# 8c Meditation and Consciousness

A random survey of recent developments

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## 1 The appeal of early Buddhism


**Fig 1 Time Magazine, 4 Aug 2003, Vol 162 no 5**

In this paper, we will examine the current state of studies and understanding of consciousness, meditation and Buddhism, as they grow more closely related in the contemporary mind.[1] Buddhism is, above all, a method of inquiry into self-discovery: it is an invitation to live an examined life.[2] This inquiry, properly carried out through mindfulness practice and meditation, would reveal the impermanence, unsatisfactoriness, the illusory nature of the self, and the emptiness of all phenomena, thus ending suffering. This is probably one of the main reasons why many psychologists have turned to Buddhism in their efforts to understand the nature of the mind, consciousness and mental health.

Another important reason for scholars today to find in Buddhism a complementary ally in their quest to understand the human mind is that Buddhism offers effective techniques to create *altered states of consciousness* while the West has the *technological means* to study them. Furthermore, Buddhism has a rich vocabulary of the mind, which Western psychology, philosophy and related fields find very operational.

Western academia's discovery of Buddhist psychology began over a century ago, and it to this fascinating history that we now turn to.

## 2 William James

**William James**

**2.1** Those who recount the history of psychology and Buddhism would often begin with **William James** (1842-1910), and for good reason, which we shall discuss here. James was a pioneering American psychologist and philosopher who wrote influential books on the young science of psychology, educational psychology, the psychology of religious experience, and the philosophy of pragmatism. He was born in New York City, the son of Henry James, Sr, an independently wealthy and notoriously eccentric Sweden borgian theologian, and one of the best known intellectuals of his time.

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[1] Googling "Buddhism, meditation, mind," will give you more hits (say about 2 million!) than you could possibly read. A common example is this Washington Post report by Marc Kaufman, "Meditation Gives Brain a Charge, Study Finds" from http://www.**washingtonpost**.com/wp-dyn/articles/A43006-2005Jan2.html.

[2] Socrates was recorded as saying, "[A]nd if again I say that to talk every day about virtue and the other things about which you hear me talking and examining myself and others is the greatest good to man, and that, the unexamined life is not worth living [not liveable] for man (*ho dè anexétastos bíos ou biôtòs anthrópôi*), you will believe me still less. This is as I say, gentlemen, but it is not easy to convince you..." (*Apology* 38a). The *Apology of Socrates* is said to be a reconstruction of the defence speeches in Socrates' trial in 399 BCE on charges of "corrupting the youth" and "believing in gods which the State does not recognize." For a modern comy on this passage, see http://www.friesian.com/apology.htm#eighteen. See also SD 56.17 (9.3.3).

**2.2** The James family was rich in its literary ambience. In fact, his younger brother was the famed writer, Henry James (1843-1916) and his tragic only sister Alice (1850-1892), a well-known diarist.[3] He studied in Harvard, where his most influential teachers were the renowned naturalist, geologist and glaciologist Louis Agassiz (who was a father of the American scientific tradition) and the scholar Charles W Eliot (who, as Harvard's president, transformed it from a provincial college into the nation's foremost research university). In 1869, he graduated with an MD from Harvard Medical School. However, due to his ill health, he did not practise medicine, but instead turned to the study of psychology.

**2.3** Throughout his life, James interacted with a wide array of writers, scholars, and thinkers, including his godfather, the poet Ralph Waldo Emerson, the newspaper editor Horace Greeley, the Romantic poet and journalist William Cullen Bryant, the jurist Oliver Wendell Holmes, Jr, the philosopher and polymath Charles Sanders Peirce, the philosopher Josiah Royce, the philosopher George Santayana, the Austrian physicist and philosopher Ernst Mach, the philosopher, psychologist and educational reformer John Dewey, the deaf-blind author, activist and lecturer Helen Keller, the humourist, satirist, writer and lecturer Mark Twain, the social anthropologist James Frazer, the French philosopher Henri Bergson, the English science fiction and historical writer H G Wells, the English man-of-letters and Christian apologist G K Chesterton, the psychoanalyst Sigmund Freud, the analytical psychologist Carl Jung, and the writer and feminist Gertrude Stein.

**2.4** In the twelve years that James took to write *The Principles of Psychology* (1890), he became interested in the existence of "subconscious" processes, and was instrumental in the founding of the American Society for Psychical Research in 1884. Here research was conducted into alleged supernatural phenomena, and investigations into trance states of mediums confirmed the existence of "subconscious" processes already being described by Jean Martin Charcot, Alfred Binet, Pierre Janet, and Hippolyte Bernheim in France.[4]

**2.5** It was research like this that led James to form the image of consciousness as a stream. Probably, he also drew on Buddhist teachings, as the term "stream of consciousness" is a literal English translation of the Pali *viññāṇa,sota*.[5] He uses the phrase in *Principles of Psychology* (1890, ch 9) to indicate the flow of inner experience.

> Consciousness, then, does not appear to itself chopped up in bits. Such words as "chain" or "train" do not describe it fitly as it presents itself in the first instance. It is nothing jointed; it flows. A "river" or a "stream" are the metaphors by which it is most naturally described. *In*

[3] Alice James was an icon in her own right, and a representative of Victorian womanhood and of the neuroses of her famous family. See http://www.pbs.org/wgbh/masterpiece/americancollection/american/genius/alice_bio.html.

[4] E Taylor 1996:23. On the subconscious, DEB qv.

[5] *Viññāṇa,sota* is a rare term in the Canon, found only in **Sampasādanīya S** (D 28.7/3:105) which prob refers to the better known comy term, *bhav'aṅga* ("life-continuum" or the sub-unconscious) or *bhavaṅga,sota* (sub-conscious stream). See SD 17.8a (1.1); also BDict: bhavaṅga & Ency Bsm: bhavaṅga. See D Scott 2000:335. In English literature, "stream of consciousness" refers to a technique that records the multifarious thoughts and feelings of a character without regard to logical argument or narrative sequence. Using this technique, the writer attempts to reflect all the forces, external and internal, influencing the psychology of a character at a single moment. The technique was first employed by Édouard Dujardin (1861–1949) in his novel *Les Lauriers sont coupés* (1888) and was subsequently used by such notable writers as James Joyce, Virginia Woolf, and William Faulkner.

> *talking of it hereafter, let us call it the stream of thought, of consciousness, or of subjective life*.
> (William James, 1890 1:239)[6]

**2.6** James, in his landmark work, *Varieties of Religious Experience* (1902), again breaks new ground by addressing the functional value of meditation. Considering his times, James shows a remarkable understanding of some deeper aspects of Buddhism, even though in his footnote, he cites his source as a German book on Buddhism by the German Orientalist, C F Koeppen.[7]

> The Buddhists use the word "samadhi" as well as the Hindus; but "dhyana" is their special word for higher states of contemplation. There seem to be four stages recognized in dhyana. The first stage comes through concentration of the mind upon one point. It excludes desire, but not discernment or judgment: it is still intellectual. In the second stage the intellectual functions drop off, and the satisfied sense of unity remains. In the third stage the satisfaction departs, and indifference begins, along with memory and self-consciousness. In the fourth stage the indifference, memory, and self-consciousness are perfected. [Just what "memory" and "self-consciousness" mean in this connection is doubtful. They cannot be the faculties familiar to us in the lower life.] Higher stages still of contemplation are mentioned—a region where there exists nothing, and where the meditator says: "There exists absolutely nothing," and stops. Then he reaches another region where he says: "There are neither ideas nor absence of ideas," and stops again. Then another region where, "having reached the end of both idea and perception, he stops finally." This would seem to be, not yet Nirvana, but as close an approach to it as this life affords. (William James, 1902:246)

**2.7** When the Sinhala anagarika (lay renunciant) **Dharmapala** (1864-1933),[8] in 1903, attended one of James's lectures at Harvard, James was quoted as having said to him, "Take my chair. You are better equipped to lecture on psychology than I."[9] In 1904, after one of Dharmapala's meditation lectures there, on the topic of non-self, James declared, "This is the psychology everybody will be studying twenty-five years from now."[10] But, as we shall see, he was too optimistic.

**2.8** It is only now, a hundred years later, we are witnessing an enthusiastic embrace of Buddhist psychology and meditation by a fast growing number of psychologists, scholars and therapists. Understandably, **Michael Carrithers** thinks that William James in general has "influenced the Western understanding of Buddhist meditation."[11] James' influence in fact extended beyond the West: his ideas of unmediated experience or introspection influenced not only the Zen scholar, D T Suzuki, but also the Japanese philosopher Nishida Kitaro.[12]

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[6] For a critique, see Collins 1982:254-258.

[7] C F Koeppen, *Die Religion des Buddha*, Berlin, 1857, 1:585 ff.

[8] Dharmapala attended the Parliament of World Religions in Chicago, 1893: see 10.3 below.

[9] Ananda Guruge (ed), *Return to Righteousness: A Collection of Speeches, Essays and Letters of Anagarika Dharmapala*. Sri Lanka: Ministry of Education af Cultural Affairs, 1965:681.

[10] David Scott 2000: 335.

[11] M Carrithers, *The Forest Monks of Sri Lanka: An Anthropological and Historical Study*. Delhi: Oxford University Press, 1983:18.

[12] E Taylor 1996:24.

# 3 The fall and rise of introspectionism

### 3.1 INTROSPECTION CAMPS

**3.1.1** By 1893, American psychology was dominated by European experimental or physiological psychology, led by the German physiologist and psychologist **Wilhelm Wundt** (1832-1920).[13] It emphasized the objective analysis of observed human behaviour, which was intellectually unpalatable to James, who regarded psychology as an introspective process. He spent his life championing the belief in the healing power of introspection, writing on such topics as hypnotism, hysteria, dreams, multiple personality, witchcraft, demonical possession, and genius, and opening himself up to oriental conceptions of consciousness and personality, especially Vedanta philosophy, Theravada Buddhism, and Japanese philosophy.[14]

**3.1.2** When, after Dharmapala's 1904 lecture, James declared, "This is the psychology everybody will be studying twenty-five years from now," he apparently was not referring to Buddhist psychology itself, but a psychology of the full developmental range of human consciousness, pursued with the kind of phenomenological precision exemplified by Buddhism.[15] Perhaps, what James found attractive in Buddhism was its introspective approach in Buddhist meditation. James, in his *Principles of Psychology*, writes that in the study of subjective mental phenomena,

> *Introspective Observation is what we have to rely on first and foremost and always*. The word introspection need hardly be defined—it means, of course, the looking into our own minds and reporting what we there discover. (James 1890 1:185)

**3.1.3 Psychology**, according to James, is the study of subjective mental phenomena—mental events as experienced in the first-person—as well as the study of how mental states are related to their objects, to brain states, and to the environment, that is, mental states in their subjective manifestations. **Physiological psychology**, on the other hand, studies the relation of mind and brain, including the naturally evolved "mutual fit" of mental faculties and the environment. Nevertheless, James continues:

> The word introspection need hardly be defined—it means, of course, the looking into our own minds and reporting what we there discover. *Everyone agrees that we there discover states of consciousness.* (James, 1890 1:185)

This is a well known passage, but not often stated is that James hardly thought introspection to be easy, nor to be an infallible guide to subjective mental life.

**3.1.4** Later, in his book, when discussing sensed moments of transition in the subjective stream of thought and feeling, he graphically writes:

> Let anyone try to cut a thought across in the middle and get a look at its section, and he will see how difficult the introspective observation of the transitive tracts is…. The attempt at introspective analysis in these cases is in fact like seizing a spinning top to catch its motion, or trying to turn up the gas quickly enough to see how the darkness looks. (James 1890 1:236 f)

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[13] Wundt is generally acknowledged as the founder of experimental psychology and cognitive psychology. Many scholars, however, regard both James and Wundt as the founders of modern psychology. In 1875, both of them—James in the US and Wundt in Germany—separately set up the first two psychological laboratories in the world.

[14] E Taylor 1996:24.

[15] E Taylor 1996:146.

James clearly does not think that we already know the nature and full range of thought and feeling simply because we are able to look into our own minds.

**3.1.5** Where experimental introspectionism was used in the late 19th century, the experiments tended to be limited in scope. Each was designed to explore some limited aspect of subjective experience, and the inner observation was often correlated with some objective factor such as time or the intensity of a sensation. James, in his *Principles of Psychology* (1890 1:191) acknowledges that "*introspection is difficult and fallible*," but went on to say that "*the difficulty is simply that of all observation of whatever kind*" (emphasis his).[16]

**3.1.6 E B Titchener** (1867-1927), even less optimistic, put it this way: "There is no difference, in principle, between inspection and introspection."[17] Later he adds,

> …we must remember that the resemblance between inspection and introspection is a broad and general likeness, which consists with all manner of difference in degree and in detail. It has, of course, been customary for psychological text-books to emphasize these differences; and I do not suppose that the weight of tradition and authority can be overcome all in a moment. I am convinced, however, that the right way to approach the study of psychological method is to assume that it is, in all essentials, identical with the observational procedure of the natural sciences. ("The Schema of Introspection," *American Journal of Psychology* 23, 1912:487)

### 3.2 DECLINE AND FALL OF INTROSPECTION

**3.2.1** Introspection was not effective as a tool of psychological experiment or examination for a good reason. None of the western minds then knew how to fully utilize it. Many were simply hostile to introspectionism. One of the American pioneers of psychology, James McKeen Cattell, for example, declared with some ridicule, in 1904: "It is usually no more necessary for the subject in a psychology experiment to be a psychologist than it is for the vivisected frog to be a physiologist."[18]

**3.2.2 Evan Thompson** makes this remark in his *Oxford Handbook of Consciousness* article, which very well summarizes the current state and future of psychology and Buddhism:

> The strategy psychology pursued was to objectify the mind as much as possible, either as behavioural performance, physiological response, or with the rise of cybernetics and then cognitive science, as non-conscious information processing. "Consciousness" became a taboo term; introspection was rejected as a method for investigating the mind; and it was no longer necessary for the psychologist to have any disciplined first-person expertise in the subjectivity of mental life.
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> Although there were notable exceptions to this trend, such as Gestalt psychology and phenomenological psychology, this "taboo of subjectivity" (Wallace, 2000) has influenced the scientific study of the mind for decades. It has taken over a full century, not a quarter of one, for the science of mind to begin to find its way back to James' vision of a science of mental life, including "the varieties of religious experience" [James 1902], which integrates experimental psychology, neuroscience, and phenomenology.

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[16] For a short account of developments during this period, see Susan Blackmore 2003:14-18.

[17] E B Titchener, *Experimental psychology of the thought processes.* NY: Macmillan, 1908:180. Titchener was one of Wundt's students.

[18] JM Cattell, "The conceptions and methods of psychology." *Popular Science Monthly* 60*,* 1904, qu by W Lyons, *The Disappearance of Introspection,* Cambridge, MA: The MIT Press (A Bradford Book), 1986: 23

> In recent years, a small but growing number of cognitive scientists have come to accept that there cannot be a complete science of the mind without understanding subjectivity and consciousness, and that cognitive science accordingly needs to make systematic use of introspective first-person reports about subjective experience (Jack and Roepstorff, 2002, 2003). As cognitive neuroscientist Chris Frith recently stated: "A major programme for 21st century science will be to discover how an experience can be translated into a report, thus enabling our experiences to be shared" (Frith, 2002: 374). (Thompson 2007:3; reparagraphed)

**3.2.3** Why did western psychology come to reject introspectionism shortly after James? Apparently, introspection was given a fair trial but failed. In fact, James himself had observed that these schools applied introspection in a stilted and tedious manner, focusing on the sensations caused by weak sense-stimuli (James 1890 1:191 f). The two rival schools of introspectionist psychology, however, did agree on the *descriptive* level of introspective phenomenology. They strongly disagreed, however, on the *theoretical* or potentially causal interpretations, such as whether there was such a thing as an imageless thought.

### 3.3 Rise of behaviourism

**3.3.1** It may well be that introspection was never successfully used as a tool of psychology due to attrition between rival academic camps. There was no consensus on the definition on introspection and the reliability of first-person reports. These are the main reasons that introspectionism fell out of favour after James.

**3.3.2** In 1913, the American behaviourist psychologist **John B Watson** argued that psychology could do without the methods of introspection, and *indeed without the concept of consciousness altogether*! He proposed the abolition of such conceptions and the establishment of psychology as "a purely objective branch of natural science."[19] So began the rise of behaviourism at the cost of introspectionism.

**3.3.3** Behaviourism has the advantage that behaviour can be measured much more reliably than introspections can. Moreover, the study of animal behaviour could also be used to understand human behaviour, as in what the Russian physiologist **Ivan Pavlov** (1849-1936) tried to show in his experiments on reflexes and classical conditioning.

**3.3.4** In due course, with **B F Skinner** (1904-1990)**,** the behaviourist emphasis shifted to the study of operant conditioning, in his experiments with how rats and pigeons learned through reward and punishments. Understandably, Skinner's behaviourist ideas and methods are popular with the authorities and autocratic regimes. As **Susan Blackmore** notes:

> Behaviourism was enormously successful in explaining some kinds of behaviour, particularly in the area of learning and memory, but it more or less abolished the study of consciousness from psychology, and even the use of the word "consciousness" became unacceptable. Also, in sweeping away the worst excesses of introspectionism, behaviourism threw out the much more even-handed mind-body approach of William James' "science of mental life." This led to half a century of a very restricted kind of psychology indeed. (Blackmore 2003:18)

[19] JB Watson, "Psychology as the behaviorist views it." *Psychological Review* 20, 1913:158.

**3.3.5** Skinner believed that human behaviour was shaped by systematic reinforcements, and that the right programme of reinforcements could bring about a human utopia. Unfortunately, history has never known any utopia. There are always fears that such ideas are perniciously manipulative, and writers have produced some dystopian classics—Aldous Huxley's *Brave New World* (1932) and George Orwell's *Animal Farm* (1945)—to express their concerns.

**3.3.6** The 1960s was a remarkable period of radical change in Western society, highlighted by the hippie counterculture in the United States (and in due course Europe) as a reaction against the conservative social norms of the 1950s, the political conservatism and social repression of the Cold War period, and the US government's extensive military intervention in Vietnam. In a sense, for the hippies and their sympathisers, anything non-Christian and non-establishment was "cool." Incidental appropriations of Eastern philosophies and religions were generally common amongst the hippies.

The counterculture era also saw behaviourism losing its influence, and whose place was being taken over by **cognitive psychology**, with its emphasis on internal representations and information processing. Still, "consciousness' was a dirty word in psychology.

**3.3.7** It was only in the 1970s, with the rise in research in mental imagery,[20] or altered states of consciousness, such as sleep and drug-induced states,[21] and hypnosis.[22] Then, with the dawn of computer science,[23] that "consciousness" began to lose its dirtiness.

**3.3.8** Three decades later, in the 1990s, there was a sudden explosion of interest in consciousness, and in 2005 the Medline website[24] indexed over a thousand publications on meditation. Human consciousness has been rightfully reinstated and is regarded as "just about the last surviving mystery."[25]

**3.3.9** One warm moment in the rapprochement between Buddhism and psychoanalysis, indeed a watershed, is the publication of *Zen Buddhism and Psychoanalysis* by **Erich Fromm**, D T Suzuki and Richard De Martino. Here, Fromm, the humanist psychologist brings both ego psychology and existential psychology into his perspective on Buddhism.

While echoing Freud in stating that the task of psychoanalysis is to make the unconscious fully conscious, Fromm further asserts that this means the overcoming the division between the division of conscious and unconscious entirely, healing the alienation of the ego from the world, a healing which he sees in Zen practice. So palpable is the influence of Buddhism in Fromm's contribution to the book that "[o]ne can even read Fromm as looking to the prior tradition of Buddhism for validation for psychoanalysis." (Metcalf 2002:352)

## 4 First-person approach

### 4.1 How to see consciousness

What do you discover when you look into your own mind? William James was confident: "*Every one agrees that we there discover states of consciousness*" he said. But a hundred years later we

[20] See Blackmore 2003 ch 22.
[21] See Blackmore 1986:81 f; 2003 chs 22-24.
[22] See Blackmore 2003 ch 8.
[23] See Blackmore 2003 ch 13.
[24] http://medline.cos.com/.
[25] Daniel Dennett 1991:21.

> might be inclined to raise a few awkward questions. What does looking mean? Who is looking into what? Does the looking itself change what is seen? Does reporting destroy what we are trying to describe? Can everything be reported when some experiences are supposed to be ineffable? What are states of consciousness anyway? (Blackmore 2003:370)

**4.2** Modern scholars have noted that it is not that introspection is ineffective for obtaining descriptive accounts of subjective experience, but rather that psychology needs to discriminate carefully between the description of subjective phenomena and causal-explanatory theorizing.[26] In a well known series of studies, **Nisbett and Wilson,** for example, observed that subjects reported that their behaviour was caused by mental events when it was really the result of external manipulation.[27]

These inaccuracies, however, were causal-explanatory; they were not factual at all. The lesson here is that experimental participants need to be coached to pay strict attention to their felt cognitive processes and to avoid causal-explanatory conjectures.[28]

**4.3** In fact, we have many good examples of scientists looking inwards and reporting what they see. We have, for example, the methods of trained introspection developed by Wundt and Titchener, and James' description of the "flights and perching" in the stream of consciousness,[29] of getting up on a cold morning,[30] and his studies of religious experiences.

Various introspections on self-experience are found, for example, in Csikszentmihalyi's studies of flow and various altered states of consciousness.[31] **Evan Thompson** points out the facility of contemplative training as a research tool in the neurophenomenology of consciousness, thus:

> **…** it stands to reason that people vary in their abilities as observers and reporters of their own mental lives, and that these abilities can be enhanced through mental training of attention, emotion, and metacognition. Contemplative practice is a vehicle for precisely this sort of cognitive and emotional training. On the other hand, it stands to reason that mental training should be reflected in changes to brain structure, function, and dynamics. Hence, contemplative practice could become a research tool for developing better phenomenologies of subjective experience and for investigating the neural correlates of consciousness. (Thompson 2007:3)

**4.4** So how do we cultivate such an accurate and useful first-person observation? A number of modern scientists, have examined this question.[32] One of the clearest insights here is succinctly stated by **David Chalmers**:

> The task of a science of consciousness, as I see it, is to systematically integrate two key classes of data into a scientific framework: *third-person data,* or about behaviour and brain processes, and *first-person data,* or data about subjective experience….

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[26] Hurlbert, R T; & C L Heavy, "Telling what we know: Describing inner experience." *Trends in Cognitive Sciences* 9, 2001:400-403.

[27] Nisbett, R E; & T D Wilson, "Telling more than we can know: Verbal reports on mental processes." *Psychological Review* 84 1977:231-259.

[28] Hurlbert, R T; & C L Heavy, "Telling what we know: Describing inner experience." *Trends in Cognitive Sciences* 9, 2001:400-403.

[29] W James, 1890 1:243.

[30] W James, 1890 1:562.

[31] Eg M Csikszentmihalyi, *Flow: The psychology of optimal experience.* NY 1990.

[32] See eg F J Varela & J Shear (eds), *The View From Within*, 1999; DD Price & M Aydede, "The experimental use of introspection in the scientific study of pain and its integration with third-person methodologies: The experiential-phenomenological approach," 2005:12.

> Both third-person data and first-person data need explanation. An example is given by the case of musical processing. If we observe a subject listening to music, relevant third-person data include those concerning the nature of the auditory stimulus, its effects on the ear and the auditory cortex of the subject, various behavioural responses by the subject, and any verbal reports the subject might produce. All of these third-person data need explanation, but they are not all that needs explanation. As anyone who has listened to music knows, there is also a distinctive quality of subjective experience associated with listening to music. A science of music that explained the various third-person data listed above, but that did not explain the first-person data of musical experience, would be a seriously incomplete science of music. A complete science of musical experience must explain both sorts of phenomena, preferably within an integrated framework….
>
> The lesson is that *as data*, first-person data are irreducible to third-person data, and vice versa. That is, third-person data alone provide an incomplete catalogue of the data that need explaining: if we explain only third-person data, we have not explained everything. Likewise, the first-person data alone are also incomplete. A satisfactory science of consciousness must admit both sorts of data, and must build an explanatory connection between them.
>
> (Chalmers 2004:1-3, digital ed)

**4.5** The Buddhist contemplative tradition provides excellent training in first person observation, and shows pragmatic refinement and theoretical sophistication.[33] Where James described introspection as simply "looking into our own minds and reporting what we there discover" (1890 1:185), Buddhism teaches sustained attention to and analytic discernment of our own mental processes.

