SOIL: A Journey Through Time and Space

Soil is the life support system of our planet. It helps make our air breathable, cleans the water we drink and supports production of the food we eat. This life support system relies upon processes that operate at spatial scales from less than a micron to over hundreds of metres or more, and over timescales from seconds to millennia. The smallest soil particles are nanometres across. It is at this scale that we find the engine room of the soil where chemical compounds are transformed between gas and liquid phases and where material containing carbon is digested by microorganisms, who then release carbon dioxide. Just like animals and plants living on the soil surface, most microorganisms need air and water to survive. At the nanometre scale the soil atmosphere has a carbon dioxide concentration that is much greater than the air we breathe, and where soil pores are filled with water there may be little oxygen. In this anaerobic world we find microorganisms that are specially adapted, relying on other compounds for respiration. Processes occur quickly here - microbial life cycles may take a matter of minutes and in that time they perform many vital biochemical processes for the soil. SOIL: A Journey Through Time and Space

Mkala, Betty Jyväskylän ammattikorkeakoulu 2013 All rights reserved Näytä kaikki kuvailutiedot Julkaisun pysyvä osoite on http://urn.fi/URN:NBN:fi:amk-201401221623 Tiivistelmä The purpose of this thesis was to provide information for the school authorities to be able to improve on the nursing degree program. This was done by finding out the perception of nursing career for the first year nursing students in the international program in JAMK University of Applied sciences and getting to know what influenced their choices of the nursing career. The research was carried out using qualitative research method where closed and open-ended questions were used in data collection. A total of 26 answered questionnaires. Questions asked revealed students understanding of the nursing career as that which involves care, help, professional skills and responsibility, their reasons for studying nursing were that it provides personal satisfaction, job security and they possess the needed potentials required of the nursing profession, and the influences for their choice of nursing career that it provides personal satisfaction, job security and they possess the needed potentials required of the nursing profession. A follow up study of the same group of students after a year or so is recommended. To find if their perceptions changed, if their expectations on their studies and career are met and what their future expectations are in the career. Kokoelmat NURSING AS A CAREER: First year Students perception of and the reasons for their choice of Nursing as a career

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THE PHYSICAL AND PSYCHOLOGICAL EFFECTS OF MEDITATION: A REVIEW OF CONTEMPORARY RESEARCH

By Michael Murphy, Steven Donovan, and Eugene Taylor

Introduction

by Eugene Taylor, PhD

Some Definitions

Meditation—that great and mysterious subject which in the past has always conjured up the image of the solitary Asian ascetic sitting in deep trance—is fast appearing in unexpected places throughout modern American culture. Secretaries are doing it as part of their daily noon yoga classes. Preadolescent teenagers dropped off at the YMCA by their mothers on a Saturday morning are learning it as part of their karate training. Truck drivers and housewives in the Stress Reduction Program at the University of Massachusetts Medical Center are practicing a combination of Hindu yoga and Buddhist insight meditation to control hypertension. Star athletes prepare themselves for a demanding basketball game with centering techniques they learned in Zen. [1]

Dhyana is the generic Sanskrit term for meditation, which in the *Yoga Sutras* refers to both the act of inward contemplation in the broadest sense and more technically to the intermediate state between mere attention to an object (*dharana*) and complete absorption in it (*samadhi*). [2] The earliest known reference to such practice on the Indian subcontinent occurs on one of the seals, a figure seated in the lotus posture, found in the ruins of the pre-Aryan civilizations at Harappa and Mohenjodaro which existed prior to 1500 BCE. Most of the orthodox Hindu schools of philosophy derive their meditation techniques from yoga, but superimpose their own theoretical understanding of consciousness onto the results of the practice. [3]

Meditation is also referred to as a spiritual practice in China. Chinese forms of meditation have their origins in the early roots of popular Taoism which existed long before the codification of Taoism as a formal philosophy during the seventh century, B.C.. However, there is no concrete evidence to prove that meditation first arose in Hindu culture and then spread elsewhere. Thus, for the time being the original meditative traditions in China and India should be considered as separate and indigenous. To further complicate the issue, analogies between meditative states and trance consciousness suggest that even earlier precursors to the Asian meditative arts can be found in shamanic cultures such as those in Siberia and Africa. [4]

As for modern developments, in trying to formulate a definition of meditation, a useful rule of thumb is to consider all meditative techniques to be culturally embedded. This means that any specific technique cannot be understood unless it is considered in the context of some particular spiritual tradition, situated in a specific historical time period, or codified in a specific text according to the philosophy of some particular individual. [5] Thus, to refer to Hindu meditation or Buddhist meditation is not enough, since the cultural traditions from which a particular kind of meditation comes are quite different and even within a single tradition differ in complex ways. The specific name of a school of thought or a teacher or the title of a specific text is often quite important for identifying a particular type of meditation. Vipassana, or insight meditation, for instance, as practiced in the United States is derived from the Theravada tradition of Buddhism, and is usually associated with the teachings of the Burmese monk Mahasi Sayadaw; Transcendental Meditation is associated exclusively with the teachings of Maharishi Mahesh Yogi, whose tradition is Vedantic Hinduism; and so on.

The attempt to abstract out the primary characteristics of meditation from a grab bag of traditions in order to come to some purified essence or generic definition is a uniquely Western and relatively recent phenomenon. This tendency should be considered, however powerful and convincing its claim as an objective, universal, and value-free method, to be an artifact of one culture attempting to comprehend another that is completely different. [6]

At the same time, however, Western styles of meditation have long existed in the form of contemplative prayer, and contemporary interest in Asian practices has kindled a resurgence of interest in Western parallels. *Orison*, the repetitive and devotional meditation on Christ, repetition of the Holy Names, the spiritual teachings of St. Ignatius, and the Eastern Orthodox practice of the *philokalia* are examples from the Western contemplative tradition that come nearest to meditation as it has been cultivated in Asian countries. Indeed there is an unbroken tradition of mysticism which can be said to embody forms of meditative practice in the West—from the NeoPlatonists such as Plotinus, through the medieval mystics both early and late—Johannes Eriugena, St. Bonaventure, John of the Cross, St. Theresa, St. Bernard of Clarivaux—followed by such personalities as Robert Parsons, Margaret Mary Alacoque, and Emanuel Swedenborg, to modern Christian contemplatives such as Pierre Teilhard de Chardin and Thomas Merton, and now Schlomo Carlbach, Bede Griffiths, and David Steindl-Rast. [7]

But for purposes of carrying on a coherent discussion about the subject, while mystical awakening can be found in some form in all cultures, meditation per se should be taken as a uniquely Asian phenomenon which, wholesale, has only recently come to the attention of the West. In its new Western context, particularly in the United States, however, it has undergone a significant reformulation. In the US it has become indigenized, so that now one can say that Asian forms of meditation have become thoroughly American. [8]

The Americanization of Meditation

Ideas about the Eastern meditative traditions began seeping into American popular culture even before the American Revolution through the various sects of European occult Christianity that transplanted themselves to such new settlements as Germantown and Ephrata in William Penn's "Holy Experiment," which he named Pennsylvania. Early framers of the Declaration of Independence and the Constitution were influenced by teachings from mystical Sufism and the Jewish Kaballah through their membership in secret fraternities such as the Rosicrucians.

Asian ideas then came pouring in during the era of the transcendentalists, especially between the 1840s and the 1880s, largely influencing the American traditions of spiritualism, theosophy, and mental healing. The Hindu conception of *Brahman* was reformulated by Ralph Waldo Emerson into the New England vision of God as the Oversoul, while Henry David Thoreau's ideas on civil disobedience arose out of his reading of Hindu scriptures on meditation, yoga, and non-violence. At the same time, spiritualists—those who believed that science had established communication with the dead through the medium of the group seance—also dabbled in Asian ideas. Helena Blavatsky, co-founder of the International Theosophical Society, is usually credited with introducing Hindu conceptions of discarnate entities into American spiritualist circles. In this context, the Theosophists also translated Hindu texts on meditation and for the first time made them available in popular form to English-speaking audiences. Similarly, New Thought practitioners—followers of the healer Phineas P. Quimby—also included meditation techniques such as guided visualizations and the mantra into their healing regimes.

In general, by the late nineteenth century Americans appropriated Asian ideas to fit their own optimistic, pragmatic, and eclectic understanding of inner experience. This usually meant adapting ideas such as reincarnation and *karma* into a very liberal and heavily Christianized, but

nevertheless secular, psychology of character development that was closer to the philosophy of transcendentalism than to doctrines in any of the Christian denominations. (Today, the same standard for interpreting Asian ideas persists but in the form of a neo-transcendentalist, Jungian, and counter-cultural definition of higher consciousness.)

The World Parliament of Religions, held in Chicago in 1893, was the landmark event that increased Western awareness of meditation. This was the first time that Western audiences on American soil received Asian spiritual teachings from Asians themselves. Thereafter, Swami Vivekananda taught meditation to the spiritualists and New Thought practitioners in New Hampshire and went on to found various Vedanta ashrams around the country in his wake. Anagarika Dharmapala lectured at Harvard on Theravada Buddhist meditation in 1904; Abdul Baha followed with a 235-day tour of the US teaching the Islamic principles of Bahai, and Soyen Shaku toured in 1907 teaching Zen and the principles of Mahayana Buddhism.

