



A GRAY MATTER

Another look at Buddhism and neuroscience

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Participants in the dialogue between science and Buddhism have long modeled their discussion primarily on the idea of convergence, the premise that the most significant comparisons are those that reveal common ground. This is by no means the only model for comparative discussion, and I would argue that in the case of Buddhism and science it is deeply flawed. Instead, another model—one based on mutual challenge, in which the two sides are able to shed light on each other precisely because of their differences—offers what I see as a more potentially fruitful alternative.

In his 2008 book *Buddhism and Science: A Guide for the Perplexed*, my colleague Donald Lopez traces the dialogue between these two realms of discourse since the question of their compatibility was first raised in the late 19th century. While various referents in the dialogue have changed with the years, certain features have remained fundamentally the same. Lopez points out, for example, that Buddhism, in order to demonstrate its compatibility with science, was “modernized” by its exponents,

without a preliminary self-critical examination of the assumptions each side brings with it, it is not even clear what such a dialogue entails.

Certainly one of these problematic premises is the claim that Buddhism, like science and unlike religion, is “experimental.” In his introduction to *Buddhism and Science: Breaking New Ground*, B. Alan Wallace, one of the foremost advocates of convergence, writes:

Buddhism, like science, presents itself as a body of systematic knowledge about the natural world, and it posits a wide array of testable hypotheses and theories concerning the nature of the mind and its relation to the physical environment. These theories have allegedly been tested and experientially confirmed numerous times over the past twenty-five hundred years, by means of duplicable meditative techniques. In this sense, too, Buddhism may be better characterized as a form of empiricism rather than transcendentalism.



which entailed eliminating much of what previously had been deemed essential by traditional Buddhists. We can, then, see that right from the beginning the two interlocutors have had an asymmetrical relationship, in which Buddhism has been cut to try to make it fit the standards of science, standards that are quite foreign to its own way of understanding itself.

With the recent emergence of neuroscience, not only has this trend accelerated, but a new change is happening as well. While neuroscience is a development in the biological sciences, for many it promises privileged access not only to the brain but to the mind. Because the mind had not previously been an area of much interest to those who work in the physical sciences, in the dialogue between Buddhism and science it had remained the preserve of Buddhism. Now, however, as neuroscience has taken the central role as a representative of science, Buddhists have been forced to redefine their position in the dialogue.

The dialogue between Buddhism and neuroscience has been widely presented in various media—mainstream, academic, and Buddhist—as a historical event. It seems to me, however, that

This is, to say the least, a highly selective definition of Buddhism, and since it apparently ignores the central place of faith, ritual, religious narratives, and other elements that might not comport with a scientific view of Buddhism, it is, from a historical point of view, entirely inadequate. One might question as well how this characterization squares with Buddhism sociologically. Consider, for example, that His Holiness the Dalai Lama, who is so central to the Buddhism and neuroscience dialogue, is himself the object of ardent devotion and faith for millions and is even said to be the incarnation of the bodhisattva of compassion, Avalokiteshvara. One can hardly call this an empirical claim, but it is not at all incidental to the authority he holds, to the very meaning of his position, role, and identity as the Dalai Lama, and to the validity he confers on the Buddhism and neuroscience dialogue. Since such matters get little or no play in the dialogue, I can only assume that its advocates either are unaware of them or regard them as irrelevant.

However often Buddhist apologists claim that Buddhism, like science, gives supreme value to experience (or experiment),

neuroscientists, being in principle skeptical, should at least try to get a fuller picture and not just accept such claims, well, on faith. There are indeed a number of Buddhist texts that advocate critical thinking, but Buddhism cannot be reduced to such a characterization. One need look no further for counterexamples than the very act—an expression of faith—by which a person becomes a Buddhist: taking refuge in the Three Treasures, the Buddha, his teaching, and the community of fellow Buddhists.