Buddhist phenomenology distinguishes between attentional stability and instability due to the two hindrances of mental excitation and laxity, as explained by **B Alan Wallace:**

> Thus, the first task in the Buddhist investigation of the mind is to so refine the attention and balance the nervous system that the mind is made properly functional, free of the detrimental influences of excitation and laxity. To do so, those two hindrances must be clearly identified in terms of one's own experience. Excitation, the first obvious interference to observing the mind, is defined as an agitated, intentional mental process that follows after attractive objects,[34] and it is a derivative of compulsive desire.[335] Laxity, on the other hand, is an intentional mental process that occurs when the attention becomes slack and the meditative object is not apprehended with vividness and forcefulness. It is said to be a derivative of delusion. (Wallace 1999:176)

**4.6** Furthermore, Buddhist phenomenology discusses the metacognitive[36] monitoring of these qualities of attention, and Buddhist epistemology looks at the degree to which a mental cognition ascertains or

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[33] Depraz, Varela and Vermersch, *On Becoming Aware: A pragmatics of experiencing.* Amsterdam & Philadelphia: John Benjamin Press, 2003

[34] Wallace 1998:168. A mental process is said to be *intentional,* not because one intends for it to occur, but because it has its own cognized object or objects. (Wallace's fn)

[35] Compulsive desire is a mental affliction that by its very nature superimposes a quality of attractiveness upon its object and yeats for it. It distorts the cognition of that object, for attachment exaggerates its admirable qualities and screens out its disagreeable qualities. Cf Guenther & Kawamura, 1975:96; Rabten 1979:74 f.

[36] "Metacognitive" is the adj of **metacognition,** an important concept in cognitive theory, consisting of two basic and simultaneous processes: *monitoring your progress* as you learn, and *making changes and adapting* your strategies if you perceive you are not doing well enough. In simple terms, it involves learning about how we learn, thinking about how we think: see further: http://coe.sdsu.edu/eet/Articles/metacognition/start.htm or http://www.-gse.buffalo.edu/fas/shuell/cep564/Metacog.htm.

fails to ascertain its mental object, according to various conditions.[37] According to this perspective, if the stream of thought and feeling is lucid, rather than turbulent or murky, then introspection, in James' sense, will be much richer in its discoveries and report.[38]

## **5** Towards a contemplative science of mind

**5.1** A dialogue is a two-way process, and in a successful dialogue both sides are somehow transformed. As mind science interacts with Buddhism learning about it and applying its mindfulness principles and methods, there is the process of what has been called "the buddhicization of psychology." And Buddhism, learning from the scientists, will have to fine-tune their religious approach, or even update or abandon outmoded teachings and practices: this is "the psychologization of Buddhism." Or, in a more restricted sense, this latter expression would refer to the kind of Buddhism that the scientists are familiar with or accept or practise.[39] [10.3]

**5.2** Understandably, mind scientists are now more enthusiastic than ever to gain a deeper understanding of experience and consciousness by making contemplative phenomenology a partner in the scientific investigation of consciousness. **Varela, Thompson and Rosch** (1991) have described this partnership approach as one of *mutual circulation,* a "back-and-forth communication between science and experience" (1991:237), where each domain of cognitive science, phenomenological philosophy, and contemplative mental training is distinct and has its own degree of autonomy—its own methods, motivations, and concerns—but they also overlap and share common areas. These domains, like circles, flow into and out of one another, so as to be mutually enlightening.[40]

**5.3** An important catalyst in working towards a workable contemplative science of mind is not to take conventional categories, especially those of science and religion, for granted. Traditionally, in the West, ever since the rise of the scientific revolution in 16th century, science has become a secular discipline, often opposed to religion.

In the ancient East, however, science has generally grown and worked in harmony with religion, even in the service of it. **Piet Hut**, in the Conclusion to *Buddhism and Science,*[41] asks some relevant questions:

> What can be the stage for a dialogue between Buddhism and science? Calling Buddhism a religion is a not very accurate description, and the very notion that science might produce a worldview is not correct, since there is still much that is left out from a scientific description. At this point it might be more prudent to start talking about mutual respect and inspiration between science and Buddhism, with an eye toward future more detailed discussions. One way of phrasing a possible middle ground between both is to start by viewing life as a laboratory, as an opportunity to examine ourselves and our world, using working hypotheses rather than doctrines.
>
> (Piet Hut 2003:399)

**5.3** This is not suggest that we stop viewing Buddhism as a religion, for there will be parts of Buddhism that are forever religious, especially for those who turn to it in a personal or apotropaic way. Nor should science water down its measures and objectivity. The middle ground is the common desire to find some

[37] G Dreyfus 1997.

[38] For a good summary of other technical benefits, see also Evan Thompson 2006:4 f.

[39] See F A Metcalf 2002:353-361.

[40] For technical issues and difficulties of "mutual circulation," see a summary by Evan Thompson 2006:6.

[41] See esp Piet Hut's "Conclusion: Life as a laboratory" in A B Wallace (ed), *Buddhism and Science,* 2003:399-415.

answers to a set of similar problems, such as those mentioned by Susan Blackmore (2003:370) [4]. Perhaps both sides would be able to see the same things if they share their insights, and help each other with the words and discipline to express these truths.

## 6 Meditation and the human brain

### 6.1 THE HUMAN BRAIN: A VERY SHORT HISTORY

**6.1.1** The normal adult human brain typically weighs between 1 and 1.5 kg (about 3 lb) and has an average volume of 1,600 cubic centimetres. The mature human brain consumes some 20-25% of the energy used by the body, while the developing brain of an infant consumes about 60% of it. Such heavy energy usage generates large quantities of heat, which must be continually removed to prevent brain damage.[42]

**6.1.2** An average male brain has approximately 4% more cells, more overall grey matter in the pre-frontal lobe and 100 grams more brain tissue than an average female brain. Both sexes, however, have similar brain weight to body weight ratios.[43] It should be noted, however, that men on average weigh more than women and that absolute brain size may not be the best measure of intelligence.[44]

Many behavioural differences have been reported for men and women. For example, it has been said that women are better in certain language abilities and men are better in certain spatial abilities. Many studies have tried to find differences in the right and left cerebral hemispheres to suggest that male and female brains are different. Few of these experiments have found meaningful differences between men and women. In fact, there are many similarities between their cerebral hemispheres.

**6.1.3** For thousands of years, humans did not know the real function of the brain. Ancient Egyptians drain the brain away through the nostril prior to mummifying the body. Ancient thinkers, such as the Greek philosopher, **Aristotle** (384-322 BCE), and **the Buddhist commentators** (5th-6th centuries) thought that mental activity occurred in the heart [7.1-2]. Ancient Greek scholars assumed correctly that the brain has a role in cooling the body, but incorrectly assumed that the brain acted as a sort of radiator, rather than as a thermostat, as it is now understood.

**6.1.4** **Herophilos** (335-280 BCE), a physician from Chalcedon in Asia Minor,[45] and **Erasistratus of Chios** (310-250 BCE), a Greek anatomist and royal physician under Seleucus I Nicator of Syria, founded a school of anatomy in Alexandria, and were among the first to conclude that the brain was the seat of intelligence. **Galen's** theory[46] that the brain's ventricles were the sites of thought and emotion prevailed until the time of the Renaissance anatomist **Vesalius** (1514-1564).

**6.1.5** In modern academic and professional fields, the study of the mind, and consciousness are varied and sophisticated. Their best known fields of study are as follows:

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[42] That is, the destruction or degeneration of brain cells, either short-term or long-term.

[43] "She Brains—He Brains." *Neuroscience for Kids*. See http://faculty.washington.edu/chudler/heshe.html. For technical reference, see A S Dekaban, "Changes in brain weights during the span of human life: relation of brain weights to body heights and body weights." *Annals of Neurology* 4,4 1978:345–356.

[44] See http://faculty.washington.edu/chudler/brainsize.html.

[45] Now Kadiköy, Turkey.

[46] Galen (129-200), more fully, **Claudius Galenus of Pergamum** (129 – 200 CE), was an ancient Greek physician. Galen's views dominated European medicine for over a thousand years.

| | |
|---|---|
| **Psychology** | The scientific study of the mind and behaviour. |
| **Psychiatry** | The medical assessment, diagnosis, treatment, rehabilitation and prevention of mental, emotional, and behavioural disorders. |
| **Neuroscience** | The study of the brain and its functions. |
| **Neurophysiology** | The study of normal healthy brain activity. |
| **Neurology** | The study of the disorders of the nervous system. |
| **Neurophenomenology** | A hybrid scientific methodology that combines neuroscience with phenomenological psychology in order to study consciousness. Phenomenology deals with the subjective aspects of first person experience. Neuroscience deals with the objective and third person aspects of consciousness. [4] |

**6.1.6** Some scientists today still regard the brain as the organ responsible for thought and consciousness. Along with the central nervous system, it also integrates and controls allostatic[47] balance and autonomic[48] functions in the body, producing and regulating many hormones, and controls cognition, recognition, processing and integration related to emotions.

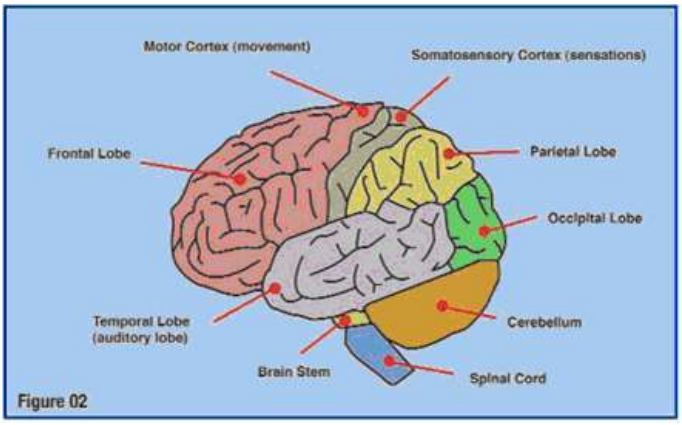


**Fig 6.2.1 The human brain (surface)**

Buddhist psychology, however, gives no significant role to the brain, and the mind (*citta, mano, viññāṇa*)[49] is not located anywhere. Just as a computer processes, stores and reproduces data, the mind-body continuum processes, stores and reproduces sense-data, which are acquired, organized and used by humans—this is what we call cognition and consciousness.

### 6.2 THE HUMAN BRAIN

**6.2.1 Human brain structure.** The human brain comprises of two hemispheres, each of which is covered by a thin skin of deeply wrinkled tissue called **the cerebral cortex**. Each bulge of the cortex is called **the gyrus** (plural, gyri), and each infold is called **the sulcus** (plural, sulci). The outside leathery covering of the brain is called **the dura**. The surface of each individual's brain is different, but the main wrinkles are common to all.

[47] "Allostatic," having to do with **allostasis,** that is, the process of achieving stability or homeostasis through physiological or behavioral change.

[48] "Autonomic," related to **the autonomic nervous system** (ANS) or visceral nervous system, that is, the part of the nervous system that controls homeostasis or the stability of the internal environment ("milieu intérieur") (the content of tissues in gases, ions and nutrients). It does so mostly by controlling the cardiovascular, digestive and respiratory functions. Salivation, perspiration, diametre of the pupils, micturition (the discharge of urine), and erection are also controlled by the ANS. Many of the activities of the ANS are involuntary. Breathing, however, can be partly consciously controlled.

[49] On *citta, mano* and *viññāṇa,* see SD 17.8a(12), see also §§1, 5.2, 7.2.

Each half of **the cerebrum**[50] is divided into 4 parts, the *frontal lobe, parietal lobe, temporal lobe* and *occipital lobe.* The frontal lobe or frontal cortex grew most dramatically during our evolutionary transition from hominid to human, and it makes up about 28% of the cortical area of the human brain, a far larger proportion than any other animal [6.2.1]. It is largely concerned with planning future action and with the control of movement. The parietal lobe is largely concerned with somatic sensation, forming a body image, and with relating our body image with extra-personal space.

The occipital lobe is largely concerned with vision. The temporal lobe is largely concerned with hearing; and through its deep structures—the hippocampus and the amygdala—with aspects of learning, memory and emotion.

## 6.2.2 The evolution of the human brain

**6.2.2.1** The human brain's evolution[51] can be divided into 3 distinct ancestral stages. These are:

- the primitive or "reptilian" brain which forms the essential core of survival functions (the breath, heartbeat, body temperature, etc) ,
- the primitive mammalian brain, or limbic system, which forms the first layer of the cortex responsible for emotions, language and the social and family behaviours of mammals, and
- the new mammalian brain (or neo-cortex) with its extensive cortical development that enables reasoning and abstract intelligence found in the primates, particularly human.

Fossil records show that human brain size has more than doubled in the past 2 million years to a volume of some 1,600 cubic centimeters. This steady growth in brain size has made possible a steady growth in intelligence, and an increasing mastery of the world.

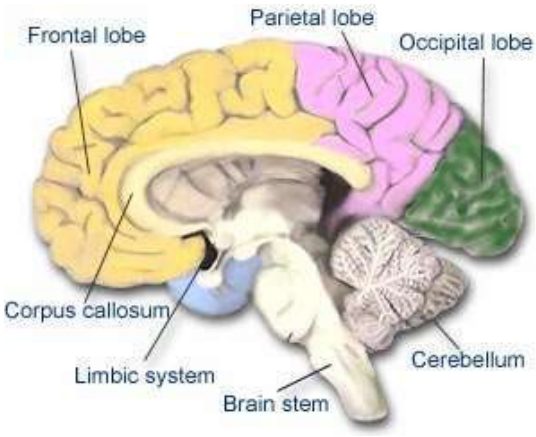


**Fig 6.2.2 The human brain (cross-section)**

**6.2.2.2** The human brain is not the largest brain there is: it is, for example, smaller than that of an elephant, or even that of a bottlenose dolphin.[52] What matters more is how the brain is structured: the human brain's uniqueness lies in its flexibility. Flexible intelligence is seen in the ability to solve problems in diverse and unexpected ways, which can then be shared with the rest of the family or tribe. It is believed that the analytical, conscious mind was born out of intellectual flexibility, helped along by an innate life-long love for learning, exploring and playing.

An early hallmark of human evolution was the capacity to reason, to reflect on actions and to engage in sophisticated discourse. The evolution of self-consciousness presaged consciousness of others and the development of ethics, seen as the rules of adaptive conduct. (Pollard, 2002)

[50] The large rounded structure of the brain occupying most of the skull (cranial cavity), divided into two halves (cerebral hemispheres).

[51] On the evolution of the human brain, see http://www.brainchannels.com/evolution/physicalbrain.html and http://thebrain.mcgill.ca/flash/d/d_05/d_05_cr/d_05_cr_her/d_05_cr_her.htm.

[52] http://en.wikipedia.org/wiki/Brain_size.

**6.2.2.3** Sophisticated instruments and methods of brain imaging (such as MRI scans)[53] [6.7.4] today allow us not only to closely examine the brain's structure but also observe and measure it at work. The human brain has many parts and each has a specific function. Each of our brains is unique and is ever changing and sensitive to its environment. Its modules are interdependent and interactive and their functions are not totally fixed. This system is so complex, that it appears that it may never succeed in comprehending itself, yet it continues to try.

**6.2.3 The limbic system.** The modules that lie beneath the corpus callosum[54] are known as *the limbic system*. This area is older than the cortex in evolutionary terms and is also known as the mammalian brain because it is thought to have first emerged in mammals. This part of the brain, and even that below it, is *unconscious*, and yet has a profound effect on our experience because it is closely connected to the conscious cortex above it and constantly feeds information upwards.

Emotions, our most basic cerebral reactions, are generated in the limbic system, along with the many inclinations and urges that help us behave in such a way to survive. For instance, the amygdala, is the place where fear is registered and generated.

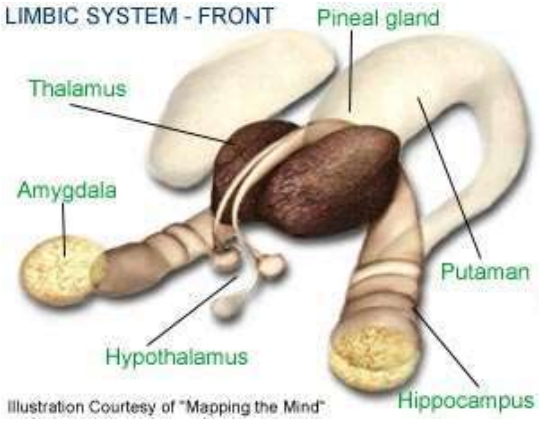


**Fig 6.2.3 The limbic system**

**6.2.4 The reptilian brain.** The brain stem or spinal bulb is the most ancient part of the brain. It evolved some 500 million years ago, and is very much like the entire brain of present-day reptiles. For this reason, it is often called the reptilian (or lizard) brain. Various clumps of cells in the brain stem determine the brain's general level of alertness and regulate the vegetative processes of the body such as breathing and heartbeat.

**6.2.5 Meditation and cognition**[55]

**6.2.5.1** Cognition is a collective term for the psychological processes that acquires, organizes and uses knowledge. It includes perception, memory, attention, problem-solving, language, thinking and imagery. Interaction between the child and its environment changes not only the child's behaviour and physiology, but also its experience of the environment.

[53] For MRI views of the brain, see http://commons.wikimedia.org/wiki/Image:Brain_chrischan_300.gif.

[54] The **corpus callosum** is a structure in the mammalian brain that connects the left and right cerebral hemispheres.

[55] This section is based on Pollard 2004.

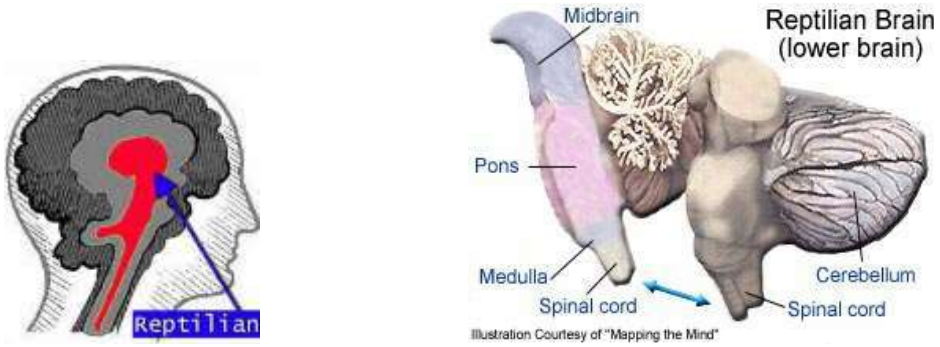


**Fig 6.2.4 The reptilian brain**

**6.2.5.2** Memory allows experience to become knowledge. Emotion, on the other hand, deals with highly individual feelings that defy any attempt at objective definition and, consequently, has long been ignored in human biology. Yet, emotions have an experiential component that is an essential part of human nature and which play a fundamental role in growth and development, social relations, and in overall wellbeing.

**6.2.5.3** Because of their adaptive value, emotions evolved relatively early in evolution with their expression being located in old parts of the brain; notably, the thalamus, amygdala and hypothalamus [Fig 6.2.3]. These structures lie between the brain stem (the oldest part mainly controlling movement) and **the neocortex.**[56] As a result an emotional activation can travel much faster through subcortical routes to produce an immediate response to a stimulus. In addition, emotional activation does not automatically require cognitive mediation and may escape intellectual processing and recognition. This implies that the origin of emotions and their attendant feelings may be difficult to recognize and acknowledge.

### 6.2.6 Meditation and the triune brain

**6.2.6.1** As already mentioned, humans have a triune (three-in-one) brain—the lizard brain, the limbic region and the neo-cortex. Apparently, there is a close connection between these three sections of the brain and early Buddhist meditation. For example, such meditation often begin with the mindfulness of the breath (*ānâpāna,sati*), which, when properly done, is very effective in slowing down the breath, the heart-rate, and blood-pressure. In other words, we become more relaxed. We have effectively toned down or even switched off the lizard brain. The breath meditation is a *body-based meditation* in the contemplation of the body (*kāyânupassanā*).

**6.2.6.2** When we are sufficiently relaxed, we can go on to cultivate lovingkindness (*mettā,bhāvanā*), which is useful in alleviating a negative mental state, making it more positive. The emotional mechanisms detected in the limbic region generate such a positive state of mind that it becomes joyfully focussed. This constitutes *a feeling-based meditation*, that is, the contemplation of feeling (*vedanā'nupassanā*).

[56] **The neocortex** ("new cortex") is part of the cerebral cortex and constitutes about 85% of the human brain's total mass. The neocortex is thought to be responsible for higher level cognitive functions, such as language, learning, memory, and complex thought. It contains some 100 billion cells, each with 1,000 to 10,000 synapses (connections), and has roughly 100 million metres of "wiring," all packed into a structure the size and thickness of a formal dinner napkin. The cells in the neocortex are arranged in six layers, within which different regions permit vision, hearing, touch, the sense of balance, movement, emotional responses and all aspects of cognition.

**6.2.6.3** When the body is profound at rest, and feeling in a positively settled state, we are ready to work on *the mind-centred* (dealing with thoughts) (*cittânupassanā*) and *the dharma-centred meditations* (*dhammânupassanā*) (dealing with spiritual states), which are manifested in the neo-cortex. The physiological aspects of spiritual experience can now be detected using various kinds of scientific machines [6.7]. However, these measurable states are simply the side-effects of the spiritual experience (which cannot really be measured). For example, we can detected certain physiological changes when a subject has pleasurable sensations when looking at pictures of loved ones, etc, but this is no measurement for the *experience* of love itself.

**6.2.6.4** In colourful meditation lingo, we can say that on the level of the lizard brain, we tend to see *a mountain as a mountain*; on the limbic level, we tend to see that a mountain is *not* a mountain; but on the neo-cortical level, we can *again* see a mountain as a mountain, but on an extrasensory level, without any mediating language. This is an experience beyond any academic discourse (it depends on language!). In the calm clarity of the non-discursive mind, beyond language and philosophy, lies true reality. Close our eyes, and truly see for ourselves.[57]

**6.2.6.5** The point here is that meditation properly done, works on the whole brain, calming it in stages, beginning with the lizard brain, then the limbic region and finally the neo-cortex, that is, as far as we can detect with scientific measuring devices. The *mechanics* of meditation may be measurable, and these early experiences of meditation may even prove to be helpful in alleviating simple stress and assist in improving attention span, and so on, but *the spirituality of meditation* lies in its dynamics, which are immeasurable.

### 6.3 MEDITATION AND MIND-BODY PROCESSES

**6.3.1** Meditation, loosely defined, is set of mental training methods involving focused attention for the purpose of self-actualization and spiritual development. It is a complex body-mind (psychosomatic) process involving changes in cognition, sensory perception, affect, hormones, and autonomic activity. Meditation is generally used in a non-religious way, such as in psychotherapy and counseling, in two main ways: regimented practice (especially sitting meditation) and mindfulness practice (by way of more wholesome view and response to situations).[58]

**6.3.2** Meditation is widely used in Western and urbanized society today in psychological and medical practices as complementary therapy, for stress management, and for a variety of physical and mental disorders. Generally, it comprises techniques of attention training leading to inner calm, clarity and insight. In simple terms, it is the opposite of attention deficit disorder. A wider, flexible attention span helps us to be more aware of a situation, to be more objective in emotionally or morally difficult situations, and to achieve a state of responsive and creative awareness or "flow."[59]

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[57] See Dale S Wright's paper on "Rethinking transcendence: The role of language in Zen experience," 1992; also Garfield & Priest, "Mountains are just mountains," 2005.