By then, the idea of comparative religions had caught on as an academic field of inquiry in the universities. Following the Sacred Books of the East Series, edited by F. Max Mueller, and major translations of the Theravada scriptures by the Pali Text Society in England, the Harvard Oriental Series appeared after 1900 under the editorship of Charles Rockwell Lanman. Meanwhile, the Cambridge Conferences on Comparative Religions, carried on by Mrs. Ole Bull in her Brattle Street home near Harvard University, and the Greenacre School of Comparative Religions, operated by Sarah Farmer in Portsmouth, New Hampshire, had been bringing ideas about meditation to interested New Englanders since the late 1890s.

During the 1920s, American popular culture was introduced to the meditative practices of the Hindu yogi Paramahansa Yogananda. Gurdjieff, the Georgian mystic who had toured the US in 1924, was spreading the gospel of meditation in action to American expatriates in Paris by the 1930s. A young Hindu trained in theosophy named Jidhu Krishnamurti had been touring the US around that same time. Settling in Southern California in the 1940s, Krishnamurti would soon be joined by English émigrés fleeing the European war, such as Christopher Isherwood, Gerald Heard, and Aldous Huxley, who were themselves writers and practitioners of the meditative arts.

During World War Two, Huxley, Heard, and others became disciples of the meditation teacher Swami Prabhavananda, head of the Vedanta Society of Southern California. Together, they produced such influential books as *Vedanta for the West* and assisted in the popular dissemination of texts such the Hindu *Upanishads* and the *Yoga Sutras*. Meanwhile, on the east coast of the United States, Swami Akhilananda of Boston frequently met with leading university intellectuals in psychology, philosophy, and religion, including Gordon Allport, Peter Bertocci, William Ernest Hocking, and George H. Williams. One product of this liason was Akhilananda's *Hindu Psychology* (1946), with an introduction by Gordon Allport, a text on the philosophy and psychology of Vedantic meditation.

Another momentous event introducing Asian ideas to the West was the arrival in 1941 of Henrich Zimmer, Indologist and Sanskrit scholar, who had been a friend and confidant of C. G. Jung. Zimmer brought the young Joseph Campbell, comparative mythologist and folklorist, to the attention of the newly formed Bollingen Foundation. Subsequently, the Foundation produced the English translation of Jung's collected works, as well as numerous books by Zimmer, which Campbell edited, among other titles. Perhaps the most influential product of this endeavor was the Bollingen edition of the *I Ching*, or Chinese Book of Changes. The *I Ching* was a Taoist oracle book revered in Chinese religious history as one of the four great Confucian classics. Translated by Richard Wilhelm with a preface by Jung, the work has continued to enjoy immense popularity since its first publication in 1947.

The 1950s represented a major expansion of interest in both meditation and Asian philosophy. Frederick Speigelberg, a professor of comparative religions at Stanford, opened the California Institute of Asian Studies in 1951, which highlighted the work of the modern Hindu mystic and

social reformer Sri Aurobindo Ghose. Alan Watts, a student of Zen and former Episcopalian minister, soon joined the faculty and within a few years produced such best-selling books as *Psychotherapy East and West* and *The Meaning of Zen*.

It was also during this time that Michael Murphy first came under the influence of Speigelberg, was introduced to the teachings of Sri Aurobindo, and began the practice of meditation. With the assistance of Abraham Maslow, Alan Watts, Willis Harman, Aldous Huxley, George Leonard and others, Murphy would soon collaborate with Richard Price to launch Esalen Institute, which quickly became the world's premier growth center for human potential.

During the same period of the early 1950s, with the help of Watts, D. T. Suzuki came from Japan to California and introduced Zen to a new generation of Americans. Suzuki settled in New York, where he accepted a visiting professorship at Columbia. His seminars were open to the public and subsequently had a wide influence. Thomas Merton visited him. The neo-Freudians such as Karen Horney and Erich Fromm were his students. Suzuki even took Horney on a three-month tour of the religious shrines in Japan. John Cage heard him, as did J. D. Salinger. Soon, Suzuki was profiled in *The New York Times*, and many of his previous works on the history and philosophy of Zen, published in relative obscurity, were translated and reprinted for American audiences. Zen, embraced by the beat generation, had suddenly come to the West.

What occurred next opened an entirely new era of popular interest in meditation. This was the confluence of three major cultural events in the 1960s: the psychedelic revolution, the Communist invasion of Asia, and the rise of the American counter-culture, especially in terms of widespread opposition to the Vietnam War.

By the early 1960s, mind expanding drugs were being taken by a significant segment of the post war baby boom, a generation which numbered some 40 million people born between 1945 and 1955 who came of age in the late 1960s and early 1970s. This led young people in their teens and twenties to collectively open the doors of inward perception, experiment with alternative lifestyles, and question established cultural norms in Western society. An entire generation soon established their own alternative institutions which began to operate in defiance of traditional cultural forms still dominated by the ideology of their parents' generation. Subsequently, this was to have important political, economic, religious, and social consequences in the West, especially in the United States as enduring but alternative cultural norms began to take root in the younger generation of the American middle class.

At the same time, the increased Soviet influence in India, the Cultural Revolution in China, the Communist Chinese takeover of Tibet and Mongolia, and the increased political influence of Chinese Communism in Korea and Southeast Asia were key forces that collectively set the stage for an influx of Asian spiritual teachers to the West. An entirely new generation of them appeared on the American scene and they found a willing audience of devotees within the American counter-culture. Swami A.C. Bhaktivedanta Swami, Swami Satchitananda, Guru Maharaji, Kerpal Singh, Nayanaponika Thera, Swami Rama, Thich Nhat Hanh, Chogyam Trungpa, Maharishi Mahesh Yogi, Swami Muktananda, Sri Bagwan Rujneesh, Pir Viliyat Kahn, and the Karmapa were but a few of the names that found followers in the United States. While there remain numerous contemporary voices, such as Guru Mai, Thich Nhat Hanh, the Maharishi, and Sogyal Rinpoche, there can be little doubt, historically, that the most well known and influential figure in this pantheon today remains Tenzin Gyatso, the fourteenth Dalai Lama of Tibet, winner of the Nobel Peace Prize in 1989.

As a result of such personalities, there has been a tremendous growth in meditation as a spiritual practice in the United States from the 1960s to the present. This phenomenon remains largely underestimated by the pundits of American high culture who see themselves as the main spokespersons for the European rationalist tradition in the New World. In the first place, from a socio-cultural standpoint, it is clear that from the 1920s to the 1960s, Freudian psychoanalysis

was the primary socially acceptable avenue through which artists, writers, and aficionados of modernism gained access to their own interior unconscious processes. For a new and younger generation of visionaries, however, psychoanalysis was soon replaced by psychedelic drugs as the primary vehicle for opening the internal doors of perception. This occurred as a result of experiments undertaken in military and university laboratories associated with the US Central Intelligence Agency (CIA). The CIA was interested in developing mind-control drugs for potential use in psychological warfare. At the same time that the CIA began testing substances such as LSD on unsuspecting populations of soldiers, businessmen, and college students, some of these chemicals came into the hands of the scientific and medical community. Researchers themselves began ingesting mescaline and LSD. Soon, by the late 1950s and early 1960s, from the psychiatrists' couches in Hollywood to the hallowed halls of Harvard University, the youthful and educated elite of the American middle class began to experiment with psychedelics in ever-increasing numbers.

The counter-culture movement that followed was considered a revolution in consciousness, driven by mind-expanding drugs, as well as defined by spiritual teachings from Asian cultures, each creating the conditions for expansion of the other. As the psychedelic revolution of the 1960s subsided for the post-war baby boomers maturing into the 1970s, meditation, and all that it implied, then became fixed as an enduring ethic of that generation. The belief was that meditative practices not only cleansed consciousness of psychedelics, and confirmed the commitment to pursuing alternative lifestyles, but they also informed the socio-cultural direction that the lives of many young people would soon take in establishing new and permanent forms of lifetime spiritual practice. Now, after thirty years, these developments have produced advanced Western practitioners, who themselves are qualified senseis, roshis, swamis, and tulkus. We known them as Ram Dass, Sivananda Radha, Jiyu Kennet Roshi, Maureen Freidgood, Jack Kornfield, Robert Frager, Richard Baker Roshi, and others. They have begun to teach these Asian traditions to Western audiences. In so doing, they are also partipating in their modification by forming new lineages of meditation practice that, while informed by Asian influences, turn out to be uniquely Western. Such teachings are already being transmitted to a second and third generation of younger people in the United States and Europe as well, altering irrecoverably the shape and direction of spiritual life in contemporary Western culture.

Not the least of these influences has been renewed interest in the Western contemplative traditions. Examination of Western mystics had increased dramatically since the 1960s. Witness, for instance, establishment of the Classics in Western Spirituality Series, published by the Paulist Press, or the appearance of the newly formed Mysticism Study Group within the American Academy of Religion. At the same time, popular books on Christian meditation are clearly linked to the spiritual awakening that has occurred in the counter-culture. Avery Brooke's *Learning and Teaching Christian Meditation* (1975), Joan Cooper's *Guided Meditation and the Teachings of Jesus* (1982), and Swami Rama's *Meditation in Christianity* (1983) are but a few of the titles that have enjoyed continuous printings since they first came out. There is also a case to be made for the idea that the fundamentalist revival in the Christian right has been a direct reaction to the larger upsurge of spirituality that has occurred in the American counter-culture.