For advocates of the meeting of Buddhism and neuroscience, meditation provides what seems to be the definitive area of convergence. Even mainstream Western media have made considerable noise about experiments done on Buddhist meditators. They cite studies claiming that meditation transforms the structure of the brain, which would seem to support the idea of neuroplasticity. Meditators are said to experience dramatic transformations in cognitive function and neural activity. They are even said to produce at will such enviable mental states as compassion and happiness. That it would be possible to find the

A careful and critical reading of the literature on Buddhism and neuroscience will lead, I think, to a far more sober assessment of their convergence than one generally hears from its advocates. An oft-quoted article by Antoine Lutz, John D. Dunne, and Richard J. Davidson entitled “Meditation and the Neuroscience of Consciousness” acknowledges that in spite of thousands of publications on meditation in Western languages, little is known about the impact of meditation on the brain. But even if meditation can provide some significant data to neuroscience, how are these data to be interpreted? Do they actually contribute to the thesis of the convergence of Buddhism and neuroscience? 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. Similarly, the literature on meditation has a tendency to ignore cultural differences in order to



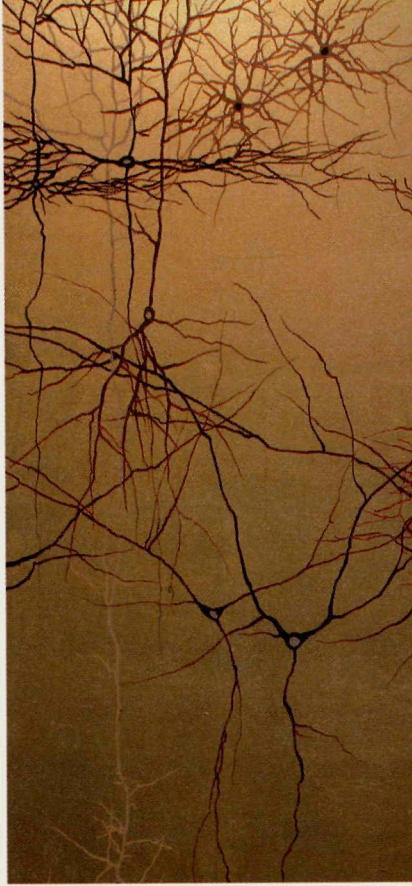
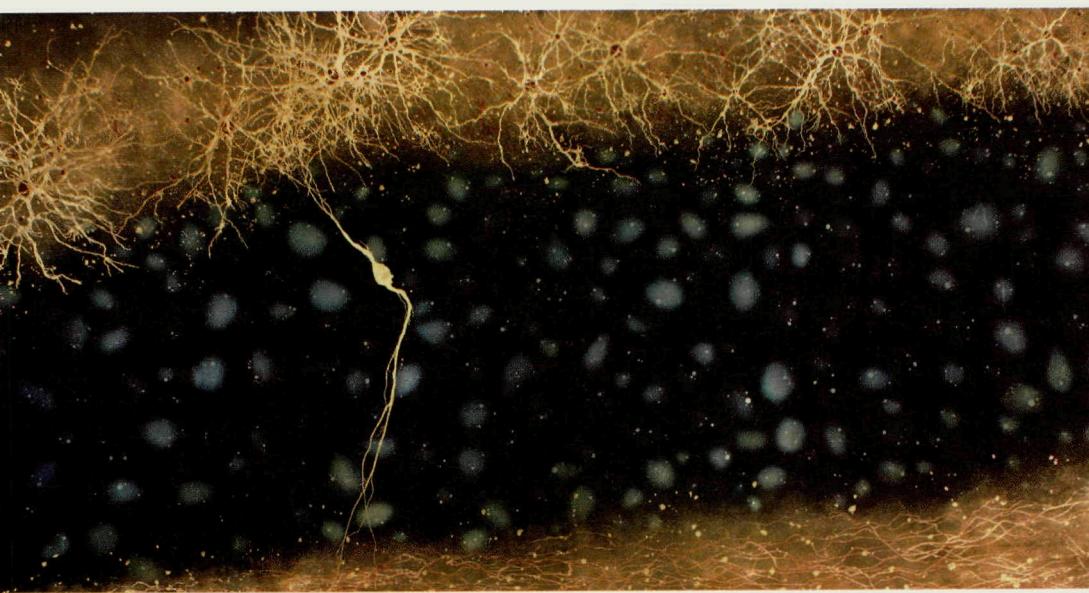
neural correlates of such mental states and, therefore, to reproduce them at will—well, it is not hard to see why some would be feeling more than a little enthusiastic.