[58] See I Pollard 2004:30.

[59] **Flow** refers to an active mental state of operation in which the person is fully immersed in what he or she is doing, characterized by a feeling of zestful focus, total involvement, and emotional satisfaction. The term, proposed by psychologist **Mihaly Csikszentmihalyi**, has been widely used in a variety of fields. Very loosely, it may include experiences ranging from orgasm to dhyana. Here, however, the more wholesome aspects of present focus is meant.

**6.3.3** Sustained meditation practice has been shown to induce some bodily changes, such as those in the body's "fight or flight" response, which is effected by the autonomic nervous system (popularly known as the involuntary nervous system). It regulates many organs and muscles, including such automatic functions as the heartbeat, sweating, breathing, and digestion. The autonomic nervous system is divided into two parts:

(1) The sympathetic nervous system, which helps prepare the body for action. When a person is under stress or facing imminent danger, this system produces the fight-or-flight response: the heart-rate and breath-rate increase, the blood vessels constrict (restricting blood-flow), and muscles tighten.

(2) The parasympathetic nervous system, which activates the so called "rest and digest" responses that oppose those of the sympathetic nervous system, so that the heart-rate and breath-rate slow down, the blood vessels dilate (improving blood-flow), and a relaxing of activity in many parts of the digestive tract.

**6.3.4** It has been known for centuries that Buddhist meditation and mindfulness practice helps to reduce activity in the sympathetic nervous system and increase activity in the parasympathetic nervous system. Great advances are being made in current scientific research using novel methods and sophisticated tools to induce and measure the effects of meditation on the brain, the mind and the rest of the body, and as complementary therapy for diseases and conditions. One important area of research is studying whether meditation has to do with significant changes in brain function. A growing number of researchers believe that these positive changes are the effects of meditation.

### 6.4 How does meditation affect the brain?

**6.4.1** For decades, western researchers have tested monastics and yogis and found their remarkable abilities to control respiration, brain waves, or core body temperature.[60] Scientists are now beginning *to focus more on the normal rather than abnormal*, by studying everyday adaptive qualities and their effects on health and wellbeing.[61]

In May 2001,[62] a very significant meeting between science and religion in recent times took place when two key people—both studying the brain each in their own way—met and, in a sense, highlighted the growing dialogue and cooperation between mind science and Buddhist meditation.

**6.4.2** **Richard Davidson,** 54, director of the W M Keck Laboratory for Functional Brain Imaging and Behavior and University of Wisconsin professor of psychology and specialist in human emotions, took **the Dalai Lama** and his delegation on a tour of the new US$10 million facility.[63]

**6.4.3** Scientists like Richard Davidson had sought the ideas and assistance of Buddhists like the Dalai Lama in their quest to answer such questions as: Can meditation be used to change brain circuits associated with emotions? Do different kinds of meditation practice produce distinct brain effects? Does the development of certain brain areas through meditation impact physiological factors that may prevent illness? Which areas of the brain are developed in long-time practitioners of meditation? How long does it take before meditation produces significant brain changes?

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[60] Delmonte 1984.

[61] Pollard 2004:30.

[62] The following section is mainly based on the article "The Dalai Lama and scientists unite to study meditation" (23 May 2001) by Dian Land, accessed 9 Nov 2006 from http://www.news.wisc.edu/6205.html.

[63] For related researches at University of Wisconsin, see http://psyphz.psych.wisc.edu/web/news.html.

**6.4.4** Davidson's best-known work focuses on neuroplasticity, the capacity of the brain to develop and change throughout life, something Western science once thought impossible [9.13]. By wiring up Tibetan Buddhist monk meditators, Davidson was able to demonstrate precisely *how meditation alters brain function*. His research effectively legitimizes the study of internal states of consciousness by linking them to the objective reality of electrical activity in the central nervous system.[64] Davidson and his team published their 1992 experiment and findings in the *Proceedings of the National Academy of Sciences* in November 2004.[65] The research made its way into *The Wall Street Journal*,[66] and Davidson instantly became a celebrity scientist.[67]

**The Dalai Lama & Richard Davidson**
Photo: Jeff Miller (2001)

**6.4.5** Davidson's studies on the Tibetan meditating monks yielded new and valuable data. It is possible, however, that the monks' positive emotional state is the result of a stress-free and ordered monastic life-style, or of a disciplined meditation regimen. However, that this need not be the case was shown with a series of studies with employees at **Promega**—a biotech firm in Wisconsin.

Prior to the study, it was established that the workers exhibited high levels of right-brain activity and reported feeling "stressed-out" and unhappy with their jobs. After eight weeks of meditation training and practice, the activity in the left prefrontal cortex increased significantly, and the workers reported *feeling happier*, with a renewed sense of enthusiasm for their life and work. This heightened activity persisted for at least four months after the experiment, when the subjects were tested again.

Moreover, the meditators who showed the greatest increase in prefrontal activity after training showed *a correspondingly more robust ability to generate antibodies in response to receiving a flu vaccine*. The findings, says **Jon Kabat-Zinn**, demonstrated qualitative shifts in brain activity after only two months of mindfulness meditation that mirror preliminary results seen in expert meditators like monks.[68]

The control group showed no change. While more long-term research is required to eliminate confounding factors, the findings are very optimistic in that meditation practice can alter an individual's emotional setting towards the positive, which may then become the mind's default state.

### 6.5 The amygdala and the prefrontal cortex

**6.5.1** Researches and writings of scientists like Davidson contribute to a greater understanding of the palpable aspects of spiritual experiences that have until then seemed purely subjective and beyond the reach of scientific investigation. Davidson's work, for example, identified **the left prefrontal cortex**, an

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[64] See A Lutz, Donne & Davidson 2007:61 f.

[65] See also R Davidson et al, "Alterations in brain and immune function produced by mindfulness meditation," *Psychosomatic Medicine* 65 2003:564-570.

[66] See http://psyphz.psych.wisc.edu/web/News/All_in_Your_Head.html.

[67] See also "Is Buddhism good for your health?" (Stephen S Hall), *New York Times*, Sunday 12 Nov 2006: http://query.nytimes.com/gst/fullpage.html?sec=health&res=940CE1DB173BF937A2575AC0A9659C8B63. On the academic objection to Davidson's relationship with Buddhism (and the Dalai Lama), see Geirland 2006.

[68] R Davidson, Kabat-Zinn et al 2003; *Harvard University Gazette* 23 Jan 2006; A Lutz, Donne & Davidson 2007:57.

area of the brain behind the left forehead, as a locus of neural activity strongly associated with happiness, zest, and alertness—and with deep meditation. The function of the pre-frontal cortex is to make us stop and think about things, and as such is also known as the "inhibitory centre."[69]

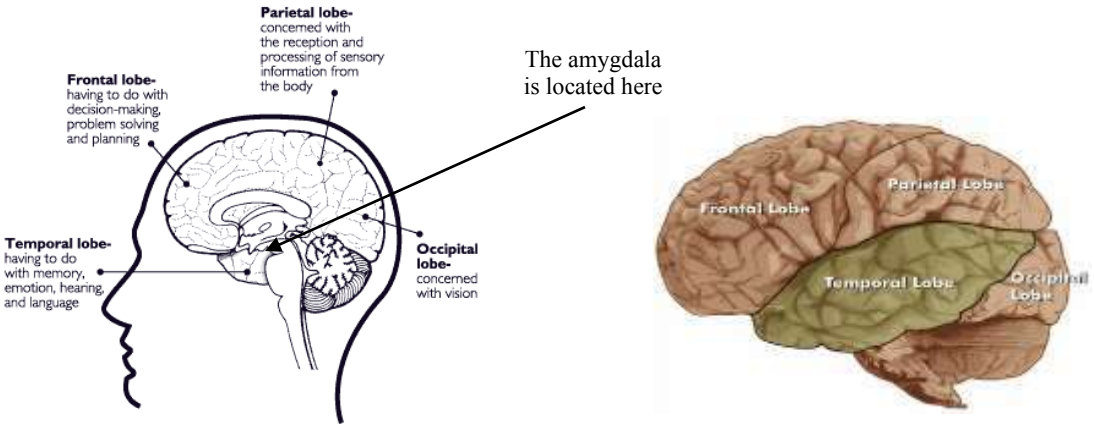


**Fig 6.5 (left) Brain cross-section; (right) profile of the left brain.**

**6.5.2** Davidson's tools are the new technologies of brain science: quantitative electrophysiology, positron emission tomography (PET), and functional magnetic resonance imaging (fMRI). By identifying interactions between the prefrontal cortex and **the amygdala**,[70] his studies may lead to new therapeutic approaches for mood and anxiety disorders. The amygdala is a key center for processing memory and emotion, and that part of the brain that decides if we should get angry or anxious, among other things. Such studies may even reveal strategies for protecting ourselves from anger-related violence, age-related memory loss and cognitive decline.

**6.5.3** More importantly, activity in the amygdala is known to increase when our face shows fear or anger, but it is still detectable *even when the emotional face is suppressed*, for example, during binocular rivalry.[71] The fact that the left prefrontal cortex is active during meditation shows that positive mental states can be generated effectively in the mind. These states are *not* initiated by the prefrontal cortex (which is merely a sort of pilot lamp), but it is the mind that generates them. Such positive states are able to moderate or, if necessary, even overrule the impulsiveness of the amygdala.

**6.5.4** Compared to the prefrontal cortex, the amygdala is older in evolutionary terms, and as such simpler. The prefrontal cortex is quick at analyzing and planning, but slow in making decisions. Its rapid judgements about a situation have a powerful effect on our emotions and behaviour, which is vital for basic survival. For example, if a person sees a fierce dog running towards him, the amygdala will trigger a fight or flight response long before the prefrontal cortex responds.

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[69] See also Irina Pollard 2004:3 f; RJ Davidson 2005; A Lutz, Donne & Davidson 2007:31.

[70] There are a pair of **amygdalae**, each about the shape and size of an "almond" (αμυγδαλη, amygdalē), are located on either side of the head, between the eye and ear, about an inch in diameter. For more info**,** see http://www.thebrain.mcgill.ca/flash/i/i_04/i_04_cr/i_04_cr_peu/i_04_cr_peu.htm. See also SD 17.8b(1.3).

[71] Williams, Morris, McGlone, Abbott & Mattingley, 2004. On binocular rivalry, see ***Saññā*** =SD 17.4 (1.3).

However, in making such snap judgements, the amygdala is prone to error, such as seeing danger where there is none. This is especially true in contemporary society where social conflicts are far more common than encounters with predators, and a basically harmless but emotionally charged situation can trigger uncontrollable fear or anger, leading to conflict, anxiety, and stress.

Because there is *roughly a quarter of a second gap* between the time an event occurs and the time it takes the amygdala to react, a skilled meditator may be able to intervene before a fight or flight response takes over, and perhaps even redirect it into more constructive or positive feelings.[72]

**6.5.5** The different roles of the amygdala and prefrontal cortex can be easily observed under the influence of various *drugs*. Alcohol, for example, generally depresses the brain, but the sophisticated prefrontal cortex is more affected than less complex areas, resulting in lowered inhibitions, decreased attention span, and greater influence of emotions over our behaviour. Likewise, the controversial drug methylphenidate[73] has the opposite effect, because it stimulates activity in the prefrontal cortex.[74]

**6.5.6** Some studies of meditation have linked the practice to increased activity in the left prefrontal cortex, which is associated with concentration, planning, meta-cognition (thinking about thinking), and positive affect (good feelings). There are similar studies linking depression and anxiety with decreased activity in the same region, and/or with dominant activity in the right prefrontal cortex. Meditation increases activity in the left prefrontal cortex, and the changes are stable over time, even if you stop meditating for a while, the effect lingers.

### 6.6 What happens in the brain when we smile

In 1862, the French neurologist, **Duchenne de Boulogne**, made this remarkable observation:

> The emotion of frank joy is expressed on the face by the combined contraction of the *zygomatic major* muscle, and the *orbicularis oculi.* The first obeys the will but the second is only put into play by the sweet emotions of the soul… (Duchenne 1990:126)[75]

Later scientists also found that in a genuine smile, some people also voluntarily contract the outer portion of the *pars lateralis* muscle, which raises the cheeks and produces crow's-feet wrinkles at the eye corners.[76] The common contraction of these three muscles are called the "Duchenne marker." Scientists then conclude that when we willfully gives a smile with the Duchenne marker,

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[72] See Thomas Zoëga Ramsøy, "How genes make up your mind" at http://www.sci-con.org/2006/03/how-genes-make-up-your-mind/ (13 Mar 2006).

[73] **Methylphenidate** (**MPH**) is an amphetamine-like prescription stimulant commonly used to treat attention deficit hyperactivity disorder (ADHD) in children and adults. It is also one of the primary drugs used to treat symptoms of traumatic brain injury and the daytime drowsiness symptoms of narcolepsy and chronic fatigue syndrome. Brand names of drugs that contain methylphenidate include Attenta®, Concerta®, Focalin®, Metadate®, Methylin®, Rilatine®), Ritalin® or Ritalina®, and Rubifen®.

[74] We can see here the significance of the fifth of the 5 precepts—that of abstaining from strong drinks and anything that intoxicates (*surā,meraya,majja,pamāda-ṭ,ṭhāna veramaṇī*)—is not just that of being sobre and socially correct in conduct, but also as prevent any negative effects on the mind, and preparing the mind ready for mental training or meditation.

[75] See http://psyphz.psych.wisc.edu/web/pubs/1990/Duchenne_**smile**.pdf & www.maths.leeds.ac.uk/Statistics/workshop/lasr2006/proceedings/linney.pdf.

[76] P Ekman, WV Friesen & M O'Sullivan, "Smiles when lying," *Journal of Personality and Social Psychology* 54,3 Mar 1988:414-420.

> it will be accompanied by a pattern of anterior brain asymmetry that has been found previously in spontaneous enjoyment, that is, greater left-sided anterior activation, compared with the voluntary production of other [non-Duchenne] smiles. (Ekman & Davidson 1993:343)

In other words, sincerely giving yourself a good smile, with the help of thinking a happy thought or looking at some pleasant object (such as fresh colourful flowers) will actually activate the left prefrontal cortex, that is, you will feel good and happy. As the Buddha says, in **the Sīla Bojjhaṅga Sutta** (S 46.3), "For one whose body is tranquil, there is happiness; for one who is happy, his mind becomes concentrated."[77]

**6.7 How do scientists look at the living brain?** Here is a summary of the main methods and brain-imaging tools used by scientists and researchers to study the human brain.[78]

**6.7.1 Invasive intervention.** Before the availability of electronic brain imaging machines and methods, intrepid surgeons or researchers would look direct into the subject's brain in *an open-brain surgery*. In the 1930s, Canadian neurosurgeon, **Wilder Penfield** (1891-1976), with his colleague, Herbert Jasper (1906-1999), treated patients with severe epilepsy by destroying nerve cells where the seizures originated.

Before operating, he stimulated the brain with electrical probes while his patients, still conscious under only local anesthesia, and observed their responses. In this way he accurately identified the brain areas to work on, reducing the side-effects of the surgery. He discovered that stimulation of the temporal lobes could bring about vivid recall of memories. Using this technique, Penfield created *the first maps of the sensory and motor cortices of the brain* showing their connections to the various limbs and organs of the body. He also mapped the sensory strip in the parietal lobe.[79]

**6.7.2 X-rays & CAT scan.** In 1895, German physicist **Wilhelm Roentgen** (1845-1923), accidentally discovered **X-rays**, making a great medical breakthrough.[80] The problem with X-rays, however, is that they are two-dimensional. Organs of the same density look the same.

In 1971, British electrical engineer **Godfrey Hounsfield** (1919-2004) improved on Roentgen's discovery by combining x-ray images with a computer. If you took many x-rays of the same area, at slightly different angles, a computer could put the information from the x-rays together to create a cross-sectional image. In the following year, he tried it out on a patient and her physicians were able to see clearly a dark, circular cyst in her brain.

Hounsfield called this technology computerized tomography scan (CT scan), also called **CAT scan** (computerized axial tomography). It was especially useful for looking at head injuries and brain problems, because it showed about 100 times greater detail in soft tissues than traditional X-rays.

**6.7.3 EEG.** The German psychiatrist **Hans Berger** (1873-1941) discovered electroencephalography (**EEG**), when he made the first electrocorticogram recording on 6 July 1924, during a neurosurgical operation on a 17-year-old boy, performed by the neurosurgeon Nikolai Guleke. He spoke of his discovery as being "spikes and waves" (Sptizenwellen), calling them alpha and beta waves, and reported it in 1929, making a historical breakthrough providing a new neurologic and psychiatric diagnostic tool at the time.

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[77] S 46.3.9/2:69 = SD 10.15.

[78] Based on http://www.nida.nih.gov/NIDA_notes/NNVol11N5/Basics.html.

[79] See http://www.pbs.org/wgbh/aso/databank/entries/bhpenf.html. Watch or download the Heritage Minute vignette on Penfield's open-brain surgery: http://www.histori.ca/minutes/minute.do?id=10211.

[80] On X-rays, see http://www.emory.edu/X-RAYS/century.htm, http://health.howstuffworks.com/x-ray.htm & http://encarta.msn.com/encyclopedia_761579196/X_Ray.html#s1.

EEG uses electrodes placed on the scalp to detect and measure patterns of electrical activity produced by the brain. The greatest advantage of EEG is speed: it can record complex patterns of neural activity occurring within fractions of a second after a stimulus has been administered. The biggest drawback to EEG is that it provides less spatial resolution than fMRI and PET [see below] do. As such, researchers often combine EEG images of brain electrical activity with MRI scans to better pinpoint the location of the brain activity.

**6.7.4 MRI.** The first commercial MRI (magnetic resonance imaging) scanner was built in March 1980. It is a computerized process that uses magnetic fields and radio waves to produce high-quality two- or three-dimensional images of brain structures without injecting radioactive tracers. Nuclear magnetic resonance is a technology that uses a gigantic magnet to line up the protons—or nuclei of hydrogen atoms —in an object or organism to align with the north-south polarity of the magnet.

MRI is excellent for observing soft tissues because they have a higher water (that is, hydrogen) content than bone. MRI can show an image of any plane through the body as the patient lies still in a body-sized tube. Using MRI, scientists can image both surface and deep brain structures with a high degree of anatomical detail, and can detect minute changes in these structures over time.[81] For many situations, MRI is the preferred diagnostic tool—especially for brain imaging, although CT scan is still chosen for strokes because it is better at detecting hemorrhage. One drawback of MRI technology is its great cost.

**6.7.5 fMRI.** In 1993, scientists developed techniques that enable them to use MRI to make "movie" images of brain activity as patients perform various tasks or are exposed to various stimuli. Called functional MRI (**fMRI**), it relies on the magnetic properties of blood to enable scientists to see images of blood-flow in the brain as it is occurring.

An fMRI scan can produce images of brain activity as fast as every second, whereas PET usually takes 40 seconds or longer to image brain activity. Thus, with fMRI, scientists can determine with greater precision when brain regions become active and how long they remain active. As a result, they can see whether brain activity occurs simultaneously or sequentially in different brain regions as a patient thinks, feels, or reacts to experimental conditions.

An fMRI scan can also produce high-quality images that *can pinpoint exactly which areas of the brain are being activated*. For example, fMRI can produce an image that distinguishes structures less than a millimeter apart, whereas the latest commercial PET scanners can resolve images of structures within 4 millimeters of each other.

In summary, fMRI provides superior image clarity along with the ability to assess blood flow and brain function in seconds. However, as we shall see below, PET still has the significant advantage of being able to identify which brain receptors are being activated by neurotransmitters, abused drugs, and potential treatment compounds.

**6.7.6 SPECT.** Another important advancement in brain-imaging is the Single Photon Emission Computed Tomography (SPECT), which uses radioactive tracers and a scanner to record data that a computer uses to construct two- or three-dimensional images of active brain regions. Work on SPECT first began in the early 1960's by **David Edwards** and **Roy Kuhl**. This rather crude device consisted of several sodium iodide photon detectors that were arranged in a rectangular position around a patient's head. This device was known to users of that era as the MARK IV camera.

It was not until advancements in nuclear imaging technology in the 1980's and 1990's that SPECT began to show promise as a diagnostic tool in the clinical environment. Generally, SPECT tracers are more limited than PET tracers in the kinds of brain activity they can monitor. SPECT tracers also deterio-

[81] For MRI views of the brain, see http://commons.wikimedia.org/wiki/Image:Brain_chrischan_300.gif.

rate more slowly than many PET tracers, which means that SPECT studies require longer test and retest periods than PET studies do. However, because SPECT tracers are longer lasting, they do not require an onsite cyclotron to produce them. SPECT studies also require less technical and medical staff support than PET studies do.

Today, SPECT imaging is recognized as one of the best imaging modalities to measure brain function and is frequently used in the diagnosis of Traumatic Brain Injury, Alzheimer's, Seizure Mapping, and is being increasingly used as a diagnostic tool for ADD/ADHD,[82] bipolar disorder, depression, anxiety disorders, OCD (obsessive compulsive disorder), and other psychiatric conditions. While PET is more versatile than SPECT and produces more detailed images with a higher degree of resolution, particularly of deeper brain structures, SPECT is much less expensive than PET and can address many of the same drug abuse research questions that PET can.

**6.7.7 PET.** Like SPECT, positron emission tomography (PET) uses radioactive tracers ("radiotracers") to assess blood-flow in the brain. PET studies make use of a machine called a cyclotron to "label" specific drugs or analogues of natural body compounds, such as glucose, with small amounts of radioactivity. The radio-tracer or labelled compound is then injected into the bloodstream, which carries it to the brain. PET measures emissions from these radioactive tracers in the bloodstream and uses the data to produce two- or three-dimensional images of the distribution of the chemicals in the brain and body.

Using different compounds, PET can show blood flow, oxygen and glucose metabolism, and drug concentrations in the tissues of the working brain. Blood flow and oxygen and glucose metabolism reflect the amount of brain activity in different regions and enable scientists to learn

The first PET camera was built for human studies by **Edward Hoffman**, **Michael M Ter-Pogossian**, and **Michael E Phelps** in 1973 at Washington University, with the Department of Energy (DOE) and the National Institutes of Health (NIH), USA, support. Phelps, who is often credited with inventing PET, received the 1998 Enrico Fermi Presidential Award for his work. The first whole-body PET scanner appeared in 1977.

### 6.8 WHAT HAPPENS IN THE BRAIN DURING MEDITATION?

**6.8.1** The brain is an electrochemical organ that works on electromagnetic energy. Electrical activity emanating from the brain is displayed in the form of brainwaves. There are four types of these brainwaves, ranging from the high amplitude, low frequency, delta to the low amplitude, high frequency, beta [Fig 6.7]. Everyone experiences the same characteristic brainwaves, but they alter during meditation.

In a good meditation, we begin with high beta (some thinking), followed by more alpha (less thinking), then more theta (more focus), and finally delta (full stillness). At the end of the meditation, the reverse process occurs, and we return to the beta level, feeling refreshed, often with new insights.

**6.8.2 Beta** ($\beta$): 13-30 cycles per second. This is waking state, occurring during extraversion, concentration, logical thinking, and active conversation. A debater would be in high beta. A person making a speech, or a teacher teaching, or a talk-show host hosting, would all be in a beta-state.

**Alpha** ($\alpha$): 7-13 cycles per second. This is a relaxed state, characterized by non-arousal, such as during deep meditation and hypnosis.

**Theta** ($\chi$): 4-7 cycles per second. This occurs in dreaming, day-dreaming, creativity, light meditation, paranormal phenomena, out of body experiences, ESP, shamanic journeys.

[82] Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder.