Perhaps the most significant opportunity to arise out of the new stream of Western meditation practitioners has been heightened awareness of Asian cultures, especially in terms of their unique integrity and outlook. While the Judeo-Christian, Greco-Roman, Western European and Anglo-American tradition continues to export its beliefs and values into other cultures on a grand scale, the Asian worldview is also fast asserting itself as a competing economic, political, and social force. But is a clash of world epistemologies inevitable? Perhaps. Meanwhile, Westerners within a new and younger generation have appeared who are fast becoming skilled interpreters of these non-Western traditions as legitimate worldviews in their own right. Their vehicle, the practice of meditation, could, instead of the predicted clash of cultures, potentially set the stage for an exchange of ideas between East and West that may yet turn out to be unprecedented in the history Western thought.

Meditation as a Scientific Study

Within this context scientific interest in meditation has grown significantly over the past quarter of a century. This has occurred partly on the justification that science might be able to show us objectively what meditation is and what its effects are, but also because the scientific method represents one of the few ways in which our culture can peer into the depths of another culture so radically different from our own. To objectively study meditative practices, however, requires that they be taken out of their subjective context. One quarter claims that science produces objective truth independent of cultures, while another maintains that the scientific attitude has its own implied philosophical context, so all we are really doing is taking the subject out of its original frame of reference and putting it into one we can more easily understand. The methods and theory surrounding the practice of meditation techniques thereby undergo a radical change.

According to this second view, no more quintessential example exists of the Westernization of an Asian idea than the scientific study of meditation. Science, the product of Aristotelian thinking and the European rationalist enlightenment, now turns its attention to the intuitive transformation of personality through awakened consciousness (and other such Asian meanings of the term *enlightenment*). This means that the faculties of logic and sense perception, hallmarks of the scientific method, are now being trained on the personality correlates of intuition and insight, hallmarks of the traditional inward sciences of the East.

To grasp what meditation is has proven to be no easy task. The underlying and usually hidden philosophical assumptions of traditional, rationalist science do not value the intuitive. They do not acknowledge the reality of the transcendent or subscribe to the concept of higher states of consciousness, let alone, in the strictest sense, even admit to the possible existence of unconscious forces active in cognitive acts of perception. Meditation, therefore, is a topic that characteristically would not be taken up by mainstream scientists. One would expect that research funding would be scarce, peer review difficult, and publication channels limited. The evidence shows that, at least until recently, this has been exactly the case.

The essential difficulty here is not just the reformulation of meditation techniques to fit the dictates of the scientific method, but rather what might be called a deeper, more subtle, and potentially more transformative clash of world epistemologies. It is not simply that meditation techniques have been difficult to measure but rather that, in the past, meditation has largely been an implicitly forbidden subject of scientific research. Now, however, major changes are currently underway within basic science that presage not only further evolution of the scientific method but also changes in the way science is viewed in modern culture. An unprecedented new era of interdisciplinary communication within the subfields of the natural sciences, a fundamental shift from physics to biology, and the cognitive neuroscience revolution have liberalized attitudes toward the study of meditation and related subjects. Meanwhile, the popular revolution in modern culture grounded in spirituality and consciousness is having a growing impact on traditional institutions such as medicine, religion, mental health, corporate management strategies, concepts of marriage, child rearing, and the family, and more. Increasingly, educated people want to know much more about meditation, while our traditional institutions of high culture remain unprepared as adequate interpreters.

The First Edition

As a result, when it first appeared, predictably, *The Physical and Psychological Effects of Meditation* drew wide attention within the meditation community and eventually sold out. Its authors, Michael Murphy and Steven Donovan, leaders in the American growth center movement and themselves seasoned meditators, presented their bibliography as a project of the Center for Exceptional Functioning, a newly founded program within Esalen Institute. Esalen, which Murphy had co-founded with Richard Price in 1961, was, for many, the premier growth center for personal development in the United States.

Interest in meditation actually began out of the earliest programs at Esalen. Alan Watts, the well-known interpreter of Zen to the West, and Al Huang, a Chinese Tai Chi master of movement meditation, both taught meditation-related workshops when Esalen first opened. Throughout the years, figures such as Suzuki Roshi, Baker Roshi, Maharishi Mahesh Yogi, Lama Anagarika Govinda, and various Tibetan Buddhist tulkus introduced different forms of meditation into the growth center environment and helped to shape the basic theme of the Esalen program. This theme Murphy conceived as nothing less than the transformation of personality.

The immediate impulse that launched the bibliographic project, however, was publication of Murphy's speculative fiction Jacob Atabet (1977). This was a tale, set in modern San Francisco, about a writer, Darwin Fall, who had been investigating various miraculous events for the Catholic Church in Rome and doing research into all kinds of transformative phenomena. Fall meets and begins to chronicle the story of Jacob Atabet, who is actually in the process of transforming every cell of his body into the higher spiritual light. Atabet, for his part, finds in Fall someone who at last understands what he is going through. In the course of the novel, Atabet needs to be instructed in the contents of the massive text summarizing Fall's not yet complete research. The monumental tome, given to Atabet in outline form as a work in progress in that fictional account, later actually became Michael Murphy's voluminous The Future of the Body (1992).

Meanwhile, scientific publications and other material collected in the course of putting together The Future of the Body became the basis for the first edition of the annotated bibliography in meditation research, which appeared in 1988. Before the advent of the revolution in personal computers, before managed care took over the health care industry, and before the full impact of rapid developments in the cognitive neurosciences were felt, Murphy and Donovan had collected a database of some 10,000 articles on various aspects of human potential and higher consciousness. Out of this cache they extracted 1253 scientific and literary studies on meditation which formed the core of the first edition. They introduced their bibliography with a series of essays to make a statement on the physiological, psychological, and behavioral effects of meditative practice as was understood in the Western literature. To this analysis they brought a meditator's reading of both the Eastern and Western contemplative traditions, which provided insightful comparisons to the slow but steadily growing study of meditation according to the methods of Western science.

The first edition clearly indicated that the scientific study of meditation was fast becoming a growth industry. In the wake of its publication, Esalen, in cooperation with the Institute of Noetic Sciences, and with financial assistance from Marius Robinson, launched an annual series of invitation-only conferences on advances in meditation research. These conferences, held annually at Esalen from 1988 to 1996, brought practitioners of meditation together with scholars in comparative religions and scientists interested in experimental and clinical investigation in order to generate cross-disciplinary dialogue about the experience and the effect of meditative practice. One fruit of those conferences has been this second edition of the Murphy and Donovan bibliography.

The Present Update

In the eight years since the first publication of their work, basic experimental studies on the subject of meditation have steadily increased, while outcome research in clinical settings has grown at an even faster rate. At the same time, when compared to what had gone on in the field in the fifty years preceding 1988, the total rate of increase between 1988 and 1996 in articles in scholarly and scientific journals as well as trade books has been nothing short of spectacular.

The second edition, in keeping with the first, chronicles mainly scientific and scholarly works, revealing several key trends and changes. Since 1988, not only has government sponsored research increased, but meditation is now a category on the National Library of Medicine's list of computer search subjects. There also has been an increase in the number of studies reported by researchers outside the US, especially from Asian countries. While more studies are being undertaken overall, the majority of research programs appear to be conducted by practitioners of meditation who are also skilled in the techniques of modern experimental methods. Finally, and perhaps most important from the standpoint of basic science, investigation has moved from the level of gross physiology to more detailed points of biochemistry and the voluntary control of internal states. From a philosophical standpoint, these studies have also raised a number of issues about the role of spiritual experiences in both psychology and medicine.

TM and the TM-Sidhi Project

As Murphy and Donovan pointed out in their first edition, and as the present update of their work has confirmed, the most prolific research on meditation in the United States in sheer numbers of published studies has been and continues to be on Transcendental Meditation. Transcendental Meditation is the specific introductory program taught by Maharishi Mahesh Yogi, a Vedantic meditation teacher originally from Madhyapradesh, India, to thousands of disciples, most of whom are in the West. Meanwhile, the TM-Sidhi program (an anglicized version of the Sanskrit *siddhi*, meaning supernormal powers) represents more advanced training in the Vedantic interpretation of the *Yoga Sutras* of Patanjali. The experimental research program into the effects of TM is carried on largely at Maharishi Mahesh International University (MIU) in Fairfield, Iowa (now called the Maharishi International School of Management), but there are other centers and individuals engaged in TM research as well.

Over the past two decades, David Orme-Johnson, one of the key investigators at MIU, and his colleagues have complied and edited 508 studies on TM in five volumes under the title *Scientific Research on Maharishi's Transcendental Meditation and TM-Sidhi Program: Collected Papers* (Orme-Johnson and Farrow, 1977; Chalmers, Clements, Schenkluhn and Weinless, 1989a, 1989b, 1989c; Wallace,Orme-Johnson and Dillbeck, 1990). These studies are arranged approximately in chronological order in each volume under the headings of physiology, psychology, sociology, and then either theoretical or review oriented papers. Experimental studies reported are about evenly divided between articles in refereed journals and those from TM conferences and in-house TM publications.

The content of the collected papers indicates that, historically, TM researchers began by positing the existence of a fourth state of consciousness—a hypometabolic waking state which their physiological measures suggested was distinctly different from either normal waking consciousness, the state of sleep with dreams, or the state of deep sleep without dreams. Studies then began to show effects when TM was applied to medical conditions such as asthma, angina, and high blood pressure. Personality variables became a focus of research. These included measures of intellectual problem-solving ability, thinking and recall, creativity, field independence, sense of self-esteem, and self-actualization. Researchers then moved into applied social

situations, looking at the effects of teaching TM to the police, the military, and such populations as juvenile offenders, incarcerated adults, high school students, and athletes, as well as managers in the corporate environment. Meanwhile, more subtle biochemical measures of blood chemistry were also undertaken. These included endocrine levels, effects on neurotransmitters such as dopamine, noradrenaline, and serotonin, and the measurement of altered cell metabolism. TM was also examined in the context of various psychiatric disorders.