But let's slow down a little and look at these claims a bit more carefully. It is good to recall that early experiments with Tibetan monks in Dharamsala yielded few results, mainly because of cultural differences. It was only when neuroscientists started working with Matthieu Ricard, a French monk in the Tibetan Buddhist tradition, that things looked more promising, with the result of creating high hopes among both neuroscientists and Buddhists, and, unsurprisingly, those who are both.

But any activity performed consistently—whether playing the piano or riding a bicycle, or reading magazines—can significantly alter one's state of mental functioning. Some pretty mundane things can even affect the brain. We know, for instance, that the hippocampi of London taxi drivers, who before the advent of GPS had to memorize the city's map, were more developed than that of ordinary pedestrians. Perhaps there is some intriguing convergence between neuroscience and taxi driving.

emphasize some vague universality in human experience.

Lutz and his colleagues define three neuroscientific agenda with regard to Buddhist meditation: neuroplasticity, interaction of mind and body, and the possibility of neural counterparts to subjective experience. Data collected on a small group of meditators indicate a *possible* relationship between meditation and changes in brain structure, specifically in cortical thickness. The same meditators who had greater prefrontal brain activity were found to have a significantly greater antibody response to influenza vaccine. The experiments are also said to reveal an increase in alpha and theta activity in various types of meditation (zazen, yogic concentration, Mindfulness-Based Stress Reduction, and the like.) However, the neuroelectric signatures of these various meditative techniques have not yet been firmly established. Long-term Buddhist practitioners show high-amplitude gamma-band oscillations and phase-synchrony during nonreferential meditation. Some preliminary data suggest that these gamma oscillations are correlated with self-reports of clarity of meditation. Unfortunately, the lack of a control population makes it difficult to inter-



THIS DISCOURSE HAS BEEN FROM THE START INSCRIBED IN THE FRAMEWORK OF NEURO-ENHANCEMENT AND CONSUMERISM, A FRAMEWORK THAT TO BUDDHISM IS PROBLEMATIC, TO SAY THE LEAST.

pret whether the brain patterns reflect specific meditative qualities or the cognitive processes induced by the instructions.

The first claim made by Lutz and his colleagues is that the brains of Buddhist practitioners are more stable, their amygdalas are less trigger-happy. The second claim is that they have baseline levels of positive affect, or happiness, that are notably higher than that of ordinary people: fMRI (functional magnetic resonance imaging) scans show higher levels of left prefrontal activity, which are *supposed* to be associated with well-being. The third claim is that they synchronize different elements of experience more effectively, which is *believed* to have some functional significance. The fourth claim is that their brains are capable of compassion at levels unknown in the West—a highly problematic claim, given how deeply compassion, like other qualitative states, is tied to the specifics of cultural context.

Contrary to how it is approached in laboratory experiments, meditation is not a free-floating practice. It has specific cultural, ritual, and soteriological conditions and meanings. Above all, it is aimed at enlightenment, not just happiness. Everyone does all kinds of things all the time to achieve some measure of happiness. Plant a garden, go to the movies, take Prozac—there are countless things one can do for the sake of happiness, most of them more efficient than taking up Buddhist practice.

For scientists, for whom precise definition is paramount, the obvious indeterminacy of meditation should raise serious questions. So far it has not done so. Meditation is itself an activity in Buddhism that is contested, multifarious, and part of a broader field of practice and discourse that includes many other types of bodily and mental techniques, including ritual. While Tibetan meditation, and to a lesser degree Japanese Zen and Burmese Vipassana, have been the subject of most recent research, they by

no means represent the wide variety of Buddhist and non-Buddhist meditative techniques. Furthermore, contrary to a notion widely held in the West, meditation is not the central practice of Buddhism. Many Buddhists never, or only rarely, practice meditation. An influential Chinese work, *Lives of Eminent Monks*, mentions meditation almost in passing, as one among a dozen of rubrics of Buddhist practice.