A person who is driving on a freeway who discovers that he cannot recall the last five kilometres, is often in a theta state, induced by the humdrum freeway driving. This can also occur when you are in the shower, or a bath, or even while shaving, or brushing your hair. It is a state where tasks become so automatic that you can mentally disengage from them. The mental process that occurs during the theta state is often *a free flow*, one thst is free of censorship and guilt-feeling, and is typically a very positive mental state.

**Delta** (δ): 1.5-4 or less cycles per second. This occurs in deep dreamless sleep.

**6.8.3** Researchers have found that EEG recordings of skilled Buddhist meditators of 10-40 years training showed a significant rise in gamma wave[83] activity in the 80 to 120 Hz range during meditation. There was also a rise in the range of 25 to 42 Hz. EEG done on new meditators showed considerably less rise. The experienced meditators also showed increased gamma activity while at rest and not meditating. During meditation there is a modest increase in slow alpha or theta wave EEG activity.[84]

**6.8.4** Chang and Lo[85] reported different results, classifying five patterns they found in meditation based on the normal four frequency ranges (delta < 4 Hz, theta 4 to < 8 Hz, alpha 8 to 13 Hz, and beta >13 Hz). The five patterns they found were:

(1) delta
(2) delta + theta
(3) theta + slow alpha
(4) high-amplitude alpha
(5) amplitude suppressed ("silent and almost flat")

They found pattern #5 unique and characterized by:

(1) extremely low power (significant suppression of EEG amplitude)
(2) corresponding temporal patterns with no particular EEG rhythm
(3) no dominating peak in the spectral distribution

They had collected EEG patterns from more than fifty meditators over five years. Five meditation EEG scenarios were then described. They further stated that most of the meditation was dominated by alpha waves. They found that delta and theta waves occurred occasionally, sometimes while people were asleep and sometimes awake. In particular, they found that the amplitude suppressed pattern correlated with "the feeling of blessings."

### 6.9 Proven benefits of meditation

**6.9.1** An imaging study led by Massachusetts General Hospital researchers showed that certain areas of the cerebral cortex, the outer layer of the brain, grew thicker in participants who were experienced in Buddhist insight meditation. The cerebral cortex is associated with emotional, attention, interoceptive and sensory processes. The thickening of the cortical layer in the experienced meditators suggests that *meditation can reduce the thinning of the cortex* that typically occurs with aging.[86] **Sara Lazar and her**

[83] A **gamma wave** is a pattern of brain waves, associated with perception and higher cognitive activity. Gamma waves are produced when masses of neurons emit electrical signals at the rate of around 40 times a second (40 hertz = Hz), but can often be between 26 and upwards of 70 Hz. Research has shown gamma waves are continuously present during the process of awakening and during active rapid eye movement (REM) sleep. Some researchers do not distinguish gamma waves as a distinct class but include them in beta brain waves.

[84] Lutz, Greischar, Rawlings, Ricard & Davidson 2004:16369-16373.

[85] Chang Kang-Ming & Lo Pei-Chen, 2005.

[86] The increased thickness of the cortical layer is only about 4 to 8 thousandths of an inch. "These increases are proportional to the time a person has been meditating during their lives," **Lazar** notes. "This suggests that the

**team's** findings that "Meditation experience is associated with increased cortical thickness" opens with this abstract:

> Previous research indicates that long-term meditation practice is associated with altered resting electroencephalogram patterns, suggestive of long lasting changes in brain activity. We hypothesized that meditation practice might also be associated with changes in the brain's physical structure. Magnetic resonance imaging was used to assess cortical thickness in 20 participants with extensive Insight meditation experience, which involves focused attention to internal experiences.
>
> Brain regions associated with attention, interoception[87] and sensory processing were thicker in meditation participants than matched controls, including the prefrontal cortex and right anterior insula. Between-group differences in prefrontal cortical thickness were most pronounced in older participants, suggesting that meditation might offset age-related cortical thinning.
>
> Finally, the thickness of two regions correlated with meditation experience. These data provide the first structural evidence for experience-dependent cortical plasticity associated with meditation practice. (Lazar, Kerr, Wasserman, et al 2005)

**6.9.2** Other important benefits of meditation attested by scientific researches include the following:

- Students who lost a night's sleep, after meditating, improved their performance due to better attention span and focus: meditation may give the sleepy brain an edge. (Time Magazine, 23 Jan 2006).
- Meditation make employees sharper, improves productivity, in large part by preventing stress-related illness and reducing absenteeism. (Time Magazine, 23 Jan 2006).[88]
- Meditation not only activates the left prefrontal cortex (reflecting a positive mental state), but such subjects also showed a significantly greater antibody response to influenza vaccine (in other words, they responded very well to the immunization process).[89]
- Meditation causes healthy physiological changes: increase in blood-flow but reduced heart rate;[90] lowered blood pressure;[91] muscles apparently stop producing carbon monoxide,

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thickness differences are acquired through extensive practice and not simply due to differences between meditators and non-meditators." (WJ Cromie, *Harvard University Gazette* 23 Jan 2006), http://www.news.harvard.edu/gazette/daily /2006/01/23-meditation.html. **A Lutz, Donne & Davidson** adds, "Increased cortical thickness could be due to greater arborization per neuron, increased glial volume, or increased regional vasculature, all of which are important for neural function." (2007:30). **Sara W Lazar et al**, "Meditation experience is associated with increased cortical thickness." *Neuroreport* 16,17 November 28, 2005:1893-1897; USA Today 14 Nov 2005; ***Medical Study News*** 14 Nov 2005, http://www.news-medical.net/print_article.asp?id=14477; for **Lazar interview**, see http://www.scicon.org/2006/02/ meditation-may-increase-the-thickness-of-the-cortex/.

[87] **Interoception** orig referred to the stimuli arising within the body and esp in the viscera. Now the term includes the physiological condition of the entire body and the ability of visceral afferent (nerve or nerve-impulse) information to reach awareness and affect behaviour, either directly or indirectly. The system of interoception as a whole constitutes "the material me" and relates to how we perceive feelings from our bodies that determine our mood, sense of well-being and emotions. See Oliver G Cameron, *Visceral Sensory Neuroscience: Interoception,* Oxford: Oxford Univ Press, 2002 & http://brain.oxfordjournals.org/content/126/6/1505.full.

[88] On how Promega workers benefitted from meditation, see 6.4 above.

[89] Rosenkranz et al 2003.

[90] Delmonte 1984; Zeier 1984; Sudsuang et al 1991.

[91] Sudsuang et al 1991.

decreased renal and hepatic blood flow, increased cerebral flow,[92] lower breathing rate (the body needs less oxygen).[93]

- In some meditation (eg the Tibetan Tummo, or *caṇḍāli,* practice) heat is often a byproduct, and in some cases the meditator can voluntarily increase heat up to as much as 8°C in their toes and fingers.[94]
- The mind can be trained through voluntary emotion regulation to be positive and happy.[95]
- Even simple meditation brings us relaxation, self-awareness, greater self-control, greater awareness of our senses, and deeper intuition within a nonreligious context.[96]
- Vipassana meditation, a popular modern form of Buddhist meditation, is being successfully used in the rehabilitation of inmates in Indian prisons (especially at Tihar Central Prison, New Delhi, and at the Baroda Jail, Gujarat)[97] and in North America.[98]

**6.9.3** For Buddhism, the ultimate purpose of meditation is to free ourselves from suffering and to gain spiritual liberation. However, meditation has its immediate and mundane benefits for those who need them. It can certainly create a more conducive environment for living. But meditation needs to be cultivated (*bhaveti*). Just as schoolchildren take PE, Davidson points out, "Wouldn't it be wonderful if they also attended a class called ME—mental education?"

# 7 The mind and the brain

### 7.1 Is the brain the seat of consciousness?

**7.1.1 Consciousness and the brain.** In the past five decades or so, psychology has begun to examine the relationship between consciousness and the brain or nervous system. **The human brain** is perhaps the most complicated object in the known universe. Despite its relatively small size, it takes up the much of the body's metabolism: it uses up a lot of our energy. Even though it weighs only about 2% of our body weight, it uses about 20% of our blood supply, 20% of our energy, and generates about 20% of our heat [6.1[. The experts are, however, still not clear how the mind or consciousness, and the brain interact: does consciousness determine brain states, or do brain states determine consciousness, or do both occur as separate processes, in which case, do they influence one another?

**7.1.2 "No brainer."** In 1980,[99] it is reported that **John Lorber** (1915-1996), neurology professsor at the University of Sheffield, made an amazing discovery while treating one of the mathematics students for a

[92] Newberg et al 2001.

[93] Hirai 1974, Zeier 1984; Kesterson & Clinch 1989; Benson et al 1990.

[94] Benson et al 1982.

[95] RJ Davidson 2005.

[96] GF Kelly 1996: 49-66.

[97] **Kiran Bedi**, the former Inspector General of Prisons in New Delhi, successfully introduced Vipassana into these prisons. Their success has been so dramatic that the Indian Government has introduced Vipassana in all of India's prisons. See http://www.prison.dhamma.org/dtdv.htm. See related film documentary, "Doing Time, Doing Vipassana," winner of the Golden Spire Award (1998 San Francisco Film Festival), and winner of the 1998 NCCD [National Council on Crime and Delinquency] Pass Awards: http://www.karunafilms.com/Dtdv/Dtdv.htm.

[98] On the success of Vipassana meditation courses in various North American prisons, radio interview, Lucia Meijer's article, history of Vipassana courses in American prisons, see http://www.prison.dhamma.org/usprison.htm. Listen to interview with **Lucia Meijer**, prison administrator of the North Rehabilitation Facility, a minimum-security of the King County jail system, Seattle, Washington: http://www.prison.dhamma.org/lminterview.ram (needs Windows Media player, Real Player or similar player).

minor ailment. A campus doctor, noticing that the student's head was a little larger than normal, referred him to professor Lorber. The student in question was academically bright, with an IQ of 126 and was expected to graduate. Through a CAT-scan,[100] however, Lorber discovered that the student's cerebrum had been squeezed out by fluid pressure.

Instead of two hemispheres filling the cranial cavity, usually 4-5 mm thick, the student had *less than 1 mm of cerebral tissue* covering the top of his spinal column. The student was suffering from hydrocephalus, the condition in which the cerebrospinal fluid, instead of circulating around the brain and entering the bloodstream, is dammed up inside the skull. He had virtually no brain at all!

Normally, the condition is fatal in the first months of childhood. Even where an individual survives he or she is usually seriously handicapped. Somehow, though, the Sheffield student had lived a perfectly normal life and went on to gain an honours degree in mathematics.

**7.1.3 Other cases.** This case is by no means as rare. In 1970, a New Yorker died at the age of 35. He had left school with no academic achievements, but had worked at manual jobs such as being a building janitor, and was popular in his neighbourhood. Tenants of the building where he worked described him as routinely doing his daily chores, such as tending the boiler, and reading the tabloid newspapers. When an autopsy was performed to determine the cause of his premature death he, too, was found to have practically no brain at all.[101] [7.1.5]

**7.1.4 Professor Lorber** had identified several hundred people who had very small cerebral hemispheres but who appeared to be normal intelligent individuals. He described some of them as having "no detectable brain," yet they had scored up to 120 on IQ tests.[102] Patrick Wall, professor of anatomy at the University College, London, notes that the importance of Lorber's work was that he had conducted a long series of systematic scanning, rather than simply collecting anecdotal material.

Lorber and other scientists theorized that there may be such a high level of redundancy in normal brain function that the minute bits of brain that these people have, may be able to assume the essential activities of a normal-sized brain. Although such findings may not conclusively show that the brain is unnecessary, they do show that the brain could work in conditions that conventional medical science would have thought impossible. [7.1.6]

**7.1.5 The "10%" myth**. No one knows how people with "no detectable brain" are able to function at all, let alone to graduate in mathematics, but there are a couple theories. One is that there is such a high

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[99] This section is adapted from Roger Lewin, "Is your brain really necessary?" *Science* 210 12 Dec 1980:1232-1234, accessed on 7 Nov 2006 from http://www.alternativescience.com/no_brainer.htm. See also *Science Digest* 91,10 Oct 1983; also http://www.therossshow.com/showthread.php?t=8196. For picture, see http://www.flickr.com/photos/68607481@N00/19449390/.

[100] CAT = "Computed Axial Tomography" is the process of using computers to generate a three-dimensional image from flat (ie, two-dimensional) x-ray pictures, one slice at a time. Also called CT scan or body section roentgenography,

[101] On 13 Sep 1848, in Cavendish, Vermont, USA, an accidental explosion of a charge set by **Nicholas Gage** blew his tamping iron (3' 7" = 109.2 cm long, weighed 13½ lbs = 6 kg, and 1¼ ins = 3.2 cm in diameter at one end) point first through his head under his left cheek bone and completely out through the top of his head, landing about 25 to 30 yards behind him. Phineas was knocked over but may not have lost consciousness even though most of the front part of the left side of his brain was destroyed. Dr John Martyn Harlow, the young physician of Cavendish, treated him with such success that he returned home to Lebanon, New Hampshire, 10 weeks later. His personal character however changed dramatically. See http://www.deakin.edu.au/hmnbs/psychology/gagepage/Pgstory.php. For photo, see http://www.flickr.com/photos/lfdeale/19449390/lightbox/.

[102] See also Brahmavamso 2001:3.

level of redundancy of function in the normal brain that what little remains is able to adapt as a surrogate for the missing hemispheres. Another suggestion similarly refers to the popular notion that we only use a small percentage of our brains anyway—perhaps as little as only 10 per cent.

The trouble with these ideas is that recent research seems to contradict them. The functions of the brain have been mapped comprehensively and although there is some redundancy, there is also a high degree of specialization—the motor area and the visual cortex being highly specific, for instance.

Similarly, the idea that we "only use 10 per cent of our brain" is a misunderstanding dating from research in the 1930s in which the functions of large areas of the cortex could not be determined and were dubbed "silent," when, in fact, they are linked with important functions like speech and abstract thinking.

**7.1.6 Mystery of memory**. Lorber's findings also remind us of the mystery of memory. At first, it was thought that memory would have some physical substrate in the brain, like the memory chips in a PC. But extensive investigation of the brain has surprisingly shown that *memory is not located in any one area* or in any specific substrate. We can conclude then that memory is everywhere in the brain and nowhere.[103] Such a notion is in full agreement with the early Buddhist teachings. More later. [7.3.2]

But if the brain is not a mechanism for classifying and storing experiences and analysing them to enable us to live our lives then what on earth is the brain for? And where is the seat of human intelligence? Where is the mind?

**7.1.7 Rupert Sheldrake**. One of the few biologists to propose a radically new approach to these questions was Cambridge-trained biologist, **Rupert Sheldrake**. In his book *A New Science of Life* (1999), Sheldrake rejected the idea that the brain is a warehouse for memories and suggested it is more like *a radio receiver for tuning into the past*. Memory is not a recording process in which a medium is altered to store records, but a journey that the mind makes into the past via the process of morphic resonance. Such a "radio" receiver would require far fewer and less complex structures than a warehouse capable of storing and retrieving a lifetime of data. This may sound like science fiction, but it is difficult to find a better explanation.[104]

### 7.2 THE MIND IS NOT JUST THE BRAIN

**7.2.1 What is the brain?** One question that neither western psychology and contemporary Buddhist psychology seek to answer is the one regarding the seat of consciousness: Where is consciousness located? Is the mind located in the brain? Is the mind the function of the brain? Let us begin with the basics.

**The brain** can be defined as that portion of the vertebrate central nervous system that is enclosed within the cranium (the skull), connected to the spinal cord, and composed of gray matter and white matter. It acts as the primary centre for the regulation and control of bodily activities, receiving and interpreting sensory impulses, and transmitting information and instructions to the muscles and bodily organs.[105]

Buddhism, however, has never regarded the brain as the seat of consciousness, thought, memory, and emotion. As **Hamilton** notes

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[103] On the conclusion of the stimulus-response behaviourist Karl Lashley (1890-1958), see eg Costandi 2009: http://www.scientificamerican.com/article.cfm?id=the-memory-trace & Engram research. For a few key scientists who have researched on memory, see http://penta.ufrgs.br/edu/telelab/1/famous.htm.

[104] For an overview of the mind-brain debate, see eg http://www.horizonresearch.org/mind-brain-problem.html.

[105] For interactive 3-D MRI/PET view of brain: http://www.med.harvard.edu/AANLIB/cases/caseNA/pb9.htm.

> Nowhere in the early texts is "mind" in this context equated with the brain, and, in spite of its materialistic understanding of the form-*khandha*, the Theravāda tradition as a whole has not interpreted mind to mean brain. As explained in Chapter Two ["The Indian Context"], in the early texts "mind" seems to refer to the most preliminary stage of filtering and organizing of experiential data according to whether it is seen, heard, smelt, tasted, touched or non-sensory (that is, abstract). (Hamilton 2000:167 n27)

### 7.2.2 Cardiac theory

**7.2.2.1** Nowhere in the scriptures does the Buddha assign a specific seat of consciousness, as those of the other senses. However, there was a popular cardiac theory of his time, one that was evidently upheld by **the Upaniṣads**, where we find that the breath is associated with "soul," with death, and with the heart as well. In sleep, for example, "When this being fell asleep... then [he] rests in that place which is the space within the heart" (*yatraiṣa etat supto 'bhūt ... ya eso'ntar-hṛdaya ākāśaḥ tasmiñ chete*) (Bṛhad Āraṇyaka Upaniṣad 2.1.17). At death, "the point of his heart becomes lighted up and by that light the self departs" (*tasya haitasya ṛdayasyāgraṁ pradyotate, tena pradyotenaiṣa ātmā niṣkrāmati*) (BU 4.4.2).

**7.2.2.2** In the Kaṭha Upaniṣad of several centuries later, we in fact find the soul (or self) directly linked with the heart: *ātmāsya jantor nihito guhāyaṁ* 'the self is set in the heart of every creature' (KU 1.2.20). The Chāndogya is even more clear in stating that "the self is in the heart" (*ātmā hṛdi*) (CU 8.3.3). In the Chāndogya, we have a physical description of the mind/heart: "Now, here in this city of Brahman is an abode, a small **lotus flower**; within it is a small place" (*atha yad idam asmin brahmapure daharaṁ* ***puṇḍarīkaṁ*** *ve'sma, daharo'sminn antarākāśaḥ....*) (CU 8.1.1).

The term *hṛdaya* itself occurs two verses later: "as far, verily, as this [world] space extends, so far extends the space within **the heart**" (*yāvān vā ayam ākāśaḥ, tāvān eṣo'ntar**hṛdaya** ākāśaḥ....*) (CU 8.1.3). All this is very interesting when we note that **the Visuddhi,magga**, too, characterizes the heart in terms of a lotus, in relation to both its shape and color.[106]

**7.2.2.3** The Visuddhimagga clearly places the mind (*mano*), specifically in the heart, in the form (*rūpa*) aggregate: 'The heart-basis has the characteristic of being the [material] support for the mind-element and for the mind-consciousness element' (*hetu,mano,viññāṇa,dhātūnaṁ,nissaya,lakkhaṇaṁ hadaya,vatthu,* Vism 14.60/447). The characteristics of the mind are then shown, with its function (*rasa*) being to "subserve" (*ādhāraṇa*) and the "manifestation" (*paccupaṭṭhāna*) being "the carrying of them" (*ubbahana*).

**7.2.2.4** Apparently, the Buddha knows of this cardiac theory, but nowhere in the Suttas do we find him referring to it. Even in **the Vibhaṅga,** in the definition of the mind-element and mind-consciousness-element, the word *hadaya* is used in a purely mental, and not physical, sense (Vism 88 f). The brain (*mattha,luṅga*), moreover, seems to have been added as the thirty-second part of the body in **the Paṭisambhidā,magga** (Pm 1.7).

The earliest canonical allusion to the seat of consciousness is found in **the Paṭṭhāna,** even then very obliquely, almost cryptically, mentioned as "**depending on that material form**" (*yam rūpam nissāya,* Paṭ 1.4), without ascertaining whether *rūpa* is the heart *(hadaya)* or the brain (*matthaluṅga*). However, for

[106] "Heart: This is the heart flesh. As to *colour,* it is the colour of the black of a red-lotus petal. As to *shape,* it is the shape of a lotus bud with the outer petals removed and turned upside down; it is smooth outside, and inside it is like the interior of a *kosātaki* (loofah gourd) (Vism 8.111/256).

commentators like Buddhaghosa and Anuruddha,[107] the seat of consciousness is clearly the heart, despite the fact that the Buddha has never accepted the popular cardiac theory of his time.

**7.2.2.5** This has led **S H J Sugunasiri** to conclude that

> No doubt the much more detailed characterization of the heart in the Visuddhimagga speaks to the creative genius of Buddhaghosa that Ñāṇamoli [Vism 497 n26] talks about. But the parallel between the specific characterization of the heart in relation to the lotus and the placing of "the mind-element and the mind-consciousness element" in the blood that is in the hollow of the heart are too close to be dismissed as being merely coincidental or accidental. The inevitable conclusion, then, has to be that the origin of the view of the seat of consciousness as being in the heart is at least partly Upaniṣadic. (Sugunasiri 1995:417)

Sugunasiri strongly rejects the identification of the heart-base as the seat of consciousness as "a gross misrepresentation of the Buddha," and concludes, by way of the commonly accepted Buddhist view today, that "the mind is extended throughout the body, through its neuroskeletal system" and that

> the mind is in every one of over several trillion cells in one of us, residing in each DNA molecule and in instantaneous communication with every other DNA, with research assigning this function of communication to "neuropeptides" or "information molecules."
>
> (Sugunasiri 1995:423)

Unfortunately, Sugunasiri only quotes from writers of popular psychology in popular psychology magazine articles.[108]

### 7.3 THE MIND IS TRAINABLE.

#### 7.3.1 The gradual way

**7.3.1.1** In the early texts, we are often told that the Buddha, when he teaches, would first ensure that the mind of the listener or the audience is well prepared by the gradual teaching (*ānupubbī,kathā*). In other words, the Buddha prepares the listening mind of the disciple before going on higher truths. The well known stock passage found in the early texts runs as follows:

> Then the Blessed One gave him a gradual instruction—that is to say, he spoke on giving (*dāna*), on moral virtue (*sīla*) and on the heavens (*sagga*); he explained the danger, worthlessness, and impurity of sensual pleasures (*kām'ādīnava*); and the advantages of renunciation (*nekkhamm'ānisaṁsa*).
>
> When the Blessed One perceived that the listener's mind was *prepared, pliant, free from hindrances, elevated and lucid*, then he explained to him the teaching peculiar to the Buddhas, that is to say: suffering, its arising, its ending, and the path.[109]

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[107] See Abhs:BRS 6.3/239(5).

[108] See a related story, "What is the biggest thing in the world?" [10.3].