By the late 1970s studies began to appear testing the abilities of advanced meditators in the TM-Sidhi program on numerous variables during deep meditation and during what they described as yogic-flying. Along with individual studies, TM researchers also began reporting evidence for an inverse correlation between the amount of meditation going on and sociological variables such as the local and national crime rate for a given period. This has been labeled the Maharishi Effect. Finally, there are numerous papers on TM and world peace.

After almost a quarter of a century of scientific investigation, TM researchers now describe their findings in theoretical terms referring to "Vedic psychology" and "Vedic science." Their system clearly acknowledges the reality of the transcendent and subserves materialist methods of Western scientific investigation under the larger domain of spiritual experience within the philosophical and religious context of Hindu monism. Their expertise with certain aspects of Western science has become quite sophisticated, however, creating an altogether new avenue of investigation at the interface between science and spirituality. In the new and more open scientific climate toward research on the subject of meditation, TM researchers have successfully been able to master the blind peer review process and were recently awarded some $2,500,000 in research grants from the National Institutes of Health. Their studies will look at the large scale application of TM in the treatment of alcohol and drug abuse and in such conditions as hypertension. [9]

Their preliminary research has shown that, with regard to drug dependence, the traditional single-cause-for-a-single-illness model is unworkable. Instead, addiction is viewed as a progressive behavior pattern involving a complex of physiological, psychological, and socio-cultural variables that can be successfully influenced by meditative practice at key points. In the case of hypertension, they have shown that psycho-pharmacology is still the preferred medical intervention but remains complicated because of toxic side effects, issues of patient non-compliance, and the fact that drugs work well on preventing stroke but not coronary heart disease. Their previous studies have confirmed that meditation works better than drug placebos, but is slower acting than pharmacologic agents, leading them to confirm the current recommendation that TM is most effective when used in combination with other therapies.

Herbert Benson: The Mind-Body Medical Institute

Another of the most visible research projects into the effects of meditation originally reported in the first edition of the Murphy and Donovan bibliography has been going on under the direction of Herbert Benson, cardiologist at Harvard Medical School. In the late 1960s, Benson began studying Transcendental Meditation practitioners. He has since expanded his work by looking at Tibetan Buddhist meditators, and generic forms of relaxation capable of being elicited by the general population.

His first major work, a trade book entitled *The Relaxation Response*, appeared in 1975. In it, he described procedures he believed were generic to the onset of meditation and other contemplative practices. The conditions necessary to evoke the relaxation response involve a quiet environment, repetition of a sound or phrase, a passive attitude, and relaxed watchful breathing. Meanwhile, in the medical literature he had identified the relaxation response as a

natural reflex mechanism which, when practiced twenty minutes a day, reduced stress and physiologically had the opposite effect of the fight-flight reflex.

Beyond the Relaxation Response appeared in 1984, and combined Benson's research into both the relaxation response and the placebo effect. This text emphasized the role that harnessing physiology can play in improving quality of life and character. Benson followed in 1987 with *Your Maximum Mind*, a text that clearly associates the positive physiological effects of the relaxation response with the hopefulness of the patient's own religious beliefs and values.

Since publication of *Your Maximum Mind*, Benson has launched the Mind-Body Medical Institute, a for-profit research and training initiative in behavioral medicine, in conjunction with the Deaconess Hospital in Boston and the Harvard Medical School. Two major streams of Benson's work on meditation are carried on at this Institute. One involves ongoing programs in scientific research, while the other is dedicated to community education.

Since 1967 Benson has been working on identifying the physiological and neurochemical underpinnings of the relaxation response, which he defines as a hypometabolic state of parasympathetic activation, that is, a state of deep rest. Early work showed the effect of the relaxation response on lowering conditions such as essential hypertension, headache, and alcohol consumption. Studies then moved to show the effect of the relaxation response on various forms of heart disease, serum levels in the blood, and on psychiatric disorders such as anxiety. Other studies compared the relaxation response with other forms of relaxation such as hypnosis.

The next major phase was to assess the effects of the relaxation response in a variety of clinical situations. Women experiencing moderate forms of PMS were found to benefit from the technique. Patients at a major health maintenance organization were found to utilize the facilities less and to report less illness over time when taught Benson's method. Recently, the Institute has inaugurated a successful relaxation curriculum for high school students.

At the same time, Benson has also been investigating advanced meditators. While he began with practitioners of TM, as work on the relaxation response became more sophisticated, Benson turned his attention to measuring the physiological changes in advanced Tibetan Buddhist meditators, using monks who follow the Dalai Lama. These were on-site investigations at monasteries in Nepal in the Himalayas. Most recently, Benson and his colleagues have been testing out the physiological effects of different forms of practice, as well as assessing metabolic and electrophysiologic changes in advanced meditators.

On the educational side, The Mind-Body Medical Institute offers regular one-week training programs for health care practitioners in all aspects of the relaxation response. The Institute franchises out its model to hospitals and other health care facilities and periodically launches educational programs for the public.

In December of 1995, for instance, the Institute sponsored a major conference on "Spirituality and Healing in Medicine." The three-day program was aimed at clinical practitioners, including physicians, psychologists, nurses, clergy, social workers, allied health professionals, and health care administrators. Perhaps for the first time, scientists, and Western healthcare practitioners joined with scholars in comparative religions to assess the relationship between spirituality and health. Here presentations on scientific evidence as well as historical and thematic scholarship attempted to interpret the life-world of radically different epistemological frames of reference from those of the laboratory scientist. It also meant taking seriously the claims of faith traditions in the West such as Pentacostalism, the Charismatic Catholic movement, and Seventh Day Adventism which the scientific outlook normally rejects. As well, Islamic, Hindu, and Buddhist scholars took up the more difficult task of interpreting the spiritual traditions of non-western cultures as

significant sources of healing. Thoughout the conference, the practice of meditation played a central role in these discussions.

More recently, Benson has released *Timeless Healing: The Power and Biology of Belief* (Benson and Stark, 1996). In this text he renames the placebo effect "remembered wellness." By using this new term he takes the idea of the placebo, which carries a negative connotation in science as something "not real," and re-examines it as a new psychological tool in medicine. In the term "remembered wellness" he here redefines the old term "placebo" as the person's natural desire for health and the person's right to choose the kind of healing to achieve it. To pharmaceuticals and surgery, Western medicine must now add the patient's own capacity for self-healing. Expectations, beliefs, values, and the practice of meditation, Benson maintains, are among the new forces we must now harness for health and growth.

Jon Kabat Zinn
at the University of Massachusetts Medical Center

Another major program of research on meditation continues under the direction of Jon Kabat-Zinn in the Department of Medicine, Division of Prevantative and Behavioral Medicine at the University of Massachusetts Medical Center in Worcester, Massachusetts. Kabat-Zinn's program, primarily for patients with medical disorders, combines elements of Vipassana, a Theraveda form of Buddhist meditation from Burma, and Zen practices from Japanese Buddhism with Hatha yoga, a tradition from the Indian subcontinent, in a training regime identified as Mindfulness-Based Stress Reduction (MBSR). The Stress Reduction Clinic takes referrals from all services throughout the hospital and elsewhere and deals with a wide range of referred conditions, including hypertension, heart disease, cancer, chronic pain, irritable bowel syndrome, headaches, HIV and AIDS, as well as disorders of stress and anxiety.

Each patient is interviewed individually prior to enrollment in the program. The course includes eight weeks of classes, two two-and-a-half hour classes per week. Each class contains between twenty-five and forty members. Home study is required as well. Six days per week, with the help of audiotapes, patients practice meditation and yoga for forty-five minutes on their own. At week six, they attend an all-day seven-hour silent meditation. All participants in the six to eight concurrently running classes (approximately 240 people) participate in this silent weekend meditation retreat together. Following the program, each patient meets individually with the instructor. Three eight-week cycles of the course are held each year.

Patients are taught a basic regime of stretching and relaxation, plus different forms of seated meditation that they can continue to practice at home. They are also taught a method of body scanning, which entails following the path of the breath through different parts of the body as a guided visualization. In groups, they also discuss issues of formal meditation practice and ways to integrate what they learn there into their daily lives.

The program has enjoyed considerable success and notoriety. Kabat-Zinn has summarized his work in two popular trade books, *Full Catastrophe Living* (1990) and *Wherever You Go, There You Are* (1994). In 1993, the work of the clinic was prominently featured in the PBS series *Healing and the Mind with Bill Moyers*. In addition, over 100 centers in the US and abroad started by colleagues trained by Kabat-Zinn now conduct research as well as deliver clinical services. Beoynd this network, in Massachusetts alone, MBSR training is presently offered bilingually, in Spanish and English, in neighborhood health centers and taught to both inmates and staff as part of an ongoing prison project. Also, training programs are offered for first and second year medical students, corporate executives, and staff at local HMOs.

While Kabat-Zinn and his colleagues have undertaken extensive outcome studies of their program on meditation, recently they have moved into more basic research that tries to refine the identification of specific biological markers that show the effects of meditation on the body.[10] Currently, the key variable of their investigation has been melatonin, a hormone which is produced in the pineal gland and thought to be a scavenger against cancer cells, acting to inhibit cancer growth at certain intermediate stages of cell proliferation. Melatonin is known to be photosensitive and is produced in greatest quantities in the body at night. Kabat-Zinn and his colleagues suggest that ist is also pychosensitive, in other words, that psychosocial interventions can also increase its production. In a recent study employing graduates from their program, for instance, Massion, Teas, Hebert, Wertheimer, and Kabat-Zinn (1995) demonstrated a significant increase in melatonin levels among meditators. Because the oncology literature provides support for the concept of psychophysiological interactions in survival among cancer patients, the Worcester group suggested not only that melatonin might be a marker for other types of psychosocial interventions, but that meditation might be relevant in the treatment of certain types of cancer, especially of the breast and prostate.