Many Westerners see meditation as something set apart from ritual, but this runs contrary to the place it has always had in Buddhism, where it is surrounded by ritual, is rooted in ritual, is highly ritualized, and one might even say is itself a form of ritual. In Soto Zen or in Vajrayana Buddhism, for instance, meditation is described not as an introspective search (as in the Romantic view that characterizes Western Buddhism) but as a way to ritually emulate the Buddha by adopting his physical posture.

The question we keep having to ask is: To what extent can meditation be extracted from the multiple and overlapping contexts in which it subsists? For those operating within a convergence model of Buddhism and science, this is an inconvenient question. Let's look at it from a few more angles.

Traditional Asian Buddhists hold that a practitioner is liable to be attacked by malevolent forces. Whether one construes such hostile forces as mental projections or real external forces, the fact remains that meditation can be dangerous and that the increased awareness of the practitioner can increase the negative forces that assail him or her. It is therefore assumed that meditative practice requires preparation, support from a group, and guidance from a more advanced practitioner. Those intent on studying only the positive effects of meditation seem either unaware of these major caveats or just choose not to give them any credence.

In the traditional view of the Buddhist path, meditation is



"GOLD CORTEX," ENAMEL ON COMPOSITION GOLD LEAF, 18" X 24". GREG DUNN, 2010.

understood in the context of faith and morality. Meditation must have a foundation of morality (*shila*) and it must give rise to wisdom (*prajna*). If any of these three is lacking, however, the practitioner soon reaches a dead end, and he or she becomes trapped in the “dark pit.”

One cannot seriously discuss Buddhist meditation without acknowledging the immense variety of the forms it takes. There is a traditional distinction made between meditation “with content” (for instance, meditation on the Four Noble Truths or another rubric) and meditation “without content.” In Indian and Tibetan Buddhism, teachers such as Tsongkhapa (1357–1419) advocate complex forms of analytical meditation. Conversely, in Chan Buddhism (and its Japanese form, Zen), the goal of seated meditation is said to be “no-thought” (*wunian*) or “no-mind” (*wuxin*). For this particular Chinese Buddhist tradition, analytical meditation would be of little use, and it might actually constitute a stumbling block. In some Buddhist schools, visualization is of central importance. In the Chinese Pure Land school, the practitioner visualizes the Buddha Amitabha and constantly recites his name. In many types of tantric Buddhist meditation, the practitioner visualizes one or several specific deities in order to identify with them.

I have, of course, barely scratched the surface. I could continue listing forms of Buddhist meditation past and present *ad nauseam*. Among all these forms, neuroscience has tended to focus on one particular type, namely mindfulness. Yet this form of meditation is usually regarded as a rudimentary practice, one that is preliminary to more advanced practices.

When they consider mindfulness meditation to be the paradigmatic practice of Buddhism, neuroscientists seem unaware of the highly complex and contested place meditation has always

had in Buddhism, of the vast variety of its forms and styles, of its cultural meanings, and even of its purpose. To decontextualize meditation techniques and lump them together under a vague, generic rubric is to misunderstand these practices, as well as their potential effects on the human brain.

In his seminal work on the history and philosophy of science, *The Structure of Scientific Revolutions*, Thomas Kuhn famously made the case that what scientists observe and how they observe it is already tied up with the paradigmatic assumptions that frame their whole endeavor. The neuroscientific paradigm is not the same as Buddhism’s and, in spite of all declarations to the contrary, is in fact at odds with it. Neuroscientists cannot have access to what the Buddhist practitioner is actually experiencing, the *qualia* of meditation, and they cannot help interpreting the practitioner’s account in their own terms, according to scientific presuppositions that leave no room for an authentic Buddhist experience. Their observations are far from neutral, inasmuch as they confirm a Western way of thinking that denies the reality of the Buddhist worldview.