[109] *Atha kho bhagavā… ānupubbīkathaṁ kathesi seyyathīdaṁ. Dāna.kathaṁ sīla,kathaṁ sagga,kathaṁ kāmānaṁ ādīnavaṁ okāraṁ saṅkilesaṁ nekkhamme ca ānisaṁsaṁ pakāsesi. Yadā bhagavā aññāsi … kalla,cittaṁ mudu,cittaṁ vinīvaraṇa,cittaṁ udagga,cittaṁ pasanna,cittaṁ, atha yā buddhānaṁ sāmukkaṁsikā dhamma-,desanā, taṁ pakāsesi: dukkhaṁ samudayaṁ nirodhaṁ maggaṁ.* (The VRI read *ānupubbīkathaṁ* as either *anupubbiṁ kathaṁ* or as *ānupubbiṁ kathaṁ*.) See **Vinaya** (V 1:15, 16, 18, 19, 20, 23, 37, 181, 225, 237, 242, 243,

**7.3.1.2** Only when the listener's mind is "prepared, pliant, free from hindrances, elevated and lucid" (*kalla,cittaṁ mudu,cittaṁ vinīvaraṇa,cittaṁ udagga,cittaṁ pasanna,cittaṁ*), does the Buddha teach the four noble truths and deeper teachings. The Commentaries explain the key terms as follows:

"prepared mind" (*kalla,cittaṁ*) — "a healthy mind" (*aroga,cittaṁ*) (DA 3:92);
"pliant mind" (*mudu,cittaṁ*) — "a mind free of stiffness, rid of ill will by way of lovingkindness" (*vyāpāda,vigamena mettā,vasena akathina,cittaṁ*) (UA 283);
"free from hindrances" (*vinīvaraṇa,cittaṁ*) — "an unobstructed mind due to non-agitation by the ridding of restlessness and worry" (*udhacca,kukkucca,vigamena avikkhipanato na pihita,cittaṁ*) (UA 283; PmA 1:232);
"elevated mind" (*udagga,cittaṁ*) — "not faint-hearted, supported by the ridding of sloth and torpor" (*thīna,middha,vigamena sampaggaha,vasena alīna,cittaṁ*) (UA 283);
"lucid mind" (*pasanna,cittaṁ*) — "the mind that is focused on right practice by the ridding of doubt" (*vicikicchā.vigamena sammā,paṭipattiyā adhimutta,cittaṁ*) (UA 283); "a mind brightened by faith by way of karmic fruit, by way of faith in the three jewels" (*ratana-t,taya,saddhāya kamma,phala,saddhāya ca pasanna,mānasaṁ*) (ItA 1:73).

**7.3.1.3** Basically, we see here that the Buddha, first of all, clears away any immediate issues troubling the listener, so that his mind is healthy (*aroga*), and other negative states, including the temporary suppression of unwholesome sense-desires (*kāma-c,chanda*) that is the basis for ill will (*vyāpāda*) and the other four mental hindrances (sloth and torpor, restlessness and worry, and doubt). Such a clear and light mind is, in fact ready for dhyanic meditation, too.

### 7.3.2 The mind is not located anywhere

**7.3.2.1** In the early texts, the seat of consciousness is never located in the brain, nor is it in the heart (although post-Buddha teachings posit it so). In fact, consciousness or the mind is, in a broad sense, not located "anywhere, but is everywhere." Buddhism sees the mind and consciousness as evolving processes: those of the spiritually undeveloped, they are "small" (*paritta*), in the highly evolved beings, they are "exalted" or "great" (*mahaggata*), even if such experiences are attained temporarily through dhyana, as **Sujato** notes:

> Here again, as in the contemplation of feelings, a distinctive facet of all the satipatthana material is the direct experience of the "exalted" [*mahaggata*] mind, the "unexcelled" [*anuttara*] mind, the mind "in samadhi" [*samāhita*], the "released" [*vimutta*] mind—all synonyms for jhana.
>
> (Sujato 2004b:150)

**7.3.2.2** The terms Sujato refers to here comes from the contemplation of the mind (*cittânupassanā*) in **the Satipaṭṭhāna Suttas** (D 22; M 10), which is the locus classicus for the Buddhist view of the mind, and the formula is a stock passage found through the 4 Nikāyas:[110]

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248; 2:156, 181, 182 x2); **Ambaṭṭha S** (D 1:110); **Kūṭa,danta S** (D 1:148); **Mahâpadānā S** (D 2:41, 43, 44); **Upāli S** (M 1:379); **Brahmâyu S** (M 2:145); **Sīha S** (A 4:186); **Ugga S 1** (A 4:209); **Ugga S 2** (A 4:213); **Suppabuddha Kuṭṭhi S** (U 49). See also **Udāyī S** (A 3:184).

[110] **Sāmañña,phala S** (D 2.209/1:79 f); **Subha S** (D 10.21/1:209); **Mahā Satipaṭṭhāna S** (D 22.12/2:299), SD 13.2; **Satipaṭṭhāna S** (M 10.34/1:59), SD 13.3; **Ākaṅkheyya S** (M 6.16/1:34); **Mahā Sīhanāda** (M 12.8/1:69); **Mahā Vacchagotta S** (M 73.21/1:495); **Mahā Sakul'udāyī S** (M 77.33/2:19); **Gopaka Moggallāna S** (M 108.20/3:12); **Kāya,-**

And how, bhikshus, does a monk dwell observing the mind[111] in the mind?
Here, bhikshus,[112]
(1) a monk understands a lustful mind as 'Lustful mind,'
or, he understands a lust-free mind as 'Lust-free mind.'
(2) Or, he understands a hating mind as 'Hating mind,'
or, he understands a hate-free mind as 'Hate-free mind.
(3) Or, he understands a deluded mind as 'Deluded mind,'
or, he understands an undeluded mind as 'Undeluded mind.'
(4) Or, he understands a contracted mind as 'Contracted mind,'[113]
or, he understands a distracted mind as 'Distracted mind.'[114]
(5) Or, he understands an exalted [great] mind as 'Exalted mind [Great mind],'[115]
or, he understands an unexalted mind as 'Unexalted mind.'
(6) Or, he understands a surpassable mind as 'Surpassable mind,'
or, he understands a unsurpassable mind as 'Unsurpassable mind.'[116]
(7) Or, he understands a concentrated mind as 'Concentrated mind,'
or, he understands an unconcentrated mind as 'Unconcentrated mind.'
(8) Or, he understands a freed mind as 'Freed mind,'
or, he understands an unfreed mind as 'Unfreed mind.'

**7.3.3 THE MIND "BECOME GREAT."** Of special interest here is the term ***maha-g,gata***, "become great," here referring to the mind during meditation. It has become great in two senses. Firstly, the "pliable (*mudu*) and workable (*kammañña*)" mind[117] has broken the barriers of the "normal" limited body-centric consciousness so that it enjoys dhyanic bliss, which is a suprasensory or extrasensory experience because all the physical senses and consciousness as we know it have shut down. Secondly, the mind has "become great" in the sense that, if properly directed, it can cultivate various supernormal powers such as recollection of past lives (retrocognition) and mind-reading (telepathy).[118]

More importantly, on a spiritual level, the mind is free from thought, especially the kind of thinking that harps of issues and proliferates:

> Becoming unrestricted by the boundaries of manifoldness [*papañca*], one sees that *all* manifoldness, including the grossest density of form, is correlated with ignorance [M 1:59]. And one is able there to release, so to speak, one's dense body from its restrictions. (Sue Hamilton, 2000:197)

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**gata,sati S** (M 119.39/3:98); **Susima S** (S 12.70/2:122); **Jhānâbhiññā S** (S 16.9/2:213); **Taṇha-k,khaya S** (S 46.26/-5:86 f); **Nibbedha,bhāgiya S** (S 46.28/5:88); **Pubba S** (S 51.11/5:263); **Paṁsu,dhovana S** (A 3.100/1:255); **Upakkilesa S** (A 5.23/3:18); **Pañcaṅgika S** (A 6.28/3:29); **Āhuneyya S 2** (A 6.2/3:280); **Gāvī Upamā S** (A 9.35/4:421); **Āhuneyya S** (A 10.97/5:199); Pm 1:113, 2:234.

[111] "Mind," *citta,* also tr as "mind consciousness" (Brahmavamso). See SD 13 Intro (5C).

[112] See SD 13 Intro (9b): "Mental noting," & Gethin 2001:46.

[113] "Contracted mind," *saṅkhittaṁ citaṁ,* ie "contracted" or "compressed" due to sloth and torpor.

[114] "Distracted mind," *vikkhittaṁ cittaṁ,* ie "distracted" by restlessness and worry.

[115] "Exalted mind," *mahaggataṁ cittaṁ*, ie "exalted" through having reached a dhyana or a formless attainment. Properly speaking, only the first 4 form dhyanas are called *jhāna*, while the higher four formless bases are called *samāpatti* (attainment); and that the 4 formless attainments actually belong to the 4th form dhyana since they all possess the same two factors (ie equanimity and samadhi).

[116] Unsurpassable (*anuttaraṁ*) mind, probably synonymous with "developed" mind. See D:W 592 n667 & Anālayo 2005 ad M 1:59.

[117] See **Paṇihita Acchanna Vagga** (A 1.5/1:8), SD 8.3(4).

[118] See Brahmavamso 2006:98.

### 7.4 THE MIND CAN GROW BEYOND THE BODY

**7.4.1 The 3 worlds.** Only when the mind has transcended the sense-world (*kāmâvacara*) that it can attain dhyanic bliss.[119] However, those reborn in this form realm (*rūpâvacara*) are made of subtle form (*rūpa*) (such as light), and when this subtle form is further transcended, it attains to the formless realm (*arūpâvacara*), where consciousness become more pervasive, yet increasingly subtle (like pure energy, but conscious).

**7.4.2 Problem of method.** Up to the last few decades the progress of psychology specifically, and science in general, can be said to have been impeded by its own methodology, that of third-person observation. We cannot learn much from *observing* another meditation; even the EEG (electro-encephalogram) readings measure only certain of the more "external" aspects of the still mind. It is like observing someone in love, but not really knowing how it really feels.

Similarly, meditation is a *first-person* experience, and has to be experienced directly: it is for us to "come and see" (*ehi,passika*). There is as yet no way dhyanas can be measured. In other words, there is no way scientifically useful reports could be written about such experiences: they cannot be shared. The next four levels of deep meditation, the 4 formless attainments (*arūpa samāpatti*) are even more profound.

**7.4.3 The formless dhyanas**

**7.4.3.1 The formless attainments** have the following characteristics:

- The mind remains inaccessible to the world of the 5 senses and all knowledge of the body.
- The mind persists in rock-like stillness, incapable of forming any thought or making any plan, for long periods of time.
- Comprehension is so frozen that we can hardly make sense, at the time, of our experience. Comprehension is achieved after emerging.
- The pure equanimity and mindfulness of the 4th dhyana remains as a foundation for each formless attainment.[120] )

**7.4.3.2** The mind in the formless attainments perceives only the *mind-base,* very refined mind-objects. Here, we feel as if we have transcended time itself (since we have let go of the physical senses). While in dhyana, within the viewpoint of the present, time is undefined, empty, immeasurable. It is both infinite and nothing at the same time. It is unlimited (*anantā*) since we perceive nothing of it, neither beginning, middle nor end.

The experience of one-pointedness in time, seen early in the meditation, can be the key to understanding the simultaneous sense of infinity and emptiness in the immaterial [formless] attainments. At least, we notice that we no more experience the "clock" time we are so used to. We sense a "clockless" time that is organic, of living the moment that seems forever.

The world of the senses mostly experience change and contrast, and occurs in **time**, that is, physical or mechanical time. Once we are able to transcend the physical senses and dwell in pure mind, then we expereince organic time, or mind-time, which is actually immeasurable. Hence, we experience no fixedness of anything, except radiant joy and peace. We also begin to understand the nature of non-self, but we must have the vocabulary for this. The suttas provide such a vocabulary.[121]

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[119] See **Dhyana**, SD 8.4.

[120] See Brahmavamso 2006:169 f.

[121] On language and early Buddhism, see **Language and discourse,** SD 26.11.

**7.4.3.3** A brief definition of the 4 formless attainments will show that *the mind is able to transcend space and time*:[122]

(1) The attainment of unlimited space. Space is perceived as being infinite, empty, immeasurable and undefined. What usually limits space, that is, material form is perceived as being absent. Space has lost its meaning. This perception remains uninterruptedly for long periods as a state of profound contentment.

(2) The attainment of unlimited consciousness. Within the attainment of unlimited space lies the mind-base of unlimited consciousness. When the mind attends to this subtle nature of unlimited space, it totally disappears and is replaced by the perception of absolute one-pointed consciousness, which simultaneously feels infinite, empty, immeasurable and undefined. This perception remains uninterruptedly for a longer period.

(3) The attainment of nothingness. Within the attainment of unlimited consciousness lies the mind-base of no-consciousness or nothingness: consciousness has lost its meaning. We have attained the one-pointedness of nothingness. This perception remains uninterruptedly for even longer.

(4) The attainment of neither-perception-nor-non-perception. Within the attainment of nothingness, lies the mind-base of not even nothingness. If the mind is able to notice this feature, then even the perception of nothingness disappears, and one cannot really say whether there is consciousness or not. Subtle as this state is, it is still a perception.[123] (A 9.42)

**7.4.3.4** The subtlety of these 4 formless attainment, indeed, even of the 4 form dhyanas, are beyond the capacity of even the most sophisticated machines we have today to measure. The reason is simple: these are suprasensory states, they have transcended the physical senses. There is only one way to observe these states: it is to experience them first-hand. There will come a time when there are scientists who are able to experience such states and to describe them meaningfully to other scientists.

That would be a time when *the dividing line between being a scientist and a spiritual teacher*, at least in terms of mental cultivation, would be significantly blurred. That is a time when Buddhist psychology would become almost indistinguishable from mind science; but it will be a profoundly new kind of science, one very different from that of our own times.

It might be asked then if Buddhism, as we know it today, would be relevant any more, and this could well be a sign of the advent of the Dharma-ending age, that is, except for those who truly hold the stillness at the centre of their lives. Or, other the hand, it could be a time when it is possible to practise meditation in a manner as originally prescribed and practised by the Buddha himself.[124]

### 7.5 THE GREAT SELF

**7.5.1** Even on a worldly karmic level, says **the Loṇa,phala Sutta** (A 3.99), when our mind is "immeasurable" (*appamāṇa*), that is, we are not "small-minded," even small moral lapses would not trouble us beyond itself.

> (1) Bhikshus, what sort of person who has done only a slight bad karma that might take him to hell?

[122] Summarized from Brahmavanso 2006:170-172.

[123] A 9.42.11/4:451 = SD 33.3.

[124] See Piya Tan's reflection, **"Free Buddhism,"** R292 13 May 2013: http://dharmafarer.org/wordpress/weekly-reflections-by-piya-tan/revisioning-buddhism

Here, bhikshus, a certain person is of undeveloped body,[125] undeveloped moral virtue, undeveloped mind, undeveloped wisdom: he is (mentally) limited (*paritta*), with **a small self** (*app'ātuma*),[126] dwelling with a little bit suffering.[127]

Such a person, bhikshus, is one who has done only a slight bad karma that might take him to hell.

(2) Bhikshus, what sort of person is one who has done that same slight evil karma that is felt right here and now—not in the least does it seem to be abundant at all?

Here, bhikshus, a certain person who is of developed body,[128] developed moral virtue, developed mind, developed wisdom: he is mentally unlimited (*aparitta*), with **a great self** (*mah'attā*),[129] dwelling immeasurable (*appamāṇa*).

Such a person, bhikshus, is one who has done that same slight evil karma that is felt right here and now—not in the least does it seem to be abundant at all. (A 3.99,2/1:249), SD 3.5

**7.5.2** A person with a "great self" might still commit a small evil karma but he does not experience its karmic fruits in hell nor any of the lower states. In other words, this refers to a streamwinner, or a once-returner, or a non-returner: an arhat has already transcended rebirth. It may also refer to those who are mindful practitioners of wise attention (*yoniso manasikāra*), insofar as their wholesome minds are not overtaken by greed, hate or delusion.[130]

**7.5.3** We can transform the "small" self into a "great" one through such practices as the cultivation of lovingkindness (*mettā*) or of mindfulness (*sati*). The importance of the cultivation of lovingkindness is attested by **the Brahma,vihāra Sutta** (A 10.208), where a meditator whose mind has "grown great" and "immeasurable" through lovingkindness knows:

Formerly my mind was limited (*paritta*) and undeveloped, but now my mind is boundless and well developed. Any karma done in a limited way[131] neither remains nor persists there. (A 10.208/5:299), SD 2.10

**7.5.4** Instructions in the practice of mindfulness with an immeasurable mind is given in **the Mahā Taṇha,-saṅkhaya Sutta** (M 38), where it is stated that one who feels neither attraction nor repulsion for any of the six sense-objects, and who has mindfulness of the body, lives "with a mind that is immeasurable

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[125] "Undeveloped in body," *abhāvita,kāya,* here meaning "resorting to self-torture, not taking care of one's body or health". See Intro above.

[126] "Small self" (*app'ātumā*) or "insignificant self" (Harvey 1995:25, 56).

[127] *Appa,dukkha,vihārī.* Comy: *Appakena pi pāpena dukkha,vihārī,* "he dwells in suffering because of a little bit of evil" (AA 2:361). This phrase is clearly to be contrasted with *appamāṇa,vihārī* below.

[128] "Undeveloped body," *abhāvita,kāyo.* Comy to **Piṇḍola Bhāra,dvāja S** (S 35.127/4:111) glosses it as *abhāvita,-pañca,dvārika,kāyā,* "undeveloped in the body that are the five (sense-)doors," ie lacking in sense-restraint (SA 2:395).

[129] On the "great self," see SD 3.5 Introd.

[130] On **wise attention,** see SD 19.14.

[131] "Karma done in a limited way," or "limited karma," *pamāṇa,kataṁ kammaṁ,* as in **Tevijja S** (D 1:251/13.77) & **Saṅkha(dhama) S** (S 4:322/ 42.8). AA here says that "limited karma" refers to sense-sphere karma (*kāmmâvacara,kamma*)," and "unlimited karma' (*appamāṇa,kataṁ kammaṁ*) refers to form-sphere karma. It is called 'unlimited' because it is done by transcending the limit, for it is developed by way of specified, unspecified and directional pervasion." SA on Saṅkha S explains that "When (simple) lovingkindness is said, this can be interpreted either as access concentration or absorption, but when it is qualified as 'liberation of mind' (*ceto,vimutti*) it definitely means absorption (*jhāna*)." The point is that if a person masters the "liberation of mind by lovingkindness" at the level of absorption, the karmic potential of this absorption attainment will take precedence over sense-sphere karma and will generate rebirth into the form realm. See Vism 309-311/9.49-58. (S:B 1149 n346; A:B 315 n73)

(*appamāṇa,cetaso*)," in contrast to someone with the opposite qualities who dwells "with a mind that is limited (*paritta,cetaso*)" (M 38,40/1:270).

#### 7.6 A BODY-MIND MAP.

**7.6.1** In **the consciousness ice-berg diagram** [Fig 7.5] we see a diagrammatic representation of consciousness as comprising the conscious "public" aspects (above the "water"), the preconscious level where feeling operates, the unconscious depths where the latent tendencies lie, and also around our whole being.[132] While the "inner" conscious aspects can become more focussed and clear, the "outer" consciousness can grow beyond ourselves and the universe is the limit. Our mind, in other words, is as far as where it can reach.

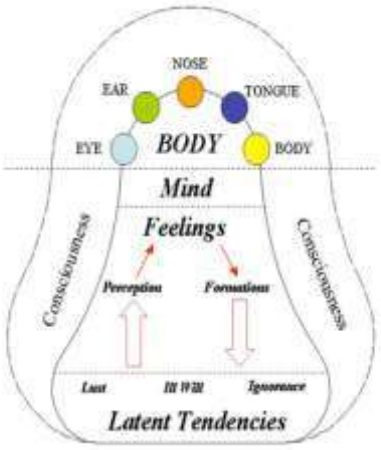


**Fig 7.6 The consciousness iceberg**
©Piya Tan, 2006. Artwork by Vincent Kwan, Singapore.

**7.6.2** Nevertheless, due to the non-dogmatic and pragmatic nature of Buddhist inquiry, such questions pose no serious problem at all. While stating that he would change Buddhist beliefs should science demonstrate any of them to be false, the Dalai Lama[133] still insists that humans cannot be "reduced to nothing than biological machines, the products of pure chance in the random combination of genes, with no purpose other than the biological imperative of reproduction" (2005). This is of course a remarkable declaration of Buddhist faith, a contemporary lion-roar. In the same spirit, we see the commentators attempting to "update" certain Buddhist teachings and assumption, even if some of these innovations themselves need further updating to work for our own times.

## 8 Some meditation issues

#### 8.1 IS GOD IN THE BRAIN?

**8.1.1** **Michael Persinger**, a professor of neuroscience at Laurentian University in Sudbury, Ontario, Canada, conducted experiments where volunteers wore a helmet-like device fitted with a set of magnets, and ran a weak electromagnetic signal across the brain hemispheres, specifically the temporal lobes [Fig 6.5]. Four in five people, he said, reported a "mystical experience, the feeling that there is a sentient being or entity standing behind or near" them, or what Persinger call a "sensed presence." Some wept, some felt God had touched them, others felt fear and talked of demons and evil spirits. "That's in the laboratory," said Persinger. "They know they are in the laboratory. Can you imagine what would happen if that happened late at night in a pew or mosque or synagogue?" According to Persinger, his research showed that "religion is a property of the brain, only the brain and has little to do with what's out there."

[132] On the early Buddhist usages of "conscious," "preconscious," "unconscious" and "subconscious," see SD 17.8a (1.1.3).

[133] For the Dalai Lama's official biography and work, see http://www.tibet.com/DL/index.html.

**8.1.2** Those who believe that the new science disproves the existence of God say they are holding up a mirror to society about the destructive power of religion. They say that religious wars, fanaticism and intolerance spring from dogmatic beliefs that particular gods and faiths are unique, rather than facets of universal brain chemistry.[134] During a PBS interview, Persinger clarifies the situation in a positive way:

> The fact that we can now understand the brain basis to faith simply tells us that we can understand it more effectively. It doesn't make it go away any more than when you look at the brain and you are seeing a sunset, and it is beautiful. It doesn't take the beauty away, it just allows you to understand more of it. (PBS 2001)

**8.1.3** It is important to note here that Persinger's point is *not* that the brain is the source of the God-idea, but rather that such religious experiences tend to stimulate certain areas of the brain. Not all Persinger's subjects reported that they experienced "God," but most of them reported some kind of experience related to the kind of religious beliefs they held (or did not hold). The BBC reported in 2003 that when Persinger tested his magnetic helmet on **Richard Dawkins**,[135] one of Britain's most renowned atheists, in a session that lasted 40 minutes, Dawkins found that the magnetic fields around his temporal lobes only affected his breathing and his limbs, but did not find God.[136]

**8.1.4** Scientists like radiologist **Andrew Newberg**[137] have experimented on what happens in the brain during moments of faith. He worked with Buddhist scientist, **Michael Baime**,[138] to study the latter's brain during meditation. By injecting radioactive tracers into Baime's bloodstream as he reached meditative focus, Newberg used a brain scanner to image the brain at the climax of his religious experience. [Fig 8.1]

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[134] For a discussion, see http://www.pbs.org/wnet/religionandethics/week510/cover.html#right.

[135] **Clinton Richard Dawkins** (1941- ) is an eminent British ethologist, evolutionary scientist, popular science writer, and Oxford University professor. His 1976 book *The Selfish Gene* popularised the gene-centric view of evolution and coined term meme, which became the basis for memetics: see SD 26.3.

[136] Persinger explained that there is a continuum in temporal lobe sensitivity and that Dawkins had temporal lobe sensitivity that was very much lower than most people (BBC 2003). **A more recent finding** was that of a 22-year-old woman, who, during a presurgical evaluation for epilepsy treatment, had her left temporoparietal junction undergo focal electrical stimulation, as a result of which she perceived an illusory figure that closely "shadowed" changes in the patient's body position and posture, but she did not recognize that the figure was an illusion of her own body (like many deluded schizophrenic patients). The researchers concluded that the patient was perceiving her own body. It is notable, the research team says, that hyperactivity in the temporoparietal cortex of patients with schizophrenia may lead to the misattribution of their own actions to other people. "Our findings may be a step towards understanding the mechanisms behind psychiatric manifestation such as paranoia, persecution and alien control." (Shahar Arzy et al 2006)

[137] **Andrew Newberg** is an assistant professor in the department of Radiology in the Division of Nuclear Medicine, and an instructor in the Department of Religious Studies at the University of Pennsylvania. With Eugene d'Aquili & Vince Rause, he co-authored *Why God Won't Go Away: Brain Science and the Biology of Belief,* NY: Ballantine Books, 2001. See Newberg et al 2001; also Newberg & Iversen 2003. For his works, see http://www.andrewnewberg.com/pub.asp.