Kabat-Zinn and his colleagues have several research projects on meditation currently underway that are in their preliminary stages and have not yet been published. One is the effect of guided meditation on psoriasis. Another, funded by the US Army, will look at the effects of behavioral interventions such as nutrition and meditation in patients suffering from early-stage breast cancer. In another experiment, just completed and not yet published, Kabat-Zinn joined colleagues A.O. Massion, J. Teas,. J.R. Hebert, and M.D. Wertheimer replicating their original findings and once again found a positive relationship between intensive meditation practice and increased melatonin levels.

Cognitive-Behavioral Approaches in Psychology

In an important new development, academic psychologists in the tradition of cognitive behaviorism have launched experimental research programs in meditation. William Mikulas (1981) at the University of West Florida has pointed out that, when analyzed in detail, meditation practices can be broken down and understood in terms of traditional constructs in experimental psychology, such as vigilance, attention, and concentration. As well, the new trend in cognitive therapy applying principles of classical and operant conditioning in order to inhibit or facilitate both mental images and thought processes has brought experimental psychologists a step closer to the type of instruction typical of various Eastern meditative practices. The continuing obstacle is, according to Mikulas, that cognitive psychologists have overemphasized a mechanistic model of the mind as a computer instead of expanding their definition of behavior.

To rectify this situation, Mikulas has outlined a program to study what he called "Behaviors of the Mind" (mind, a decidedly unbehavioristic term, he defines as the subjective center or agent of mental activity). [11] Three such behavioral variables relevant to the study of meditation that he has studied are concentration, the ability to focus attention on an object for varying periods; mindfulness, a generalized state of alertness where the mind remains unfocused but is prepared to attend to any potential stimulus; and clinging, the tendency of the mind to attach to and to dwell on specific thoughts or objects.

Such constructs, Mikulas believes, can be operationalized as a way to understand meditation from a cognitive-behavioral perspective. Moreover, this addresses what is actually going on at a mental level in a much more sophisticated way than just studying physiological measures or a single experimental variable. [12]

Another cognitive-behaviorist, Jonathan C. Smith, at Roosevelt University in Chicago, has developed an extensive research program on meditation as part of his Stress Institute (J.C. Smith, 1975a, 1975b, 1975c, 1978, 1984a, 1984b, 1985, 1986a, 1986b, 1987, 1988, 1990, 1991, 1993). Thinking along lines similar to Mikulas, Smith had already begun his own research by conceiving meditation as just a special form of relaxation. Psychologists have numerous relaxation strategies available to them, including progressive muscle relaxation, yogic stretching, guided mental imagery, contemplation, a focus on the gross aspects of the body, and a more refined focus on subtle body functions. Yet another is meditation, which can be either focused, as in Transcendental Meditation or Benson's relaxation response, or open and unfocused, as in Zen practice or Buddhist mindfulness.

His empirical research, relying heavily on factor theory, has more recently caused Smith to revise his thinking about theories of relaxation. In a complete reversal, he now considers relaxation a subset of meditation (J.C. Smith et al., 1996). In the old Benson model (one that still largely prevails), relaxation was confined to measurements of reduced physiological arousal. Another explanation that has been most popular among traditional stress researchers, such as Davidson and Schwartz (1984, 1976), defines relaxation in terms of cognitive-somatic specificity, i.e., there are two kinds of relaxation, physical and mental, which require two different sets of techniques, physiological and psychological. Then there was Smith's approach which saw all types of relaxation as the refinement of cognitive skills involving passivity, receptivity, and focusing. As more research results came in, Smith then came to believe that, in addition to just cognitive skills, relaxation was most successful when it included supportive cognitive structures, such as those found in personal philosophies of life.

Now, his research has further indicated that relaxation is composed of four separate effects: 1) the initial evocation of the relaxation response, which is purely physiological (which accounts for only 5% of the variance of relaxation); 2) tension release, the combination of physiological relaxation plus positive thoughts and feelings (as when one describes oneself as limp, melted, soothed, peaceful, calm); 3) disengagement, which is an attentional effect, creating the sensation of being distant, detached, forgetful, and becoming less aware of the world; and 4) engagement, opening up to and becoming more aware of the world, but in a passive way.

He has further operationally refined engagement by defining it as an advanced level of relaxation, having four subcategories. The first is engaged awareness, feeling aware, clear, focused, strengthened, and energized. This can be attained through yoga and breathing. The second is engaged prayerfulness, being open not just to the world, but to a greater world, in the sense of feeling reverent, spiritual, or selfless. Meditation is the key to attainment here. Third is engaged joyfulness, meaning a rainbow of feelings (feeling simultaneously loving, thankful, inspired, warm, healed, and infinite.) (He suggests that joyfulness accounts for 40% of the variance of relaxation, and further, that while progressive relaxation does not evoke it, yoga, breathing, and meditation do). Finally, the final subcategory he defines as mystery, the experience of mystical feelings. He claims that initially he did not have enough subjects to measure this variable, that it was identified only by a small statistical effect, and that more study will be needed in the future to confirm it.

In addition to his empirical research, Smith has also developed an applied program. Here, he demystifies meditation, takes it out of its Asian context, and packages it as a training course that covers all the generic forms one can find in both Eastern and Western contemplative traditions, making meditation accessible to the common reader.

The significance of work by such researchers should not be underestimated. Programs such as these, the new cognitive-behaviorists believe, have greater potential for connecting traditional systems of Asian psychology with basic science than the more experiential approaches of humanistic or transpersonal psychotherapy. At the same time, interest in the subject by

cognitive-behaviorists indicates the extent to which meditation has penetrated into the mainstream of American academic psychology as a respectable research subject.

Health Psychology and Complementary Medicine

Another important development in the field of meditation research has been alternative or complementary medicine. The historical evolution of the alternative medicine movement in the United States is long and too detailed to go into here. However, the main point can still be made that beginning in the 1960s and '70s, with the emergence of humanistic and transpersonal psychology as major forces in the human potential movement, the clinical practice of psychology and medicine began to fuse with a more sophisticated understanding of spiritual growth affecting certain key areas of modern culture. Now, after more than thirty years of personal and scientific experimentation with encounter groups, sensitivity training, psychedelics, somatic body work, parapsychology, guided imagery, yoga and meditation, biofeedback, hypnosis, and the like, alternative, or what is now being called complementary, medicine has emerged as an important challenge to Western reductionistic approaches to healing. Western medical science radically separates mind and body; complementary medicine unites them. Western medical science focuses on the physical symptom; complementary medicine looks at the symptom in the context of the whole person. Western medical science presumes that it is science that heals the sick; complementary medicine presumes that it is our manipulations that harness the patient's own resources for self-healing.

Complementary medicine, first of all, is now being defined by a new generation of scientist-practitioners. Those who before were but the mere students of their subject matter have now become both advanced meditators and recognized scientists capable of carrying off sophisticated research. We remember the pioneering work of Arthur Deikman and Charles Tart, done twenty-five years ago. Then we listened to Herbert Benson and Robert Keith Wallace. Then, in the 1970s and 1980s we heard from Dan Goleman, Daniel Brown, Jack Engler, Roger Walsh, Dean Shapiro, Elmer Green, Alyce Green, Michael Maliszewski, and Michael West, Today, we read Charles Alexander, Robert Orme-Johnson, Richard Freidman, Mark Epistein, and James Spira. [13] The trend began as a study of meditation as an isolated practice, whereas it is now viewed in the much larger context of complementary medicine and one's overall sense of health and well-being.

Complementary medicine is complementary because it interfaces with scientific and medical reductionism. It not only advocates a combined approach to healing, but also points to the importance of holistic change. One does not merely take a pill and then return to the same lifestyle that contributed to the creation of the problem in the first place. The practice of meditation, as well as the pursuit of other forms of complementary medicine, means an alteration of basic attitudes, dramatic and positive lifestyle changes, and perhaps even radical overthrow of old, habitual ways of perceiving on the part of the person being healed.

Complementary medicine also reflects the major social revolution now going on at the interface between popular middle-class culture and the delivery of clinical services in the health care professions. A recent issue of the *Sharper Image Catalog,* for instance, advertises tapes, videos, and books by physician Dean Ornish of the University of California at San Francisco, who has pioneered in the treatment of heart disease using diet, meditation, and lifestyle change. [14] *The Wall Street Journal* and *Forbes* have carried articles on the therapeutic application of meditation in corporate management for stress reduction, new product development, and team building, while the November 1994 issue of *Psychology Today* indicated that meditation practice is at the heart of a contemporary spiritual awakening affecting not only pastoral counseling within traditional Christianity but also a large segment of the psychotherapeutic counter-culture.

In addition, there is clear evidence for the rising influence of complementary medicine within other traditional institutions of modern culture. One sign has been the recent founding of the Office of Alternative Medicine within the National Institutes of Health. The OAM, working on a small budget, has commissioned individual investigators to run clinical trials on alternative therapies such as meditation that can be used in conjunction with traditional scientific medical practice. They have also recently established a network of research centers throughout the United States targeting specific experimental problems in complementary medicine. [15] Another sign has been the launching of several new journals, the most successful of which has been *Alternative Therapies in Health and Medicine*. [16] Edited by Larry Dossey and Jeanne Achterberg and sponsored by the American Association of Critical Care Nurses, *Alternative Therapies* regularly reports on advances in meditation research in the context of other approaches such as homeopathy, vitamin therapy, hypnosis, biofeedback, and psychoneuroimmunology.