At a more technical level, measurements of a meditation practitioner’s brain lead to unresolved questions about their meaning. What exactly do an increase of prefrontal activity or cortex thickness, an increase of gamma rays, and the like mean? Changes in brain-wave patterns and such during practice tell us nothing about the experience itself, let alone about its value for the practitioner.

Even as data, the data are often problematic. EEGs and fMRIs may provide a wealth of data, but these are usually inconclusive. Neuroplasticity is not—or should not be—an end in itself, and it remains meaningless unless a clear goal is defined. All measurements are not equal, and neither are the data resulting from them. You can measure anything you like, of course, but solid experimental data cannot simply be the results of new scanning techniques; they must be a response to well-asked questions that justify specific measurements. Unless these conditions are met, experiments obey a blind logic of accumulation. Instead of being creative, in such a case, all observations are equal and equally arbitrary, recorded in the hope that some distant day they may somehow make sense. In this respect, one cannot fail to be struck by how dependably the interpretations of the data on meditation, buoyed by a lot of wishful thinking, are put in the conditional tense: an increase of gamma rays “might mean” this or that.

There is one last question I would like to look at: the question of the long-term purpose of experiments on Buddhist meditators. Is the idea that neuroscientists, having been lucky enough to find the neural correlates of some beneficial mental states, will be able to reproduce these states technologically, perhaps artificially, even chemically? While the financial benefits of this could prove immense, Buddhism would, in this case, be reduced to another variety of neuro-enhancement of the same type as those advertised by pharmaceutical companies.

This might sound harsh or pessimistic, but I would say it is justified if we consider that, on the neuroscientific side, there has been no serious engagement with Buddhism, just a random gathering of data. As a biological science, neuroscience is only interested in the brain, and it therefore sees Buddhism as ancillary to its purpose. Unless it can be proved that “Buddhist

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"brains" are significantly different, Buddhist monks represent just another type of population for neuroscience. One may object that this instrumental approach is due to the fact that these experiments and dialogues are still at the incipient stage. But precisely since so much depends on the preliminary stages, it would have been particularly important to set the record straight. And this is not, in my opinion, what happened. On the contrary, the desire to obtain quick results preempted robust critical questions.

Most studies on the topic provide an optimistic and charitable interpretation of the dialogue. A more realistic approach would look at its ideological and economic motivations, noting, for instance, that the mutual validation of Buddhism and neuroscience has generated a lot of funding on both sides. Other vested interests include those of the pharmaceutical industry, which is always quick to inflate claims for marketing purposes and to downplay the obvious limitations of neuroscientific experiments. All these various agendas have given birth to a new field of discourse, which has taken on a life of its own. This discourse has been from the start inscribed in the framework of neuro-enhancement and consumerism, a framework that to Buddhism is problematic, to say the least.

By rushing to conclusions, enthusiastic advocates of the dialogue between Buddhism and neuroscience have raised expectations that they cannot meet. When all is said and done, does Buddhist doctrine make a difference in the dialogue between Buddhism and neuroscience? Apparently not. Does this mean that Buddhist claims are false? I believe it simply shows that they

belong to a framework of understanding the world that is different from scientific discourse and therefore cannot be reduced to it. As the Dalai Lama himself pointed out, 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. 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.

Whether a meaningful dialogue between neuroscience and Buddhism is possible remains to be seen. For it to happen, neuroscientists must make the effort to understand Buddhism on its own terms and accept the possibility that its description of the world might have some validity. The readiness of Buddhists simply to abandon their world view and its claims in order to pass the tests of neuroscience may have provided some short-term benefits, but in the long run it will probably condemn this dialogue to irrelevance. For a real dialogue to take place, both sides must accept the otherness of those with whom they seek to engage. Convergence may never be reached, and that is likely for the best, because it is difference, and the challenges it presents, that is the richer source of understanding. ▼

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