[138] **Michael J Baime** is a meditation expert who runs a stress management program out of the University of Pennsylvania. Baime is a Clinical Assistant Professor of Medicine at the University of Pennsylvania School of Medicine. He has practiced meditation since the age of 14. See Newberg et al 2001 (which he co-authors).

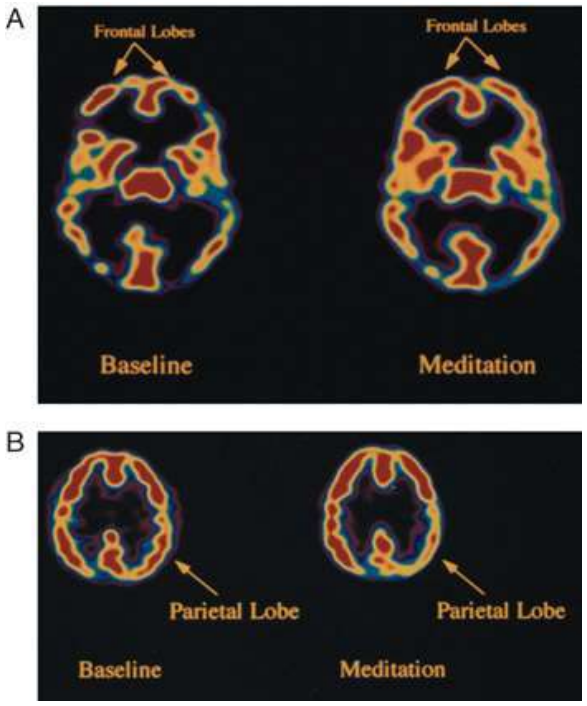


**Figure 8.1** (**A**) Comparison of brain blood flow for Buddhist monks during normal activity (left) and during meditation (right). Note the increase in blood flow to the frontal cortex indicating increased activity in that area of the brain. (**B**) Comparison of brain blood flow for Buddhist monks during normal activity (left) and during meditation (right). Note the decrease in blood flow to the parietal cortex indicating decreased activity in that area of the brain.

http://ecam.oxfordjournals.org/cgi/content/full/3/4/513.

Baime's blood-flow patterns not only activated his temporal lobes but the parietal lobes appeared almost completely to have shut down. The parietal lobes give us our sense of time and place. Without them, we may lose our sense of self. Followers of many of the world's religions often regard a sense of personal insignificance (a sort of "emptying of the self") and oneness with a deity as something to strive for. Newberg's work explains a neurological basis for such religious experiences.[139]

### 8.2 Temporal lobe epilepsy

**8.2.1** Why do we have religious beliefs? Might religion actually be a fundamental part of us like the need for sleep, food or sex? Is God in the brain? [8.1]. Such are the questions that neurotheology seek to answer. **Neurotheology**,[140] also known as biotheology, is the study of the neural basis of religion and spirituality. Neurotheology deals with the neurological and evolutionary basis for subjective experiences traditionally regarded as religious.

In recent times, "neurotheology" was used by **Andrew Newberg** [8.1], and others to describe the scientific study of religious experiences. Recently, it has been used by others to refer to specific religious perspectives, exploring brain states occurring as highly charged emotional and mental experiences that are universally regarded as "spiritual," "religious" or "mystical." Neurotheology has received renewed interest with the current encounter between eastern contemplative disciplines (such as Buddhist meditation) and the western mind sciences.

[139] On Baime, see eg http://www.upenn.edu/researchatpenn/article.php?681&hlt. See also Alex Hankey 2006.

[140] The term was first used by English author Aldous Huxley (1894-1963), living in California, in his utopian novel, *Island* (1961), where he used it mainly in a philosophical sense.

**8.2.2** Some researchers claimed to have found evidence of a "God module" or "God spot" in the brain. In particular, they find an association between epileptic seizures in the left temporal lobe [Fig 6.5] and feelings of ecstasy sometimes described as a "sensed presence" (Persinger) of God [8.1].[141] This scientific notion is based on a long known fact, namely, that some subjects affected by temporal lobe epilepsy (TLE) report having intense spiritual experiences during their seizures, with some claiming that God spoke to them directly. Such patients would often become preoccupied with spiritual issues even during interictal (seizure-free) periods, that is, in between episodes of seizures.

**Box 8.2 Epilepsy**

**EPILEPSY** or epileptic seizures are temporary abnormal electrophysiology (bodily electrical activity) of the brain, resulting in abnormal synchronization of electrical neuronal activity. Seizures are the only visible symptoms of epilepsy, and they are of different kinds. The symptom of each type of seizure can affect people differently. Seizures can last from a few seconds to a few minutes. You may remain alert during the seizure or you may lose consciousness. After the episode, you may recall what happened or may not even realize that one had a seizure.

Seizures that make you fall to the ground ("drop attacks") or make the muscles stiffen or jerk out of control are easy to recognize. Many seizures, however, do not have these reactions, and may be difficult to notice. Some seizures make you stare into space for a few seconds. Others may consist only of a few muscle twitches, or a turn of the head, or a strange smell, or visual disturbance that only you sense.

Epileptic seizures often happen without warning, and may be partial or generalized. Some may experience an aura at the beginning of a seizure. **Aura** is the term used to describe symptoms that may occur before a seizure. An aura may include:

- Visual changes, for example: bright lights; zigzag lines; slowly spreading spots; distortions in the size or shape of objects; blind or dark spots in the field of vision.
- Auditory hallucinations: hearing voices or sounds.
- Olfactory hallucinations: strange smells.
- Feelings of stiffness, numbness or tingling on one side of the face or body.
- Feeling separated from one's body.
- Anxiety or fear.
- Nausea.

An aura is often the first sign of an imminent seizure. You may have an aura for several seconds up to an hour before a seizure. Most people who have auras would have the same type every time they have a seizure. A seizure ends when the abnormal electrical activity in the brain stops and brain activity begins to become normal again.

[See eg University of Chicago's http://www.uchospitals.edu/online-library/content=P00779]

It is possible that the great names in religion, especially the God-centred ones, such as Moses, Ezekiel, Paul on the road to Damascus,[142] and Joan of Arc[143] had epileptic episodes which they attributed to

[141] W Penfield records how stimulating the temporal lobe of epileptics made them have our-of-body experiences (OBE) (1955:458). See also Blackmore 2003:360.

[142] "We must remember too that temporal lobe epilepsy (TLE) is often accompanied by hyperreligiosity, and it is likely that **St Paul** (b 5-15 CE, d 64 CE)—arguably the creator of Christianity—suffered from epilepsy of some kind." (FR Zindler, 'Why Is Religiosity So Hard To Cure?,' *American Atheist* 37,3 Summer 1999): http://www.american-

religious experience. Understandably, it has been called the "sacred disease" since the times of the Greek physician Hippocrates (c460–c370 BCE), often regarded as the father of Western medicine. Amongst famous literary figures who probably had the disorder were the Russian writer Fyodor Dostoevsky (1821-1881), the Dutch artist Vincent Van Gogh (1853-1890), the Danish existentialist philosopher and theologian Søren Kierkegaard (1813-1855), and the English mathematician, writer and Anglican clergyman Charles Lutwidge Dodgson, better known as Lewis Carroll (1832-1898).

**8.2.3** One of the most convincing studies in the TLE in a religious context is that American neurologist **Gregory Holmes**. He has studied the life of Ellen G White (1827-1915), the American religious leader whose prophetic ministry was instrumental in founding the Sabbatarian Adventist movement that led to the rise of the Seventh-day Adventist church.[144] Various neurologists, like Holmes, have commented that White's traumatic brain injury caused her partial complex seizures and hallucinations, and as a result she was cataleptic and hysterical. They suggest that her visions were actually hallucinations and delusions during non-motor seizures which led her to believe that she had visions of God.[145]

As we have seen, experiments by Persinger [8.1], using transcranial magnetic stimulators showed that we could produce these kinds of effects in subjects with no history of temporal lobe seizures. One researcher who stimulated his own temporal lobes, reported being amazed at having the experience of God for the first time in his life. As may be expected, while some people have taken this brain area to be the seat of a special human faculty for experiencing the divine, others see it as confirmation that such religious experiences are delusions caused by electrical disturbances in the brain.

**8.2.4** At the University of California in San Diego, neuroscientist **V S Ramachandran** noticed that a disproportionate number of patients, about a quarter, with temporal lobe epilepsy, reported having deeply moving religious experiences. He discusses his research on the neural basis of religious experience in the same way as he does his work with people who feel phantom limbs or who see cartoon characters in a visual blind spot.[146] This leads us to the question: Did God create the brain, or did the brain create God?

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atheist.org/smr99/T2/zindler.html. In Ireland, epilepsy is called "St Paul's disease." On the explanation that Paul regarded his "ailment" as a "punishment from God," see: http://www.epilepsiemuseum.de/alt/paulusen.html.

[143] *Epilepsy Toronto*: "**Joan of Arc** [1412-1431] was an uneducated farmer's daughter in a remote village of medieval France who altered the course of history through her amazing military victories. From age thirteen Joan reported ecstatic moments in which she saw flashes of light coming from the side, heard voices of saints and saw visions of angels. In the opinion of the neurologist Dr. Lydia Bayne, Joan's blissful experiences "in which she felt that the secrets of the universe were about to be revealed to her"—were seizures, and they were triggered by the ringing of church bells. Joan displayed symptoms of a temporal lobe focus epilepsy: specifically, a musicogenic form of reflex epilepsy with an ecstatic aura. Musicogenic epilepsy is generally triggered by particular music which has an emotional significance to the individual. Joan's voices and visions propelled her to become a heroic soldier in the effort to save France from English domination and led to her martyrdom in 1431, burned at the stake as a heretic when she was 19 years old." (http://www.epilepsy.com/epilepsy/famous_religious.html)

[144] Gregory Holmes & Delbert Hodder, "Ellen G White and the Seventh Day Adventist Church: Visions or Partial Complex Seizures?" *Journal of Neurology* 31,4 1981:160-161.

[145] **E L Altshuler**, "Did Ezekiel have temporal lobe epilepsy." *Archives of General Psychiatry* 59,6 2002:561-652. **A W Beard**, "The schizophrenia-like psychosis of epilepsy: Physical aspects." *The Journal of Psychiatry* 109 1963: 113-129. **R Dewhust & A Beard,** "Sudden religions conversions in temporal lobe epilepsy. *Epilepsy and Behavior* 4,1 2003:78-87. **B K Puri**, "SPECT neuroimaging in schizophrenia with religious delusions." *International Journal of Psychophysiology* 40,2 2001:143-148. **J Wuerfel,** "Religion is associated with hippocampal but not amygdala volumes in patients with refractory epilepsy." *Journal of Neurology, Neuropsychiatry, and Neurosurgery*, 75,4 2004: 640-642, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1739034/

[146] See Ramachandran & Blakeslee 1998.

**8.3 RELIGION IS MORE THAN MEDITATION.** Neurologist **James Austin**[147] began practicing Zen meditation during a visit to Japan. After years of practice, he found himself having to re-evaluate what his professional background had taught him. "It was decided for me by the experiences I had while meditating," said Austin. Referring to his 1992 Zen "enlightenment" experience he had in a London underground train station, he recounts:

> Some of them were quickenings,[148] one was a major internal absorption, an intense hyper-awareness, empty endless space that was blacker than black and soundless and vacant of any sense of my physical bodily self. I felt deep bliss. I realized that nothing in my training or experience had prepared me to help me understand what was going on in my brain. It was a wake-up call for a neurologist. (James Austin, 1998)

Austin does not believe in God and relates well with some streams of Hinduism and Buddhism. Both emphasize the importance of meditation and its power to make us a loving and compassionate person. Theologians predictably reject his views saying that such practices do not describe how most people view religiosity in either eastern or western traditions.

"When these people talk of religious experience, they are talking of a meditative experience," said **John Haught**, a professor of theology at Georgetown University. "But religion is more than that. It involves commitments and suffering and struggle, it's not all meditative bliss. It also involves moments when you feel abandoned by God." "Religion is visiting widows and orphans," he added. "It is symbolism and myth and story and much richer things. They have isolated one small aspect of religious experience and they are identifying that with the whole of religion." [10.3]

Buddhists, since the beginning, however, have placed importance on meditative bliss, mythology and alleviating our suffering and those of others. Indeed, without meditation, mythology is just magical fables, but *the still mind sees spirituality encoded in such stories, and only the still mind can truly show compassion and effectively bring succour to others*. However, religion, mythology, and even meditative bliss, in themselves do not do anything: we have to decide what to do with them, and do so with wisdom and compasssion.

### 8.4 DOWNSIDE OF MEDITATION

**8.4.1** The history of the meeting of western science and eastern meditation has not always been smooth. In a sense, the whole process is like a lotus rising from the mud of false and weak systems, a veritable evolutionary process of the survival of the fittest system by scientific selection.[149] By the mid-1970s, clinical reports of negative outcomes of various mantra meditation programs began to appear in psychiatric literature.[150] These included people becoming unemployable because they were unable to

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[147] **James H Austin** is Clinical Professor of Neurology, University of Missouri Health Science Center, and Emeritus Professor of Neurology, University of Colorado Health Science Center. He is the author of the magisterial book *Zen and the Brain* (1998), which aims to establish links between the neurological workings of the human brain and meditation. His sequel to it is *Zen-Brain Reflections* (2006).

[148] "Quickenings" are signs of life felt by one pregnant as a result of fetal movements, usually appearing 16-20 weeks into pregnancy. Here, it has a sense of feelings of being given renewed life or intensified vitality.

[149] This section is mostly based on http://www.ex-premie.org/pages/ismeditation.htm.

[150] Clinical reports of negative outcomes. A P French, A C Schmid and E Ingalls, "Transcendental Meditation, Altered reality testing, and behavioral change: A case report," *Journal of Nervous and Mental Disease* 161 1975:55-58; R B Kennedy, "Self-induced depersonalisation syndrome," *American Journal of Psychiatry* 133, 1976:1326-1328; A A Lazarus, "Psychiatric problems precipitated by Transcendental Meditation," *Psychological Reports* 39 1976:601-602.

control their mental states (eg everything around them seemed unreal), and more serious problems ranging from depression and agitation to psychosis.

**8.4.2** **Leon Otis**, a psychologist at Stanford Research Institute, found that adverse outcomes were related to how long that person had meditated using such methods.[151] **Michael Persinger,** neuroscientist at the Laurentian University, Sudbury, Ontario, Canada, found that for some people, meditation can bring on symptoms of complex partial epilepsy, such as visual abnormalities, hearing voices, feeling vibrations, or experiencing automatic behaviours.[152]

**8.4.3** Another concern, explored by Esalen founders, **Michael Murphy**[153] and **Steven Donovan**,[154] was that advanced practitioners of mantra meditation ranked high in suggestibility,[155] not surprising given its similarity to self-hypnosis. A number of people in the US have successfully brought legal suits for damages suffered as a result of their participation in meditation programmes, especially commercialized methods such as cult Guru Mahesh's TM ("transcendental meditation").[156]

Many such people suffered from problems and difficulties regarding thinking and attention. Other impairments included emotional difficulties, blackouts, anxiety, "spacing out" [feeling drowsy, weak, and bored], amnesia, and losing track of time.[157]

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[151] N Mead, "Why meditation may not reduce stress," *Natural Health* 23,6 Nov-Dec 1993: 80-85. L S Otis, "Adverse effects of transcendental meditation" in D Shapiro & R Walsh (eds), *Meditation: Classic and Contemporaneous Perspectives*, New York: Alden, 1984; D S Holmes, "Meditation and somatic arousal reduction," *American Psychologist* 39 1984:1-10.

[152] Michael A Persinger, "Transcendental Meditation and general meditation are associated with enhanced complex partial epileptic-like signs: Evidence of 'cognitive kindling'?" *Perceptual and Motor Skills* 76, 1993:80-82; Persinger, "Enhanced incidence of 'The sensed presence' in people who have learned to meditate: Support for the right hemispheric intrusion hypothesis," *Perceptual and Motor Skills* 75, 1992:1308-1310; M A Persinger & K Makarec, "Temporal lobe epileptic signs and correlative behaviors displayed by normal populations," *Journal of General Psychology* 114,2, 1987:179-195.

[153] **The Esalen Institute,** Big Sur, California, founded by Michael Murphy and Dick Price in 1962, is a center for humanistic alternative education, a nonprofit organization devoted to multidisciplinary studies ordinarily neglected by traditional academia. Esalen offers more than 500 public workshops a year, besides invitational conferences, residential work-study programmes, research initiatives, and internships. Part think-tank for the emerging world culture, part college and lab for transformative practices, and part restorative retreat, Esalen is dedicated to exploring work in the humanities and sciences that advances the full realization of what Aldous Huxley called the "human potential." Esalen is well known for its blend of East/West philosophies, its experiential/didactic workshops, and the steady influx of philosophers, psychologists, artists, and religious thinkers.

[154] Entrepreneur & consultant, President of the Esalen Institute, 1985 to 1993.

[155] Michael Murphy & Steve Donovan, *The Physical and Psychological Effects of Meditation,* Big Sur, CA: Esalen Institute, 1989.

[156] Legal suits for damages. John Doe I-VI and Jane Doe vs Maharishi Mahesh Yogi; World Plan Executive Council-United States; Maharishi International University for the US District Court for the District of Columbia, 95-2848, 2849, 2851, 2852, 2853, 2854 (consolidated); Jane Green vs Maharishi Mahesh Yogi et al. US District Court for the District of Columbia, 87-0015-OG. Patrick Ryan vs World Plan Executive Council-United States et al. US District Court for the District of Columbia, 87-0016-OG. On the ineffectiveness and problems of TM, see A Lutz, Donne & Davidson 2007:41-43; however, cf http://mantra.meditation.onwww.net/. On the dangers of TM (Transcendental Meditation) (a detailed insider report by Joe Kellett), see http://www.suggestibility.org/. Another comprehensive insider's website is www.minet.org.

[157] Problems found in therapy. M T Singer & R Ofshe, "Thought reform and the production of psychiatric casualties," *Psychiatric Annals* 20,4 1990:189-190.

**8.4.4** This is not to say that everyone who meditates has had these difficulties. Many find brief meditation sessions relaxing, but these people are usually not part of groups which influence or induce them into continuing, regardless of their own feelings or experiences. The problem arises when *a particular meditation* is triumphalistically claimed to be universally "good for mankind" so it can, indeed must, be applied to anyone.

In the early years of Buddhism in the US, two approaches were common. The first *was the empty-mind mantra meditation* based on the Hindu tradition. The second, from the Judaeo-Christian tradition, is *reflective meditation*, where you reflect as a way of focusing. In the former, a close relationship between teacher and pupil included attention to individual differences and any problems which might arise. In contrast to earlier approaches, meditation today is often being sold by mass marketing, and often by individuals who have no religious affiliation or do not declare it.[158]

**8.4.5** As early as 1967, when **the Divine Light Mission** arrived in the US, it used "meditation" as a marketing strategy. By the 1980s, numbers dropped off due to disillusionment, and its guru Maharaji (Prem Rawat) renounced its Asian trappings and changed the cult's name to Elan Vital, and went on to seek new converts in third world countries such as Nigeria. Many more productive lives were destroyed as a result.

**8.4.6** In the 1980s, Swami Muktananda, a respected meditation guru and avowed celibate of **the Siddha Yoga cult**, was accused of regularly having sex with his teenaged disciples.[159] Around the same time, Richard Baker, one of the foremost **Zen** teachers in the US, was forced to resign from his leadership of the San Francisco Zen Centre on charges of misuse of funds and having an affair with a married resident female student.[160]

**8.4.7** In the late 1980s, **Bhagwan Shree Rajneesh** (also called Osho), the self-proclaimed enlightened Indian "sage," who owned thirty Rolls Royce, fled the US in the wake of an ugly controversy involving charges of blackmail and murder.[161] In 1981, on arriving in the US he bought the 64,000-acre Big Muddy cattle ranch in eastern Oregon for US$6 million, and named it Rajneeshpuram, which he headed as a virtual autocrat. He was renowned for molesting young girls and women to "feel their chakra," and impregnated many of them. His own sannyasins (monastic followers) were known to poison those they perceived as a threat. Members of Rajneesh's own staff were poisoned by his personal secretary, Ma Ananda Sheela, when she thought they knew too much or had simply fallen out of her favour.

**8.4.8** To prevent such misconduct and issues, **the Western Vipassana teachers** formed their own ethics committee. The Insight Meditation Society (Barre, Massachussetts) and Spirit Rock Meditation Center (Woodacre, California), two of the leading meditation centres in the US, for example, have their own ethical code[162] and ethics committee.[163] More importantly, in terms of conflict-resolution, the Spirit Rock Meditation Center also has an Ethics and Reconciliation Council (EAR).[164]

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[158] On various aspects of the commercialization of meditation and pseudoscientific claims, see eg Barry L Beyerstein, "Pseudoscience and the brain: Tuners and tonics for aspiring superhumans" at http://www.autistici.org/2000-maniax/texts/06Pseudoscience-and-Brain.pdf.

[159] See open letter of an ex-follower, http://leavingsiddhayoga.net/secret.htm.

[160] See Sandra Bell, "Scandals in emerging Western Buddhism," in Prebish & Baumann (eds), 2002:235-238.

[161] See Hugh Milne (Shivamurti), *The God that Failed,* NY: St Martin's Press, 1987.

[162] That of the Spirit Rock Meditation Centre is called "Teacher Code of Ethics," based on the Five Precepts: http://www.spiritrock.org/page.aspx?pid=315.

[163] http://www.dharma.org/sites/default/files/2003_spring_insight_newsletter_0.pdf, p8.

[164] http://www.spiritrock.org/about-us/ethics-council.

**8.4.9** In March 1993, a ten-day conference of Western Buddhist meditation teachers was held in Dharamsala in a hotel near the Namgyal Monastery, the residence of **the Dalai Lama**, who headed the conference, themed, "Toward a Western Buddhism."[165] One of the most important issues discussed was that of Buddhist ethics and the Dalai Lama strongly emphasized the right, even responsibility, of students to object to any behaviour of teachers deemed abusive, damaging, immoral, or unsuitable for the time and place: "Make voice," he insisted, "Give warning! We no longer tolerate!" The Dalai Lama encouraged repeated open criticism of such behaviour; if all else failed, he proposed, "Name names in newspapers!"[166]

**8.4.10** Sadly, in early 2006, another scandal arose in Tibetan Buddhism in the West, involving "geshe" **Michael Roach** (b 1952), whose teachings and behaviour are causing controversy and concern within much of the Buddhist community, due to his relationship with female student, Christie McNally and his unconventional teachings about Tibetan meditation practices.[167] In fact, he even declared that he was an enlightened Bodhisattva.[168] As a result, the Dalai Lama has rendered him as persona non grata.[169]

**8.4.11** The lesson of such scandals and tragedies is basically that we should avoid unhealthy teacher-pupil relationships, especially those involving *transference* and *counter-transference*.[170] These pathological states lead to the teacher's exploitation of his pupils, and of blind obedience and of grandiose perception of the teacher on the pupils' part.

*When the teacher is placed above the teaching*, there is always the danger of the teacher being misperceived as being more than what he is, and the pupils of being abused by the teacher.[171] Meditation only succeeds when we sit peacefully alone and joyfully rise above our physical senses to a higher stillness within.

### 8.5 WHO SHOULD *NOT* MEDITATE?

**8.5.1** Meditation is generally safe for most people, but there are reported cases and studies noting some adverse effects.[172] From one-third to one-half of participants of long silent meditation retreats (two weeks to three months) in the West reported increased tension, anxiety, confusion, and depression.[173] In an article well publicized on the Internet, **Jack Kornfield** confesses that in *vipassanā* practice,

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[165] http://www.mandala.hr/5/6-surya.html.