The Qi Gong database

In addition to the inclusion of meditation in complementary forms of medicine in the United States, research on various forms of meditation is also occurring in other parts of the world. The Qi Gong database, a report on one aspect of meditative practice in China, is made available through the East-West Center for the Healing Arts in California and was assembled by a team of researchers led by Kenneth M. Sancier. [17] It contains some one thousand abstracts of unpublished papers delivered at a series of international conferences on Qi Gong and traditional Chinese medicine held since the late 1980s in China. Paradoxically, the Chinese Communist government wants to promote traditional Chinese medicine to the world at the same time that it severely restricts the ability of Chinese researchers to communicate freely with other investigators. The bibliography is therefore valuable as one of the only large scale sources of information available on the practice of Chinese meditation techniques related to Qi Gong; at the same time it suffers from a certain lack of oxygen because the material is presented in a contextual vacuum which presumes that traditional Chinese medicine is automatically testable by Western scientific methods.

Qi Gong is the traditional Chinese practice of meditation upon the *chi*, or life force, which is believed to continuously circulate throughout the body and which regulates the daily and seasonal functioning of the person in dynamic relation to the environment over the entire life cycle. The internal form of Qi Gong can be practiced as a seated meditation, while its external aspect may take the form of different movement disciplines. Qi Gong is the mother of tai chi, for instance, the most familiar style of Chinese health movement known to the West.

The database clearly indicates that there is a continuously growing body of information on the positive clinical application of Qi Gong therapy. [18] However, to really appreciate the information presented requires a detailed knowledge of the Taoist philosophy of yin and yang and the five elements, a knowledge of acupuncture, acquaintance with the philosophy behind the important Chinese works a such as the *Book of Songs* and the *Book of Changes*, and a knowledge of the major classics in traditional Chinese medicine. Western scientific medical practitioners will therefore find it difficult to assess the clinical significance of unpublished studies presented only as abstracts and based on an epistemological system so radically different from the Western analytic tradition that the very frame of reference used in of many of the discussions will to them remain incomprehensible. For the knowledgeable researcher, however, the hermetically sealed quality of the research at least gives an internal consistency to the one type of meditation studied.

Yoga Research in India

Scientific research on yoga and meditation appears to be going on all over India, but only a fraction of this work makes its way into the Western scientific and medical literature. An effort has recently been made by the Yoga Biomedical Trust, a non-profit research organization in Cambridge, England, founded in 1983 to collate more of this normally unavailable information on yoga and meditation. [19] Principally, their bibliographic references have come from yoga centers, private collections, specialist publishers, and researchers themselves, in addition to scientific conferences held periodically in India, the Indian social science literature, and the international medical research literature, which includes references normally unavailable to Western investigators.

In the Trust's primary publication, the *Yoga Research Bibliography: Scientific Studies on Yoga and Meditation* (1989), Monro, Ghosh, and Kalish present over 1000 citations ranging from essay-commentaries to clinical applications and pure empirical research. Again, however, as with the Qi Gong database, the *Yoga Research Bibliography* will be appreciated most by individuals trained in scientific research who also have an extensive knowledge of the classical texts in yoga and the philosophy behind the techniques, as well as a detailed experiential knowledge of specific yogic practices and their Sanskrit names. Again, the trend is clearly toward a mounting body of evidence showing the efficacious use of yoga techniques and Hindu meditation practice in specific disorders such as hypertension, diabetes, cancer, cholesterol regulation, alcoholism, anxiety disorders, asthma, pain control, and obesity. As compared to studies in the Chinese database, the level of scientific expertise in various experimental studies on yoga and meditation is quite sophisticated by Western standards. There is a much more subtle empirical demonstration of the relation of brain states to mental states in this yoga literature by Indian researchers than has yet to be demonstrated by non-Indian researchers.

The International Meditation Bibliography, 1950-1982

The only work comparable to the present text is the *International Meditation Bibliography, 1950-1982*, authored by Howard Jarrell and commissioned by the American Theological Library Association. [20] Its linguistic breadth is somewhat larger, in that it contains articles in English, books in English and German, with some titles in French, Spanish, and Portuguese, and dissertations in both English and German. The total number of entries (just over 2,200) is also somewhat larger. There are 937 journal and magazine articles, all of which are briefly annotated, over 1000 books, 200 doctoral dissertations and master's theses, titles from 32 motion pictures and 93 recordings and a list of 32 societies and associations. In addition there is a title index, an author index, and a subject index.

The Transcendental Meditation people seem to have had more than a passing hand in creating it, as there is a eulogistic preface extolling the benefits of TM, although the editors may have been simply trying to reflect the fact that the majority of experimental studies reported up to 1983 involved TM techniques. The work also does not discriminate between trade literature and more scholarly, academic or scientific publications, but rather presents them all as part of the greater bibliography. The impression that gets reinforced, quite accurate in my historical opinion, is that in the United States, at least, the majority of interest in meditation has come from popular culture, rather than from the universities or the scientific establishment, which have remained largely reactive. [21]

The Historic Significance of Murphy and Donovan's Text

Murphy and Donovan have done the field of meditation research a valuable service on several fronts. Perhaps the most important of these has been to highlight the epistemological differences between those who meditate and those who do not as a crucial determinant of how and under what circumstances scientific research into this new subject can be conducted. They have also raised the issue of what a new science that takes meditation seriously might look like in the future. This issue is the same we have raised earlier: namely, how can the methods of science be applied to a subject whose full understanding may transform the very foundation upon which reductionistic science is based? Murphy and Donovan produced their first edition during a time when there was fast-growing and widespread cultural interest in the subject, but great resistance from the basic science community. They not only collated a vast wealth of information on scientific research when the subject of meditation was less acceptable than it is today, but they also emphasized the importance of meditation for understanding the larger issues of how we actualize our human potential. Now there has been a significant change in outlook and such issues are being taken more seriously by a younger generation of thoughtful leaders in modern culture. From an analysis of recent history, the Murphy and Donovan bibliography in its first edition contributed significantly toward advancing this discussion because it was a milestone that marked the current cultural revolution focusing on spirituality and higher consciousness. Two historical examples suggest this conclusion; the first was an episode that took place within the profession of psychology, while the second has occurred within the wider area of government-sponsored research in the medical sciences.

Psychologists Debate the Issues

Twenty years ago, the American Psychiatric Association recognized the need for controlled experimental research when it called for an in-depth study of different types of meditation and their positive effects on health (mentioning also that we should be investigating their potential "dangers"). [22] Then, just before the first edition of the Murphy and Donovan bibliography appeared in 1988, a significant exchange on the experimental evidence underlying certain claims about meditation took place in the pages of the *American Psychologist*, main organ of the American Psychological Association.

The controversy began in 1984 when David S. Holmes, a staunch behaviorist in the tradition of Pavlov, Watson, and Skinner, who was from the University of Kansas and who had studied a few Transcendental Meditation practitioners, challenged a large mass of previously published experimental literature by claiming that there was no evidence that meditation reduced somatic arousal (Holmes, 1984). Holmes came to this conclusion through a few studies of his own and through a review of the research literature. From this literature, however, he excluded consideration of all studies that were merely case reports and all those that involved subjects who had first acted as their own controls (within subjects designs) on the assumption that such research represented bad science. This left only studies which had used separate experimental and control groups. He then evaluated these remaining few and concluded that none showed meditation as producing a significant lowering of arousal different from simply resting.

A year and a half later, the editors of the *American Psychologist* devoted an entire section of their June 1985 issue to criticisms of Holmes' article, including responses from Holmes.

John Suler from Rider College maintained that on purely methodological grounds Holmes had invoked a fairy tale definition of psychology as an exact science in order to discount studies on meditation, and that Holmes had limited himself to studies on TM which were not generalizable to other types of meditation (Suler, 1985).

Michael West, from the University of Sheffield, England, researcher, practitioner, and author of a well known text on meditation, believed that Holmes did not look carefully enough at the research literature so that his conclusions were overgeneralized and unwarranted (West, 1985). Needed instead, West maintained, was a more complex discussion of evidence and more double-blind, randomly assigned experiments controlling for expectation and group differences. He believed that someone also needed to undertake longitudinal studies of meditators and a big picture needed to be constructed that included case reports and within subject designs.

Deane Shapiro, clinical psychologist, meditation practitioner, and researcher at the University of California, Irvine, who has been one of the key pioneers in the field, waded in and concluded that Holmes had not looked at all the literature, that what he had looked at he had completely misinterpreted, and that conclusions drawn from Holmes' experiments using laboratory subjects were not automatically generalizable to clinical populations anyway.

Ignoring Suler and West, Holmes replied only to Shapiro, since in all likelihood he saw him as the more formidable opponent (Holmes, 1985a). He asserted on grounds of scientific rigor that Shapiro's own review of the meditation literature, which Holmes himself had originally ignored, contained numerous errors. Further, he clearly stated that Shapiro did not know how to conduct or analyze scientific research.

