can vividly and accurately recall events. Some Buddhists claim that within the distilled, luminous space of deep concentration, one may direct the attention back in time even before conception in this life and recall events in the distant past.[22] As far-fetched as this hypothesis may seem, it can be tested with carefully controlled experiments, assuming that the subjects involved are highly expert in this practice. By such rigorous examination, it should be a fairly straightforward process to determine whether such adepts' "memories" are accurate recollections from the past or mere fantasies.

Open-minded skepticism toward these claims—specifically, the kind of skepticism that inspires testing hypotheses in the most rigorous way possible—is healthy and appropriate for the scientific community. To the great detriment of science, however, the ideal of skepticism in the twentieth cen-

tury has often degenerated into a kind of complacent closed-mindedness about any theory or method of inquiry that deviates from current mainstream science. Richard Feynman reminded us of the true ideal of scientific skepticism when he encouraged experimenters to search most diligently in precisely those areas where it seems most likely they can prove their own theories wrong.[23] Heraclitus, the sixth-century B.C.E. Greek philosopher known for his belief that the nature of everything is change itself, encouraged this open-minded attentiveness to novelty: "If you do not expect the unexpected, you will not find it, since it is trackless and unexplored."[24]