[166] http://www.tricycle.com/blog/dorje-shugden-deity-or-demon?page=3; http://alt.religion.buddhism.tibetan.narkive.com/SvkEUDaz/hh-dalai-lama-denounces-geshe-michael-roach.

[167] http://en.wikipedia.org/wiki/Michael_Roach: also see links here.

[168] See http://michaelroachfiles.wordpress.com/; http://michaelroachfiles.wordpress.com/category/the-problems/feed/. See **The Three Roots Ins**, SD 31.12 (3.4.7).

[169] For related links, see http://groups.yahoo.com/neo/groups/defendersofthedharma/conversations/topics/796. See **Three Roots Inc**, SD 31.12 (3.4.7).

[170] In psychotherapy, "transference" is the displacement of feelings and attitudes applicable to other persons (usually one's parents, spouse, siblings, etc) onto the analyst or teacher; while "countertransference" is the analyst's or teacher's displacement of affect (feelings) (ie transference) onto the client or pupil.

[171] See **The teacher or the teaching?** SD 3.14.

[172] See §8.2nn for refs.

[173] See eg Jack Kornfield 1993.

> At least half the students who came to three-month retreats couldn't do the simple "bare attention" practices because they were holding a great deal of unresolved grief, fear, woundedness, and unfinished business from the past. I also had an opportunity to observe the most successful group of meditators—including experienced students of Zen and Tibetan Buddhism—who had developed strong samadhi and deep insight into impermanence and selflessness. Even after many intensive retreats, most of the meditators continued to experience great difficulties and significant areas of attachment and unconsciousness in their lives, including fear, difficulty with work, relationships wounds, and closed hearts. (Kornfield 2003)

**8.5.2** On the other hand, most of these very same participants also reported very positive effects from their meditation practice. The vulerable margin of participants usually includes those who are under some kind of medication, or have a psychiatric history or some kind of undisclosed personal disorder. There have been a few reports that intensive meditation could cause or worsen symptoms in people who have certain psychiatric problems, but this question has not been fully researched. [8.4]

Such studies do suggest, however, that meditation may not be recommended for people with psychotic disorders, severe depression, and other severe personality disorders, unless they are also receiving psychological or medical treatment, and closely monitored so that they can receive support whenever needed. Individuals who are aware of an underlying psychiatric disorder who wish to take up meditation should speak with a mental health professional or experienced instructor before doing so.[174]

**8.5.3** Obviously, for some people, the "vipassana" method does not always work, or does not always work by itself. **Meditation for beginners** is likely to succeed when the following minimum conditions are present:

(1) Participants with emotional or psychological issues have them resolved first.
(2) The instructor is an experienced teacher, with sufficient spiritual training.
(3) Breath meditation and lovingkindness cultivation are taught in a balanced manner.
(4) The group is small, say, not more than fifteen participants per group.
(5) The environment is quiet and conducive, and there are basic standing rules.
(6) The length of sitting is flexible, depending on the student's ability and inclination.
(7) The instructor keeps to an ethical code and is easily available for related consultation.

**8.5.4** Psychotherapists and other professional specialists trained in meditation may be effective meditation instructors for beginners, even for intermediate levels. However, for more advanced practice, the teacher must be firmly founded on Buddhist meditation, if the students are to really benefit.

**8.5.5** Even if religious experience can be scientifically induced [8.1], it is still a feeling like love, faith and compassion, which cannot be meaningfully induced by the most sophisticated scientific instrument, short of man himself. This is a matter of consciousness working upon itself: only the mind can induce such states. The best tool for cultivating inner stillness is a hearty meditation.[175]

# 9 The Mind and Life Conferences

## 9.1 Beginnings

### 9.1.1 Engle and Varela

[174] For more details, see ***Bhāvanā***, SD 15.1 esp (14).
[175] On Buddhist meditation, see ***Bhāvanā***, SD 15.1.

**9.1.1.1** One of the most important events contributing to the dialogue between mind science and Buddhist psychology is the Mind and Life conference series and their related activities (such as their follow-up reports and publications).[176] The Mind and Life dialogues between the Dalai Lama and Western scientists began with collaboration between **R Adam Engle**, a North American businessman, and the late **Francisco J Varela** (1946-2001), a Chilean-born neuroscientist living and working in Paris. In 1983, both men independently took the initiative to create a series of cross-cultural meetings between the Dalai Lama and Western scientists.

**9.1.1.2 Engle** was a Buddhist practitioner since 1974. His motivation stemmed from his awareness of the Dalai Lama's lifelong and keen interest in science, and his desire to both deepen his understanding of Western science, and to share his understanding of Eastern contemplative science with Westerners. In 1983, Engle began his plans, and by the autumn of 1984, a week-long cross-cultural scientific meeting was organized with the Dalai Lama's approval and participation.

**9.1.1.3 Varela**, also a Buddhist practitioner since 1974, met the Dalai Lama at the 1983 Alpbach Symposia on Consciousness in Austria. Their communication was immediate as Varela was not only a mind science specialist but had a good understanding of Tibetan Buddhism. In due course, His Holiness expressed the desire to have more extensive, planned time for mutual discussion and inquiry.

**9.1.1.4** Some two years later, the first meeting was held in **Dharamsala**, India, in October 1987. During this time, the organizers collaborated closely to find a useful structure for the meeting. Varela, acting as scientific coordinator, was primarily responsible for the scientific content of the meeting, issuing invitations to scientists, and editing a volume from transcripts of the meeting.

Engle, acting as general coordinator, was responsible for fundraising, relations with His Holiness and his office, and all other aspects of the project. This division of responsibility between general and scientific coordinators has been part of the organizational strategy for all subsequent meetings. While Varela had not been the scientific coordinator of all of the meetings, he remained, until his death in 2001, a guiding force in the Mind and Life Institute, which was formally incorporated in 1990 with Engle as its Chairman.

### 9.2 Mind and Life I

**9.2.1** The task of the first Mind and Life conference was a very notoriously difficult one: to serve a bridge for mutual enrichment between traditional contemplative disciplines and modern life science. Fortunately (or unfortunately), Varela had had a first taste of these difficulties while helping to establish a science program at Naropa Institute, a liberal arts institution created by scandal-ridden Tibetan shaman and meditation master Chogyam Trungpa, as a meeting ground between Western traditions and contemplative studies.

**9.2.2** In 1979, the program received a grant from the Sloan Foundation[177] to organize what was probably the very first conference of its kind: "**Comparative Approaches to Cognition: Western and Buddhist**." Some twenty-five academics from prominent North American institutions convened. Their disciplines

[176] This section is based on a history of the Mind and Life conferences: http://www.mindandlife.org/history.html.

[177] **The Alfred P Sloan Foundation**, a philanthropic nonprofit institution in the US, was established in 1934 by Alfred P Sloan, Jr (1875-1966), then President and Chief Executive Officer of the General Motors Corporation. The Foundation's programmes and interests are in the areas of science and technology, standard of living and economic performance, and education and careers in science and technology.

included mainstream philosophy, cognitive science (neurosciences, experimental psychology, linguistics, artificial intelligence) and, of course, Buddhist studies.

**9.2.3** The gathering's difficulties served as a hard lesson on the organizational care and finesse that a successful cross-cultural dialogue requires. Thus in 1987, wishing to avoid some of the pitfalls encountered during the Naropa experience, several operating principles were adopted that have contributed significantly to the success of the Mind and Life series. These include:

- Choosing open-minded and competent scientists who ideally have some familiarity with contemplative traditions;
- creating fully participatory meetings where His Holiness is briefed on general scientific background from a nonpartisan perspective before discussion is opened;
- employing gifted translators like Thupten Jinpa, Alan Wallace, and Jose Cabezon, who are comfortable with scientific vocabulary in both Tibetan and English; and finally
- creating a private, protected space where relaxed and spontaneous discussion can proceed
- away from the Western media's watchful eye.

**9.2.4 The first Mind and Life Conference** took place in October 1987 in Dharamsala, and its proceedings were published as *Gentle Bridges: Conversations with the Dalai Lama on the Sciences of Mind.*[178] The conference focussed on the basic groundwork of modern cognitive science, the most natural starting point for a dialogue between the Buddhist tradition and modern science. The curriculum for the first conference introduced broad themes from cognitive science, including scientific method, neurobiology, cognitive psychology, artificial intelligence, brain development, and evolution. At our concluding session, the Dalai Lama asked us to continue the dialogue with biennial conferences.

**9.3 MIND AND LIFE II** was held in October 1989 in Newport Beach, California, with Robert Livingston as the scientific coordinator. The conference focused on neuroscience and the mind/body relationship. Coinciding fortuitously with the announcement of the award the Nobel Peace Prize to His Holiness, the two-day meeting was atypical for the Mind and Life Conferences both in its brevity and its Western venue. Its proceedings have been published as *Consciousness at the Crossroads: Conversations with the Dalai Lama on Brain Science and Buddhism*.[179]

**9.4 MIND AND LIFE III** was held in Dharamsala, in 1990. Daniel Goleman served as the scientific coordinator for the meeting, which focussed on the relationship between emotions and health, and its proceedings have been published as *Healing Emotions: Conversations with the Dalai Lama on Mindfulness, Emotions, and Health*.[180] A new mode of exploration emerged: participants initiated a research project to investigate the neurobiological effects of meditation on long-term mediators. To facilitate such research, the Mind and Life network was created to connect other scientists interested in both Eastern contemplative experience and Western science. With seed money from the Hershey Family Foundation, **the Mind and Life Institute** was born in 1990. The Fetzer Institute funded two years of network expenses and the initial stages of the research project. Research continues on various topics such as attention and emotional response.

**9.5 MIND AND LIFE IV** was held in Dharamsala, in October 1992, with Francisco Varela again acting as scientific coordinator. The dialogue focussed on the areas of sleep, dreams, and the process of dying,

[178] Boston & London: Shambhala, 1992.
[179] NY: Snow Lion, 1999.
[180] Boston & London: Shambhala, 1997.

and has been published as *Sleeping, Dreaming and Dying: An Exploration of Consciousness with the Dalai Lama*.[181]

**9.6 MIND AND LIFE V** was held in Dharamsala in October 1995. The topic was altruism, ethics, and compassion, with Richard Davidson as the scientific coordinator. The dialogue has been published by Oxford University Press as *Visions of Compassion: Western Scientists and Tibetan Buddhists Examine Human Nature*.[182]

**9.7 MIND AND LIFE VI** opened a new area of exploration beyond the previous focus on life science, moving into the new physics and cosmology. The meeting took place in Dharamsala in October 1997, with Arthur Zajonc as the scientific coordinator. The dialogue has been published as *The New Physics and Cosmology: Dialogues with the Dalai Lama*.[183]

**9.8 MIND AND LIFE VII** At the invitation of Anton Zeilinger, a participant in Mind and Life VI, the dialogue on quantum physics that had begun in Dharamsala was continued at a smaller meeting, Mind and Life VII, held at the Institut fur Experimentalphysic in Innsbruck, Austria, in June 1998. That meeting has been described in the cover story of the January 1999 issue of GEO magazine of Germany.

**9.9 MIND AND LIFE VIII** was held in Dharamsala in March 2000. The topic was destructive emotions with Daniel Goleman as the scientific coordinator. The dialogue has been published in *Destructive Emotions: How can we overcome them? A scientific dialogue with the Dalai Lama*.[184]

**9.10 MIND AND LIFE IX** was a two-day meeting held in Madison, Wisconsin in May 2001, and was organized in conjunction with the Health Emotions Research Institute and the Center for Research on Mind-Body Interactions at the University of Wisconsin, Madison, with Richard Davidson as the scientific coordinator. Participants presented an overview of modern methods for investigating human brain function and discussed with His Holiness the application of these methods in new research aimed at understanding the changes produced by meditation practice. Francisco Varela, who was instrumental in the planning of the meeting, was unable to attend due to illness. He passed away a week later on May 28, 2001. Fortunately, in his last days, he was able to observe the meeting and communicate with His Holiness via a live video connection.

**9.11 MIND AND LIFE X**

**9.11.1** Mind and Life X was held from 20 September to 4 October, 2002, in Dharamsala, coordinated by Arthur Zajonc. At the outset of his famous 1943 lectures "What is Life?," the physicist Erwin Schrödinger posed the question, "Can that which takes place inside a living organism be accounted for by physics and chemistry?" Mind and Life X again explored this perennial question concerning the nature of life and its relationship to matter, but within a broader and modern context, through physics, chemistry, and biology.

**9.11.2** In addition, however, the conference included the important voices of Western and Buddhist philosophy as well. On the one hand, it examined the current scientific views on the emergence of life,

[181] Boston: Wisdom, 1997.
[182] NY: Oxford University Press, 2001.
[183] NY: Oxford University Press, 2004.
[184] NY: Bantam Dell, 2003.

the important role of evolution, and the extraordinary moral challenges confronted today because of biotechnology. Remarkable developments have taken place in the sciences that underpin all these areas.

It also examined the foundational assumptions on which the modern theories of life depend, and the implications of these for the very definition of life we employ and the ethics we adopt for the use of the awesome biological technologies under development.

**9.11.3** In physics and biophysics, the detailed mechanisms of life are finding exact description, while at the same time quantum physics is fashioning a new, precise and non-mechanistic notion of holism as an essential feature of matter. What are the implications of this holism for the foundations of biology? In the new science of complexity, suggestive models are being developed for the rich array of processes that yield order from chaos and support life. The concept of emergence is often used in this science to account for the novel properties that arise from complex physical systems as they become the elements of structure and function that operate in living cells.

**9.11.4** What is emergence, and can it really account for the distinctive features of life? Evolution through natural selection is science's explanation of the development of higher life forms (including sentient beings) from its humble predecessors. How can we understand the dynamics of causation in these accounts?

**9.11.5** Finally, in recent years human control of the genetic material at the kernel of life has become a reality. The clumsy means of eugenics of the past are being replaced with powerful new biotech methods that promise great benefit for human health and food production, but the risks of unintended harm are also high. To these moral and philosophical issues we bring both the best thinking of science and of Buddhist philosophy.

### 9.12 MIND AND LIFE XI

**9.12.1** Mind and Life XI was themed "Investigating the Mind: Exchanges between Buddhism and Bio-behavioral Science," was held on 13-14 September 2003 in the MIT's Kresge Auditorium in Cambridge, Massachussetts. The underlying conference question was: "Can western science, in the pursuit of its own research, make use of Buddhism's 2,500 years of investigating the mind?" Up to now, science had been skeptical of this course of investigation because of its subjectivity—the use of the mind to investigate itself. Today, however, especially with the development of new technology, the biobehavioural sciences (neuroscience, cognitive science, psychology, biomedicine) are in the process of extending their methods in search of ever bolder approaches to studying the workings of the human mind.

**9.12.2** **Attention and Cognitive Control.** *Attention* has sometimes been referred to as the "gateway to consciousness." *Cognitive control* is defined as the ability to act (or think) in accord with intention. These were once taboo topics within the biobehavioural sciences in the thrall of stimulus-response and narrowly mechanistic understandings of human action. However, with the rise of cognitive science and new developments in brain-behaviour research, the phenomena of attention and cognitive control have, over the past three decades, become central and burgeoning areas of research.

**9.12.3** The focus so far has been on understanding the psychological processes and underlying neural mechanisms of attention and cognitive control. There is also growing interest in phenomena that involve alterations in the normal locus of control, such as hypnosis and placebo responding. These may offer a window on attention and control processes that provide insights into capacities beyond the limits of normal function.

**9.12.4** To date, however, attention and cognitive control researchers have hardly give any attention to Buddhist teachings and empirical observations on these matters. This seems like a missed opportunity, in that Buddhism is very clear that training the attention—teaching the mind to focus on its inner contents in a sustained manner—is a gateway to an expansion of our capacity in general to exert cognitive control both over the contents of our own thoughts and (possibly) also the processes of our own body.

**9.12.5** Indeed, there have been reports for centuries that advanced Buddhist practitioners have *the capacity to exert voluntary control over bodily processes that normally lie outside of voluntary control (eg, autonomic processes like heart rate and body temperature)*. What are the implications both of Buddhist teaching and empirical investigation into the scope of cognitive control for modern attention and cognitive control researchers? And what are the implications of results from scientific studies of attention and cognitive control for Buddhist understandings of the centrality of attention as the bedrock of spiritual practice?

**9.12.6 Emotion.** Buddhist psychology and western psychology begin with very different starting understandings of *emotion* as a fundamental dimension of human mental life. Western psychology, for example, tends to be concerned with the valence ("positive," "negative") of an emotion, while Buddhism has tended to emphasize the wholesomeness or not of a particular emotional experience for the individual's personal and social functioning in the world. Buddhism insists that emotions can be regulated with cognitive strategies, while western psychology has tended to assume that emotions are exactly that part of human mental life most apt to degrade or "swamp" normal systems of cognitive reasoning and control.

**9.12.7** Buddhist approaches to emotion place great emphasis on the power of *compassion* and provide very specific methods for its cultivation; in contrast, compassion has been relatively ignored in the western lexicon of emotion. Finally, Buddhist approaches emphasize *the importance of first person accounts* but are based upon the premise that accurate first person reports require systematic training. Self-reports of emotional experience are frequently obtained in western research on emotion, but there is little emphasis on how specific training might improve introspective access.

**9.12.8** The time is clearly ripe for a systematic examination of the points of divergence and overlap between Buddhist and western understandings of emotion. In particular, we will want to examine those areas that have the greatest potential for mutual learning: why do our two traditions disagree about the extent to which emotion can be voluntarily controlled? Can evolutionary and Buddhist views of emotion be reconciled, and on what grounds, empirical or otherwise? How far might new brain research on interfaces between cognitive and affective functioning cast new light on traditional Buddhist understandings of the role of emotion in cognitive function?

**9.12.9 Mental Imagery.** Mental images are furniture of the mind. When we are conscious of our thoughts, we are aware of images—visual, verbal, tactile, and all the rest. Objects populate the world without; images populate the world within. Indeed, such notables as Albert Einstein and Marcel Proust claimed that their most creative moments hinged on observations about their imagery.

**9.12.10** Nevertheless, the study of imagery within western science has a checkered history. Until very recently, imagery seemed like an utterly private event, something we could access only through introspection. Growing suspicion of introspection in the middle decades of the 20th century led behaviourist psychologists and philosophers such as Ludwig Wittgenstein to thus claim that imagery could not be studied scientifically. Today, we believe that the behaviourists and these philosophers were wrong. Not

only have we developed behavioural techniques that allow us publicly to validate introspections by tracking the observable footprints of imagery, but also we now can use brain scanning to observe the neural levers and pistons that power imagery.

**9.12.11** There is still, however, a great deal more to do, a great deal more that we would like to know. In particular, our understanding of the phenomenology of mental imagery—the scope of cognitive and emotional experiences that people can have of imagery—remains woefully underdeveloped. In contrast, over the centuries, various Buddhist traditions[185] have developed systems of disciplined introspective techniques for generating, controlling, and observing mental images that are probably unparalleled in the world. What can modern science learn from this rich and virtually untapped database of phenomenological observation? And what can traditional Buddhism learn from modern science?

**9.12.12 Integration and Final Reflections.** This conference has, in turn, examined attention, imagery, and emotion from a Buddhist and a western biobehavioural scientific perspective. In this final session, the conference attempted to put together the pieces: in understanding how both traditions understand the functional interrelations between attention, imagery, and emotion; and, more broadly, what each tradition understands the "mind" to be, and on what empirical basis.

**9.12.13** Differences in methodology are critical to the discussion. Buddhism as a mode of inquiry is characterized by highly disciplined practices of introspection or "first person" methodologies. Western biobehavioural science as a mode of inquiry is characterized by no less disciplined practices of external or "third person" observation, especially using instruments. Are these differences complementary or more fundamentally at odds with each other?

**9.12.14** Motivation is also be critical to the discussion. Buddhism and western science are both committed to empirical investigations of the mind, but for reasons that are embedded in apparently quite different ethical and philosophical traditions. What kind of cross-cultural exchange on how the mind works, now and in the future, is best suited to advance what is most compelling both intellectually and ethically within both traditions of inquiry?

### 9.13 MIND AND LIFE XII

**9.13.1 Neuroplasticity:** The conference theme was: "Neuroplasticity: The Neuronal Substrates of Learning and Transformation." Coordinated by Richard Davidson, it was held on 18-22 October, 2004, at Dharamsala. Here is the conference overview.

**9.13.2 Neuroplasticity: Transforming the Mind by Changing the Brain.** Neuroplasticity refers to *structural and functional changes in the brain that are brought about by training and experience*. The brain is a vital organ that is able to change in response to experience. Neuroscience and psychological research over the past two decades on this topic has burgeoned and is leading to new insights about the many ways in which the brain and behaviour change in response to experience. This basic issue is being studied at many different levels, in different species, and on different time-scales. Yet all of the work invariably leads to the conclusion that *the brain is not static but rather is dynamically changing and undergoes such changes throughout our entire life.*

[185] The website actually mentions "Tibetan Buddhism" specifically, as the dialogue was between the scientists and the Dalai Lama, but in reality many non-Tibetan Buddhists and methods are also involved.

The scientists assembled for this meeting represented the various levels of analysis in which these questions were pursued. Research on structural plasticity reveals how the literal composition of the adult mammalian brain is constantly changing and shows the factors that influence these changes.

**9.13.3** Other studies at the molecular level reveal *how the DHA chemistry can be changed by experience in ways that affect the expression of our genes*. Moreover, such effects on the chemistry of DNA can be produced by social experience, which in turn modifies gene expression in ways that can persist for the duration of a lifetime. These findings have radical implications for conceptualizing the dynamic interplay between nature and nurture. At more macro levels of brain systems, research have demonstrated how sensory, perceptual and language functions are modified by experience and how the neural systems that underlie these complex behaviours are transformed through experiential alterations that occur early in life.

Emotional function is also importantly shaped by experience, and the adult's social relationships are shaped in part by early life experience. The ways in which these influences occur were discussed and the brain mechanisms that might underlie such changes were examined. Individuals differ in their characteristic ways of reacting to emotional situations.

**9.13.4** Such individual differences may be importantly shaped by experience and by certain types of training. The role of contemplative training in transforming the emotional mind were considered. A major question pursued over the course of this meeting was the nature of mental training and its potential impact on the brain and behaviour. Mental training appears to be emphasized much more in the contemplative traditions than it is in the Western scientific tradition.

Another important issue considered was the optimal developmental periods to intervene to produce plastic changes to promote healthy functioning. Finally, the philosophical implications of this domain of science were considered. Specifically, how we should conceptualize the impact of voluntary mental activity as influencing brain function.[186]

### 9.14 Mind and Life XIII

**9.14.1** This confere3nce was themed "Investigating the Mind: The Science and Clinical Applications of Meditation," was held on 8-10 November 2005 at the DAR Constitution Hall, Washington DC. This conference addressed the growing interest in meditation within modern medicine and biomedical science that has arisen over the past thirty years and further explored the emerging clinical opportunities. In addition, an annual, week-long Mind and Life Summer Research Institute was started to advance the field of the scientific study of meditation, and a number of studies have also been initiated by participants in that programme.[187]

**9.14.2** **Meditation is becoming mainstream in Western medicine and society.** Applications of meditation are now common in the treatment of stress, pain, and a range of chronic diseases in both medicine and psychiatry, and some approaches are currently the subject of NIH[188]-supported clinical trials and research studies. At the same time, the power of our non-invasive technologies have made it possible to investigate the nature of cognition and emotion in the brain as never before, and to begin to explore the interfaces between mind, brain, and body, and the implications of particular forms of meditative practices for modulating and regulating biological pathways to restore or enhance homeostatic

[186] Download MLXII: Neuroplasticity brochure pdf.
[187] See http://mindandlife.org/sri06.ml.summer.institute.html for 2006, and navigate for other years' institutes.
[188] National Institute of Health.