Harvard cardiologist Herbert Benson and SUNY psychologist Robert Freidman, practitioners, teachers, and researchers of the relaxation response, then joined the chorus of voices. Benson and Freidman's point was that the relaxation response was common to all forms of relaxation, including rest and meditation, so that Holmes' distinction of meditation from rest was purely artificial (Benson and Freidman, 1985). Further, the trophotrophic response as a complex of opposite physiological reactions to the fight-flight reflex had been established in physiology since the time of Hess (et al., 1947; Hess, 1953)—for which Hess had received the Nobel Prize—and the relaxation response had been experimentally established in the medial literature as an extension of Hess's work. Benson and Freidman then pointed out other numerous errors in Holmes' work, suggesting not only that Holmes did not know his basic physiology, but also that he did not know how to conduct and interpret a scientific experiment.

Holmes (1985b) responded by implying in his opening paragraph that Benson and his colleagues did not know anything about meditation, physiology, or science, and then proceeded with an essay of some 3,000 words to deliver a barrage of rhetoric about what constitutes legitimate data in reductionistic science and what were the criteria for legitimate designs of various experiments in psychology, meanwhile having nothing much to say about meditation per se.

The final word was given in another issue of the *American Psychologist* a year later. This last comment that the editors permitted on Holmes was delivered by Jonathan C. Smith, cognitive-behaviorist and meditation and stress researcher from Roosevelt University (J.C. Smith, 1986a). Smith, theoretically in a reductionistic camp closer to Holmes than anyone else who had responded, maintained that the recent studies by Holmes on meditation and Roberts on biofeedback (see Roberts, 1985) that claimed no evidence for a reduction of somatic arousal were based on outdated assumptions concerning the nature of relaxation. Psychology had actually progressed from a 1950s definition of overt observable behavior as simply stimulus-response connections to a more sophisticated picture demonstrating control of mental and physiological operations. According to Smith's own model, both stress and relaxation were complex cognitive and interactive responses. Simply comparing meditation, biofeedback, and other relaxation techniques to each other is not sufficient; one must get at the extent to which each technique enhances the subject's skill at deploying attention in a focused, passive, and receptive way. Even so, Smith suspected we would then find that genuine relaxation is not necessarily always associated with changes in arousal. [23]

This exchange tells us that within psychology as an academic experimental discipline there has been significant movement from reductionistic modeling that does not even acknowledge the reality of consciousness—the position of the radical behaviorists who controlled much of the methodological dialogue in the discipline since J. B. Watson's infamous proclamation of 1913—to at least a consideration of those aspects of meditation that can be operationalized. It further suggests that scientists who are also practitioners are not only more active in cross-disciplinary research, but by the 1980s were ready to engage in discussions with their more reductionistic colleagues on issues of method and interpretation. Subsequently, history has shown that the discussion has not only moved out into the wider field of medical science, but continues to develop in the direction set not by the reductionists but by the scientist-practitioners of meditation.

Governmental Research and Medical Science

More recently, in this regard, an assessment of meditation has emerged in several statements made by investigating agencies of the United States government. Between 1988 and 1991, the National Research Council, in a project commissioned by the Army Research Institute, issued a series of findings on the assessment of techniques believed to enhance human performance. [24] These included, among numerous other topics, such approaches as self-help groups, subliminal tapes, and meditation. The overall conclusion of the investigators regarding the effect of meditation was widely disseminated in the public press as the official position of the NRC. Their assessment of the available scientific research led them to the conclusion that meditation seems to be no more effective than established relaxation techniques; and it was therefore unwarranted to attribute any special effects to meditation alone.

More than this, however, the overall tone of the entire research endeavor was negative and skeptical to begin with. Numerous criticisms emerged afterward of misinterpretation of data and false conclusions even from established experimentalists. As well, the analysis of the experimental literature on meditation was undertaken by two psychologists who had no expertise in the area of meditation research, although, somewhat ludicrously, they attempted to launch a definition and explanation of what they considered to be the different types of meditation/ They compared a few specific studies that had no basis for factual comparison according to the experimental standards they themselves had set, and they based their overall analysis of all experimental studies undertaken on meditation by reading a single outdated summary that had been commissioned some years earlier from a single researcher. To underscore the fact that their conclusions were based on a philosophical bias rather than basic research, they even included an epistemological coda admitting that to be the case. [25]

In October 1995, a more positive and forceful recommendation was made in a joint statement issued by agencies within the National Institutes of Health. The recommendation was based on the outcome of a major technology assessment conference that attempted to integrate behavioral and relaxation approaches into the treatment of chronic pain and insomnia. [26] One of the major interventions considered was that of meditation. The sponsoring agencies for this conference included The Office of Medical Applications of Research and the newly founded Office of Alternative Medicine. These groups were then backed by co-sponsoring agencies that included the National Institute of Mental Health, the National Institute of Dental Research, the National Heart, Lung, and Blood Institute, the National Institute on Aging, The National Cancer Institute, the National Institute of Nursing Research, the National Institute of Neurological Disorders and Stroke, and the National Institute of Arthritis and Musculoskeletal and Skin Diseases. Combining meditation under the same heading as autogenic training and progressive muscle relaxation, and determining that these were deep rather then merely brief methods of standard relaxation therapy, the conference members concluded that "the evidence is strong for the effectiveness of this class of techniques in reducing chronic pain in a variety of medical conditions." [27] They

recommended the commitment of funds to research trials that tested these combined forms of therapy and the integration of alternative medicine with traditional scientific medical practice.

Here again we have the classic differentiation between the attitudes of laboratory versus clinical researchers. Basic researchers believe that they are doing the real science and only what comes out of the laboratory should be applied to clinical situations. Clinicians, on the other hand, faced with the real live complexity of human problems, maintain that most of what comes out of basic science is done to prove some theory, while what they say they really need is data on concrete, workable interventions for immediate life situations. While there is a revolution now going on in the neurosciences affecting how basic scientists communicate with one another, a completely different revolution is going on at the level of clinical services, one that has deep roots in values and attitudes, lifestyle choices the patient alone can make, alternative forms of healing, and an appeal to the spiritual dimension of human experience. Consequently, the National Research Council has had its say on the scientific validity of studying meditation, which has now been superseded by the more recent conclusions of the National Institutes of Health.

As this brief overview indicates, in their first edition, Murphy and Donovan gave us a summary of meditation research that anticipated, among other trends, the rising influence of psychology in general medicine, the increasingly important role of beliefs and values in the healing process, the possibility of a new dialogue emerging between science and religion framed in terms of spiritual experience, and the potential impact that different models of consciousness might have on our understanding of character development. Presciently, as the current update suggests, these still seem to be rising trends for the future.

End Notes

1. For analysis of some cultural forces supporting this interest, see E.I. Taylor. "Desperately Seeking Spirituality." Psychology Today, Nov.-Dec. 1994, p. 56.

2. Monier Monier-Williams, *A Sanskrit-English Dictionary: Etymologically and Philogically Arranged with Special Reference to Cognate Indo-European Languages*. Oxford: Clarendon Press, 1951 ed., establishes the feminine root *dhya* as generic to the Vedic, Classical, and Buddhist hybrid Sanskit traditions, p. 521. *Dharana, dhyana,* and *samadhi* are characterized as *samyama*, the three-fold tool, in *The Yoga Sutras*.

3. H. Zimmer. *The Philosophies of India.* New York: Pantheon, 1951.

4. Mircea Eliade. *Shamanism: Archaic Techniques of Ecstasy.* Translated from the French by Willard R. Trask. New York: Bollingen Foundation; distributed by Pantheon Books, 1964; H. Ellenberger. *Discovery of the Unconscious*. New York: Basic Books, 1970.

5. Mircea Eliade and Joseph M. Kitagawa, eds. *The History of Religions: Essays in Methodology*. Chicago: University of Chicago Press, 1959.

6. Frederick J. Streng. *Understanding Religious Life.* 2d ed. Encino, CA: Dickenson Pub. Co., 1976.

7. See, for instance, *Studia Mysticorum*, Newsletter of the Mysticism Study Group within the American Academy of Religion (Published by The Essene Press for The Cambridge Institute of Psychology and Religion, 98 Clifton St., Cambridge, Massachusetts, 02140).

8. The following section has been complied from E.I. Taylor. "Asian Interpretations: Transcending the Stream of Consciousness." In K. Pope and J. Singer, eds. *The Stream of Consciousness: Scientific Investigations into the Flow of Human Experience.* New York: Plenum, l978, 31-54. Reprinted in J. Pickering and M. Skinner, eds. *From Sentience to Symbol: Readings on Consciousness.* London: Harvester-Westsheaf, and Toronto: University of Toronto Press, 1990; E.I. Taylor."Psychology of Religion and Asian Studies: The William James Legacy." *Journal of Transpersonal Psychology*, l0:l, l978, 66-79; E.I. Taylor. "Contemporary Interest in Classical Eastern Psychology." In A. Paranjpe, D. Ho, and R. Rieber, eds. *Asian Contributions to Psychology.* New York: Praeger, l988, 79-122; E.I. Taylor, "Our Roots: The American Visionary Tradition." *Noetic Sciences Review*, Autumn 1993 (Twentieth Anniversary Issue), 6-17; and E.I. Taylor. *The Great Awakening: Folk-Psychology and the American Visionary Tradition.* [This was published as *Shadow Culture: Psychology and Spirituality in America*. Washington, DC: Counterpoint, 1999. Web Editor.]

9. Charles Alexander. Maharishi International School of Management, 1996 (personal communication).

10. The following is based on interviews with Jon Kabat-Zinn and his colleague Ann Massion, March 1996.

11. William Mikulas, "Behaviors of the Mind." Unpublished course materials, Department of Psychology, University of West Florida, March 1995.