**Mind and Life XIII: Investigating the Mind**
(DAR Constitution Hall, Washington, DC, 8-10 Nov 2005)
**Speakers**: Tenzin Gyatso (the 14th Dalai Lama), Ajahn Amaro (Abhayagiri Monastery), Richard J Davidson (Univ of Wisconsin-Madison), John S DeGioia (President, Georgetown Univ), Adam Engle (Mind & Life Institute), Jon Kabat-Zinn (U of Massachusetts Medical School, emeritus), Helen S Mayberg (Emory Univ), Edward D Miller (Johns Hopkins Univ Sch of Medicine, Dean), Robert M Sapolsky (Stanford Univ), Zindel V Segal (Univ of Toronto), David S Sheps (Univ of Florida), John F Sheridan (Ohio State University), Wolf Singer (Max Planck-Institute für Hirnforschung), Ralph Snyderman (Duke Univ Medical Center). **Panelists:** Tenzin Gyatso, Jan Chozen Bays (Great Vow Zen Monastery), Joan Halifax (Upaya Zen Center), Fr Thomas Keating (St Benedict's Monastery), Margaret E Kemeny (Univ of California-San Francisco), Jack Kornfield (Spirit Rock Meditation Center), Matthieu Ricard (Shechen Monastery), Sharon Salzberg (Insight Meditation Soc), Bennett M Shapiro (Merck Research Laboratories, emeritus), Esther M Sternberg (Nation Institute for Mental Health), John D Teasdale (MRC Cognition & Brain Science Unit, emeritus), B Alan Wallace (Santa Barbara Institute for Consciousness Studies). **Interpreters:** Thupten Jinpa (Institute of Tibetan Classics) & B Alan Wallace.
Source: http://www.investigatingthemind.org/speakers.html

processes and perhaps extend the reach of both mind and body in ways that might potentially promote rehabilitation and healing as well as greater overall health and well-being.

**9.14.3** Recent studies have shown that meditation can result in stable brain patterns and changes over both short and long-term intervals that have not been seen before in human beings and that suggest the potential for the systematic driving of positive neuroplastic changes via such intentional practices cultivated over time. These investigations may offer opportunities for understanding the basic unifying mechanisms of the brain, mind and body that underlie awareness and our capacity for effective adaptation to stressful and uncertain conditions.

### 9.15 Mind and Life series 2006

**9.15.1** In 2006, the Mind and Life Institute sponsored several meetings to continue the important work of creating and maintaining healthy minds:

April — Mind and Life XIV, with the Dalai Lama in India.
June — Summer Research Institute in Garrison, NY, USA.

September — Public Talk by the Dalai Lama in Denver, CO, USA.
November — Mind and Life XV with the Dalai Lama in Japan.

Additionally, Mind and Life[189] is facilitating a major initiative in the field of Mindfulness in Education. The goal of this initiative is to develop practical tools for everyday use in our schools that foster mindfulness in our youth.

**9.15.2** The year 2006 is also a historic in terms of Buddhist psychology. **The Insight Meditation Society** (IMS), which has been conducting silent meditation courses for over 30 years, was the venue for **the 1st Scientists Retreat**. Two meditation techniques were taught—vipassana (mindfulness or insight) and metta (lovingkindness).

Vipassana is an ancient method of introspection that readily conforms to the spirit of empirical science. It is simply a means of training the mind to be more keenly aware of sensory phenomena and the flow of thought. Metta meditation helps us cultivate an open and loving heart. These practices are non-sectarian and do not require adopting Buddhism as a religion or dogma.[190]

**9.15.3** **The 2nd Scientists Retreat** was held from 5-12 January 2007 at Spirit Rock, California, and the instructors were Guy Armstrong, Sylvia Boorstin, and Sharon Salzberg.[191]

**9.15.4** The 3rd Scientists Retreat—also called **the IMS Scientists Retreat**—was from 8-15 January 2008, at the Insight Meditation Society (IMS) in Barre, Massachusetts. The IMS Scientists Retreat was designed for neuroscientists, cognitive scientists, psychologists and others who studied the mind. It was also open to graduate students, post-doctoral trainees and faculty who worked in the broad area of the mind sciences. The course was led by Joseph Goldstein, Sharon Salzberg, Guy Armstrong and Susan O'Brien, and scientists associated with the Mind & Life Institute.[192]

**9.15.5** In **Israel,** the First International Conference of Training the Mind-Mindfulness, Brain and Behavior (30 Dec 2009) was held by the Psychology School of the Interdisciplinary Center (IDC), Herzliya. This was followed by the Mindfulness-training Retreat for Scientists and Mental Health Professional" (31 Dec 2009-3 Jan 2010) was held in the Neve-Shalom Hotel, Neve-Shalom.[193] The retreat faculty included Israel's leading meditation teachers and Prof Richard Davidson (of Wisconsin University, Madison)[194] [6.4]. Buddhist Studies is also on the rise in Israel, such as in the East Asian Studies department, Tel Aviv University.[195]

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[189] http://www.mindandlife.org/. The current address is: **The Mind & Life Institute,** 589 West Street, Louisville, CO 80027. Phone: 720-891-4292. Fax: 303-665-5597. Email to Mind & Life Institute: info@mindandlife.org.

[190] Sam Harris's report, The HuffingtonPost.com 2 Feb 2006, http://www.huffingtonpost.com/sam-harris/a-contemplative-science_b_15024.html or: http://www.mindandlife.org/current.news.html#shhp06.

[191] http://www.spiritrock.org/download/SRNews15-28-final.pdf.

[192] http://www.dharma.org/ims/retreat_detail.php?id=89.

[193] Or Wahat al-Salam, "the Oasis of Peace" (Isaiah 32.18), a cooperative village, located halfway between Tel Aviv and Jerusalem, was jointly established by Jewish and Palestinian Arab citizens of Israel, that is engaged in educational work for peace, equality and understanding between the two peoples. See http://en.wikipedia.org/wiki/Neve_Shalom_%E2%80%93_W%C4%81%C4%A7at_as-Sal%C4%81m.

[194] https://www.eventzone.co.il/EventsSites/mindfulness/10685.html.

[195] See eg http://www.tau.ac.il/humanities/eastasia/events.eng.html. Cf "Israel and Palestine were formerly Buddhist," http://www.lankanewspapers.com/news/2009/4/42006_space.html. Also "Buddhism in Palestine," http://www.buddhistchannel.tv/index.php?id=71,8053,0,0,1,0

## **10** Closing remarks

### 10.1 BUDDHIST MODELS AND IDEALS

**10.1.1** Compared to the other world religions, especially the God-centred ones (namely, Judaism, Christianity and Islam), Buddhism allows a wide latitude as to how it is defined it and who defines it. In the God-centred systems, a religious individual, council, or community is, as a rule, defined by their avowed "confession of faith," that is, a set of dogmas that sets one group apart from others. Naturally, such a system would be markedly sectarian, with very restricted or controlled exchange between confessional groups.

**10.1.2** Although Buddhism has a huge collection of scriptures and commentaries, much bigger than all the scripture of the God-centred religions put together, it is not a religion of the book. Although scripture, such as the early suttas, provide an almost incontrovertible source of authenticating the Buddhist life, principles and goal, each Buddhist school, group, indeed, individual, is free to interpret it according to his conscience and wisdom. With a high literacy rate and the freer flow of information today through various mass and electronic media, the individual is truly free to decide, even define, what kind of Buddhism he needs or wants.

**10.1.3** Of course, this has not always been the case. Throughout Buddhist history, different types of individuals have been perceived as **religious virtuosi** or "religious specialists," that is, those who are *perceived* as having a vital grasp of Buddhist doctrine and spirit by *sheer personality and social status*. In terms of salvation, each of the four periods of Buddhist history in India has its the conception of its religious virtuoso or ideal. The virtuoso is differently perceived at different times in Buddhist history, which in terms of historical development, and by way of simplicity, can be divided into **5 periods**, lasting roughly 500-1000 years each, each with their generally perceived ideal, thus:

1st period (500 BCE-0 CE)—**the arhat** or self-liberated saint, in whom all cravings have been extinguished and who will no more be reborn: this is essentially the period of early Buddhism.

2nd period (0-500 CE)—the **Bodhisattva**, the hypostasis or embodiment of compassion, conceived as a being (human or cosmic) who wishes to save other beings, even at the cost of postponing his own awakening; it is period of great philosophical development, that is, the era of Mahāyāna Buddhism.

3rd period (500-1500)—**the Siddha**, the charismatic holy man or religious adept who is conceived as being totally in harmony with his environment, that he is under no constraint whatsoever, and, as a free agent, is believed to be able to manipulate the cosmic forces both inside and outside himself; this period was dominated by the indigenizations, innovations, and shamanism of Tantric Buddhism.

4th period (1500-2000)—**the Seth**,[196] a professional, entrepreneur, or luminary, especially one with social status, wealth or academic qualification, which are perceived as blessings of good karma, and, as such, worthy of emulation and respect as a teacher or leader: this is corporate Buddhism.

5th period (2000- ? )—**the Vidyadhara,** person of great learning, related to or derived from Buddhism. Such a person may range from being a well known lay academic scholar in a special

[196] Skt *śreṣṭhī,* P *seṭṭhī. Seth* is a modern Hindi word for a wealthy entrepreneur or businessman. The traditional definition of ***seṭṭhi*** is given in the PED as "foreman of a guild, treasurer, banker, "City man," wealthy merchant, V 1:15 f, 271 f, 2:110 f, 157, S 1:89…etc."

field to an accomplished monastic specialist (say Abhidhamma or an academic field), or ideally one who is a master of both Buddhist religiosity and worldly learning, that is, one who champions a "modern" or "scientific" Buddhism.[197]

**10.1.4** In the final analysis, only **the arhat** is the true ideal of Buddhism of the Buddha. Each of the other three types is the "ideal Buddhist" as envisioned in later eras. Each of these types appears to be a quantum leap from the original arhat ideal. However, we should view them as "social ideals" reflecting the religious needs and inclination of the times.

**10.1.5** These ideals are not mutually exclusive, but overlap as concentric circles emanating from the arhat ideal at the centre. The arhat ideal actually underlies all the other three social ideals since as long as the noble eightfold path exists, it is possible to gain enlightenment. An important purpose of such a typology is to help us become aware of the changes or evolution in Buddhism, even radical innovations, and what they portend. Ultimately, our understanding of such developments should highlight the natural vitality of early Buddhism, which is a constant against which such worldly manifestations flow and ebb, reflecting the social and personal struggles of those ages.

### 10.2 THE COST OF PROGRESS

**10.2.1** From the four-period scheme of Buddhist history, we can see a growing tendency towards **secularism**, spirally downwards from the ideal of the spiritually liberated arhat, to the socially engaged Bodhisattva (and the Buddhist philosopher), to the licentious Siddha of shamanistic Buddhism, to the charismatic entrepreneurial Seth of corporate Buddhism, and the utilitarianly scientific Vidyadhara of the information age.

**10.2.2** **Secularism** here refers to a socio-religious attitude where there is less emphasis on inner spirituality for ourselves, but a greater emphasis on measurability of success, health, even religiosity, and a dominant perception that to be "religious" is to be engaged with the world.[198] There is also a popular "democratization" of religious and monastic roles, so that terms like monks, nuns, sangha, even enlightenment, are redefined or parochialized by various groups or individuals according to their perception and vision of life and Buddhism.

**10.2.3** The arhat ideal has generally fallen out of favour in a majority of Buddhist circles for one simple but important reason: the difficulty of meditating, or more exactly, of not attaining dhyana. When Dharma, as living *word,*[199] became silent *scripture*—when spoken communication of spirituality came to be written down in dry dead letters—the Dharma in due course came to be regarded by many as a modernist or measurable commodity.

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[197] Skt *vidyā,dhara*, lit tr as "knowledge holders." Although the term is found in Vedism and Tibetan Buddhism, I use it as a convenient neologism to represent the new Buddhist ideal of one who is knowledgeable not only in Buddhist lore, but also in modern learning. Interestingly, Brahmavamso of Australia, is an example, as he graduated in theoretical physics from Cambridge, UK, and is a spirited defender of Buddhism as "the only real science" (2004).

[198] See esp **Upāya S** (S 22.53/3:53 f), SD 29.4. This is not a criticism of socially-engaged Buddhism, which is basically compassion and wisdom put into action with a distinction of self or other, or regarding other as self. What is meant here is a worldly and self-centred clinging to the world due to our sense of lack.

[199] In the sense of voice (*vacana*), as in *Buddha,vacana*.

**10.2.4** Traditionally, **the holy** has become externalized and fetishized, a set ritual or material object, embodied in, say, a Buddha "relic" or a portable pantheon.[200] The power that was spiritually internal has been r reified (made into an object). Once such power is invested in an external thing, whoever possesses the object would be perceived as possessing that power, too. This then allows the purchase or exchange of religious merit or power. In short, this is *priestcraft*. This is diametrically opposite of we being our own refuge, when spirituality is internalized, that is, the locus of control is within ourselves.

**10.2.5** Who or what is the **Vidyadhara** ("knowledge-bearers") of the new century or millennium? Could it be the psychotherapist or neuroscientist, the modern shaman? One significant fact of the current dialogue between Buddhist psychology and academic mind science is clear: what early Buddhism sees as immeasurable, timeless, and a personal experience, namely, *the meditative experience*, is made into measurable scientific data, externalized so that scientists and experts can work and mull over them, and use them as their own.

**10.2.6** **Buddhist psychology**—by which I mean *Buddhist principles, systems and methods of mind-training and meditation*—is a modern way of speaking of the second of the 3 Buddhist trainings (*sikkhā*), that is, mental cultivation (*samādhi*). This training is necessarily based on a healthy understanding and acceptance of moral virtue (*sīla*), which, with proper mental cultivation, bring about levels of liberating wisdom, or at least mental health and creativity here and now.

Buddhist psychology, especially meditation, on the other hand, is opening a new field of knowledge for non-Buddhists and the scientists. Knowledge is power. Power is very attractive because we can use it to create wealth, control others and manipulate society. Even other religions see the necessity of appropriating such Buddhist teaching and methods in the universal and timeless proclivity for religious plagiarism.

**10.2.7** If **power** can be put into little packages, they would sell very well, like high-powered batteries, or even as tools for crowd control: they are called **books***.* Over the last two decades, there is a sudden and phenomenal explosion of Buddhist books, especially on meditation or meditation-related topics. Most of these books—expounding what might be called "vague Buddhism"—are written by non-practitioners, or by those lacking any deep understanding of Buddhism, or even by non-Buddhists. And they sell well—for, it's in *the name*—but mostly it is a case of the blind *reading* the blind.[201]

**10.2.8** Another question regarding the growing cooperation between mind science and Buddhism is whether the Buddhist community as a whole stands to benefit from it. As **Charles Prebish** has observed, there have always been two distinct lines of development for Buddhism in America (indeed, we might generalize to say, outside of Asia). "One form of Buddhism places primary emphasis on sound, basic doctrines, shared by all Buddhists, and on solid religious practice."[202] This is the faith of the immigrant Buddhists.[203]

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[200] Eg the Buddha's "Tooth Relic" in Sri Lanka and the "Emerald Buddha" of Thailand. See esp Piya Tan, *History of Buddhism,* rev 2005: Spread §10 (Relics rule).

[201] Even successful writers on psychology and meditation such as Daniel Goleman have been accused of making unfounded, even false, claims, such as his ideas about "emotional intelligence." For refs, See.

[202] Prebish, *American Buddhism,* North Scituate, MA: Duxbury Press, 1979:51.

[203] I am using the terms *immigrant* and *convert* Buddhism as general categories. Prebish himself does not use these terms. See Martin Baumann, "Protective Amulets and Awareness Techniques, or How to make sense of Buddhism in the West," in Prebish & Baumann 2002:51-65 (ch 3).

The other category comprises the convert Buddhists, who, having become more mature since the hippie 1960s,[204] are less inclined towards culture-based or "religious" Buddhism, but are more attracted to meditation, Buddhist psychology, and suttas. It is the latter Buddhists who are more likely to keep up with the new dialogue and benefit from it, while the immigrant Buddhists probably would not be significantly affected in any way, as they struggle to preserve their own cultural ways mostly as a cultural reflex, while they attend to their higher life-priorities.

### 10.3 Will science invalidate Buddhism?

**10.3.1** Earlier on [5], we spoke of the "psychologization of Buddhism," that is, on the impact that science would have on Buddhism today. At least one university student, **Jeff D Walker,**[205] has shown a special interest in "The interface of Buddhism and science: Will it alter a tradition?"[206] writing on the possible effects of modern psychology working with Buddhism, in that it

> may lead to the invalidation of foundational beliefs of one of the traditions. However, if approached with careful attention and wholesome motivation, the interface of Buddhism and science presents an opportunity to progress toward a healthier society and a deeper understanding of human experience. (Walker 2006:1)

Walker first notes that, like any religion that has left its point of origin—"there comes a point where we can say that, that which has dispersed has been removed from its original context … the ideas of Buddhism shaped the people, and the people shaped the ideas of Buddhism" (id).

**10.3.2** In the late 19th century (and in our own times), cultural currency of science in the West has led people to question the authority of Christianity. Buddhist evangelists such as **Anagarika Dharmapala** capitalized on this, declaring at the 1893 Parliament of World Religions in Chicago, that it was Buddhism, not Christianity, that could heal the rift between science and religion.[207] [2.7].

**10.3.3** Such events not only planted the seeds of Buddhism in the West, but also acted as a precedent for an interdisciplinary dialogue between Buddhism and science. Walker [10.3.1] quotes a contemporary Tibetan scholar, **Thubten Jinpa**,[208] who explains the current argument for such collaboration, first Buddhism's encountering the physical sciences, and in recent years, engaging with the mind sciences:

> The following key features of Buddhism—its suspicion of any notion of absolutes, its insistence on belief based on understanding, its empiricist philosophical orientation, its minute analysis of the nature of mind and its various modalities, and its overwhelming emphasis on knowledge gained through personal experience—all make it easy for Buddhism to be in a dialogue with a system of thought that emphasizes empirical evidence as the key means of acquiring knowledge. (Jinpa 2003:83)

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[204] See eg http://en.wikipedia.org/wiki/Hippie.

[205] Wesleyan University, 2006. Walker is a neuroscience and religion double major student, and member of the class of 2008, from Wesleyan University, Middletown, CT, USA, who plans to pursue an advanced degree in cognitive neuroscience: see http://www.wesleyan.edu/psyc/mindmatters/editors.html.

[206] See biblio: http://www.wesleyan.edu/aaai/2006_summer_papers/jwalker.html.

[207] Fields 1981:126.

[208] He is a renowned scholar with a PhD in religious studies from Cambridge, and since 1985 has been a principal English translator to the Dalai Lama and has traveled extensively in this capacity.

**10.3.4** Even in India, a few centuries after the Buddha's death, Buddhism began to develop new ideas (such as cosmic Buddhas and Bodhisattvas, and the downplaying of the arhat ideal), and more dramatic developments set in as Buddhism spread across Asia, changing nations and in turn changed by them. And now interfacing with science, Buddhism is further experiencing a renewed assimilation.

**10.3.5** Then there is the problem of authenticating our religion. Unlike in the past, when saints were seen to walk the earth and were approachable, this is not so today, where religion has often become a sophisticated status symbol and means of wealth management. One of the most important observations that Walker makes, I think, is when he says:

> Lacking such examples, the Western world turns to the authority of science to validate Buddhist practices. Superficially it may seem as though science is the dominant tradition, and, in order to be recognized as legitimate, Buddhism must have a scientific seal of approval. However, to understand the situation in its entirety one must examine intentions of the researchers, as well as context of the researcher. (Walker 2006:5) [10.3.1]

**10.3.6 How the mind works.** To understand the nature of consciousness is to understand how the mind works, but more importantly for practitioners, it reminds us of the immeasurable capacity of the mind for goodness—or for bad. If we do not consciously choose to direct the mind towards good, we would, as a rule, be autopilotted by our past habits to go on living in the past, perceiving others preta-like as shadows of our past, and drawn beast-like by the future, measuring others asura-like by how much they are worth to us.

There *is* only the present moment. There *was* the past but it is gone. There *will be* a future, maybe; but it was not and is not. Even when we think of the past or yearn for the future, it is happening now. Life's answer and liberation are clearly in the present moment: *life is well lived when we are present as it happens, no matter what happens*. For, this is our consciousness at its best.[209]

The question now is whether we can rise above this consciousness. The Buddha has shown that we can, if we well prepare ourselves for this liberation. However, this is not something easy to talk or write about. It is not even an experience (for all experiences must be in time). True reality is ultimately time-less, time-free.

For, there is nothing we can really change in time: neither the past nor the future, not even the present (Dh 348): this is the changing world.[210] We can only change our attitude towards them, and to live by that vision. If we understand this, then we have a helpful idea of the nature of timelessness of joy and peace, even of awakening.

### 10.3.7 The biggest thing in the world

**10.3.7.1** Let me close with a well known modern Buddhist story based on a poem of the Thai contemplative monk Buddhadasa (1906-1993), entitled "Conversation: the Buddha city" (2010:7, 17). A primary school teacher once asked her class, "**What is the biggest thing in the world?**" A sweet small girl answers, "My daddy." An excited little boy declares, "An elephant," since he likes animals. An older girl proposes, "A mountain." A bespectacled boy replies, "My eye is the biggest thing in the world!" The class holds its breath. Even the teacher does not understand his answer. So, the little sage explains, "Well, my eye can see her daddy, an elephant, and a mountain, too. It can also see so much else. If all of that can fit into my eye, then my eye must be the biggest thing in the world!"

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[209] See **Bhadd'eka,ratta Sutta** (M 131), SD 8.9.

[210] Dh 348: **Ugga,sena Vatthu,** DhA 24.6/4:59-65. See SD 8.9 (5).

However, he is not quite right, we might say. The mind can see everything that our eye can see, and it can also imagine so much more. It can also hear, smell, taste and touch, as well as think. In fact, everything that can be known can fit into the mind. Therefore, the mind must be the biggest thing in the world. The mind contains everything![211] For the moment, let us give ourselves the benefit of this answer [10.3.7.3].

**10.3.7.2** Understanding the mind, as such, is the basis of understanding everything. Our minds cannot be fully or properly examined in a lab, even by the most sophisticated instruments. The bottom line is that the mind cannot be fully measured, but can be examined, and better still, *trained*, by us ourselves so that it is liberated from suffering. Using a famous analogy, **William James** [2] observes that psychology stubbornly investigates the still water in buckets drawn from the stream of consciousness, while ignoring the flowing stream itself! (1890:255). We are that stream of consciousness, and only we can truly know ourselves.

**10.3.7.3** By the way, there is something *even bigger than the mind*, that is, **love,** or more exactly, lovingkindness, an unconditional acceptance of all life and its ambience. For, it is love that brings us forth into this world. We would not have been here if not for that love. Even more so, the mind or wisdom by itself can be self-centred, but with love, it is fulfilled: for, wisdom shown is love given.[212]

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BBC = British Broadcasting Corporation

[211] For Brahmavamso's version, see "Buddhism, the only real science" (2004), where Brahmavamso concludes the story thus: "Science's mistake [that the brain contains the mind] is obvious now. The mind is not in the brain, nor in the body. The brain, the body and the rest of the world, are in the mind!" See "Buddhism, the only real science," Lanka Daily News, 28 March 2007 & http://www.buddhistchannel.tv/index.php?id=6,3895,0,0,1,0. This story is also found in *Opening the Door of Your Heart*, Melbourne: Lothian Books, 2004:150 f. For Nimal Rajapakse's criticism of Brahmavamso's statement on science here, see Lanka Daily News, 7 April 2007 & http://www.buddhistchannel.tv/-index.php?id=22,3931,0,0,1,0.

[212] On lovingkindness (*mettā*), see ***Brahma,vihāra,*** SD 38.5. On how respect (*gārava*) relates to ~ ↓**Gārava S** (S 6.2) @ SD 12.3 (1.2.3).

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