12. See, for instance, W.L. Mikulas. *Concepts in Learning.* Philadephia: W.B. Saunders, 1974; W.L. Mikulas. *Behavior Modification.* New York: Harper and Row, 1978; W.L. Mikulas. "Four

Nobel Truths of Buddhism Related to Behavior Therapy." *Psychological Record* 28 (1978): 59-67; W.L. Mikulas. *Skills of Living.* Lanham, MD : University Press of America, 1983; W.L. Mikulas. "Self-Control: Essence and Development." *Psychological Record* 36 (1986) 297-308; W.L. Mikulas. *The Way Beyond.* Wheaton, IL: Theosophical Publishing House, 1987; W.L. Mikulas. "Mindfulness, Self-Control, and Personal Growth." In M.G.T. Kwee, ed. *Psychotherapy, Meditation, and Health.* London/The Hague: East-West Publications, 1990; W.L. Mikulas. "Eastern and Western Psychology: Issues and Domains for Integration." *International Journal of Integrative and Eclectic Psychotherapy* 10 (1991): 29-40.

13. See, for instance, M. Epstein. *Thoughts Without a Thinker: Psychotherapy from a Buddhist Perspective*. Foreward by the Dalai Lama. New York: Basic Books, 1995.

M.G.T. Kwee, ed. *Psychotherapy, Meditation, and Health.* London/The Hague: East-West Publications, 1990; M.A. West, ed. *The Psychology of Meditation.* Oxford: Clarendon Press, 1987; D.H. Shapiro Jr. and Roger N. Walsh, eds. *Meditation, Classic and Contemporary Perspectives.* New York: Aldine Pub. Co., 1984; D. Goleman. *The Meditative Mind: Varieties of Meditative Experience.* Los Angeles: Tarcher, 1988.

14. Dean Ornish. *Stress, Diet, and Your Heart.* New York : Holt, Rinehart, and Winston, 1982; D. Ornish. *Eat More, Weigh Less.* New York : HarperCollins, 1993.

15. As another example, one of the largest pain clinics in the world, the Diamond Headache Clinic in Chicago, utilized a unique approach of non-pharmacologic techniques from behavioral medicine in combination with advanced pharmacologic interventions to accelerate response to pain reduction. Non-pharmacologic interventions included regimes such as relaxation, meditation, and biofeedback. See S. Diamond, F.C. Freitas, and M. Maliszewski. "Inpatient Treatment of Headache: Long-term Results." *Headache* 26, no. 4 (1986): 189-197.

16. Published by InnoVision Communications, 101 Columbia, Aliso Viejo CA 92656 (800-899-1712).

17. East-West Center for the Healing Arts, 561 Berkeley Avenue, Menlo Park CA 94025.

18. Investigations of Qi Gong are being carried out in Korea and Japan as well. See, for instance, H. Ryu, C.D. Jun, B.S. Lee, B.M. Choi, H.M. Kim, and H. Chung. "Effect of Qi Gong Training on Proportions of T Lymphocyte Subsets in Human Peripheral Blood." *American Journal of Chinese Medicine,* XXII, No. 1 (1995): 27-36; and Yasuo Yuasa. "Traditional Eastern Philosophy and Scientific Technology Today." *Obirin Review of International Studies*, 3 (1991): 23-40.

19. Yoga Biomedical Trust, PO Box 140, Cambridge CB4 3SY. (Tel. +44-1223-67301).

20. H.R. Jarrell. *International Meditation Bibliography, 1950-1982.* Metuchen, N.J.: The Scarecrow Press, 1985.

21. In addition to this international bibliography, forthcoming, and an unexpected boon to future experimental investigations, will be Prof. Y. Haruki's *Meditation Researchers around the World: An International Overview*, published by the Masara Ibuka Foundation and the Advanced Research Center for Human Sciences at Waseda University in Tokyo. [This was published as *Comparative and Psychological Studies on Meditation*. Tokyo: Waseda University Press, 1996. Web Editor.]

22. American Psychiatric Association, unsigned statement. *American Journal of Psychiatry*, 134 (1977): p. 720.

23. Now, in a forthcoming lead article in the *American Psychologist* Shapiro, Schwartz, et al. present an even more detailed picture of meditation in the context of cognitive strategies for self-control. D.H. Shapiro, C.E. Schwartz, and J. A. Austin. "Controlling Ourselves, Controlling our World." *American Psychologist* 51, no. 12 (1996): 1213-1230.

24. Daniel Druckman and John A. Swets, eds. *Enhancing Human Performance: Issues, Theories, and Techniques* (1988) and Daniel Druckman and Robert A. Bjork, eds. *In the Mind's Eye: Enhancing Human Performance.* Washington, DC: National Academy Press, 1991.

25. This lone researcher had originally based his own conclusions on only 300 of the 1,253 entries he had taken from Murphy and Donovan's first edition. For an analysis of their analysis, see E.I. Taylor. "Radical Empiricism and the Conduct of Research." In Willis Harman and Jane Clark, eds. *New Metaphysical Foundations of Modern Science.* Sausalito, CA: Institute of Noetic Sciences, 1994.

26. NIH Technology and Assessment Panel. *The Integration of Behavioral and Relaxation Approaches into the Treatment of Chronic Pain and Insomnia.* Bethesda, MD: NIH, 1995.

27. Ibid, p. 5.

More than 75 percent of research studies on meditation arenâ€™t measuring or monitoring adverse effects, Britton tells me. Last year, she published the largest study on meditation-related problems, interviewing 100 meditation teachers and other meditators who had personal knowledge of such issues. In that study, and a followup study sheâ€™s working on now, she tells me there were some common symptoms.Â Needless to say, Britton feels wary about our growing tendency to dole out meditation like a generic multivitamin. â€œI don't see that the programs or the apps or people who are teaching it are taking responsibility for these people,â€ she says. â€œIf they're calling me, then they're not getting the help they need from the people who are teaching them.â€ The physical and psychological effects of meditation. Sausalito, CA: Institute of Noetic Sciences, 1999. 2.Goleman, D. The meditative mind: the varieties of meditative experience.Â Mindfulness-Based Approaches with Children and Adolescents: A Preliminary Review of Current Research in an Emergent Field. Journal of Child and Family Studies, Vol. 19, Issue. 2, p. 133. The Physiobgical and Psychological Effects of Meditation: A Review of Contemporary Research With a Comprehensive Bibliography, 1931^19%. Petaluma, CA: The Institute of Noetic Sciences, 1997. Nash Đ¡. B. and Nash C. S. The effect of paranormally conditioned solution on yeast fermentation. Journal of Parapsychology, 1967; 31: 314. Nash Đ¡. B. Test of Psychokinetic Control of Bacterial Mutation. Journal of the American Society for Psychical Research, 1984; 78: 145-152.Â Nelson R. I). The physical basis of intent ional healing systems. Princeton Engineering Anomalies Research, PEAR Technical Report, 99001, Princeton, New Jersey, January 1999. Nelson R. Wishing for good weather: a natural experiment in group consciousness. Research has shown that meditation can reduce the effects of a multitude of different psychosomatic disorders. This is especially true in the case of disorders in which stress plays a leading role. An example being that cardiovascular disorders â€“ such as hypertension and hypercholesterolemia â€“ are particularly responsive to transcendental meditation. Asthma, stuttering, and even type 2 diabetes mellitus are responsive to meditation.Â (1999). The Physical and Psychological Effects of Meditation: A Review of Contemporary Research with a Comprehensive Bibliography 1931â€“1996. library.noetic.org/.../physical-and-psychological-effects-meditation. Black, L., et al. (2018). Use of yoga, meditation, and chiropractors among U.S. children aged 4â€“17 years. The Physical and Psychological Effects of Meditation: A Review of Contemporary Research With a Comprehensive Bibliography, 1931-1996 Paperback â€“ June 1, 1997. by Michael Murphy (Author), Steven Donovan (Author), Eugene Taylor (Author) & 0 more. 5.0 out of 5 stars 3 ratings. See all formats and editions Hide other formats and editions. Price.Â The Amazon Book Review Book recommendations, author interviews, editors' picks, and more. Read it now. click to open popover.Â This seller also included a very helpful addendum of more recent research on the efficacy of meditation. The publication is old, but surprisingly, the book was indeed new when I recieved it, never opened evident by the plastic cover and tight pages.

Soilâ€¦ itâ€™s one the most underrated, and little-understood, wonders on our fragile planet. Hereâ€™s whyâ€¦ Soilâ€¦ The wonder stuff beneath your feet.Â Earthworms journey down and around, creating breathing holes, like lungs in the soil. This creates space for plant roots to grow and keeps soil alive. Under the soil, there are also vast and intricate webs of fungal threads. Plants and fungi need each other to thrive, and so they do a dealâ€¦ Fungi canâ€™t capture carbon dioxide to grow like plants can, but theyâ€™re better than plants at mining the soil for nutrients, so they trade.Â It stores three times as much carbon as all the plants on Earth combined, including trees. But because it grows so slowly, we need to protect what we have. We are not succeeding. Personal Blog. Journey through ADHD. Personal Blog. LoveMisasa. Product/Service. Once upon a time, a Tbear story. Personal Blog. Confection Connection. The area of space occupied by our solar system is tiny when compared to the rest of outer space and the Universe, which contains billions of other galaxies. Our solar system is unique because it is the only one found, so far, that contains all of the properties for sustaining life. Other galaxies may contain stars similar to the Sun, but the Sun is what allows us to have life.Â Its nickname is the â€˜Red Planetâ€™ due to the color of its soil. Mars has two moons. Mars: The Red Planet: This site contains some interesting facts about Mars.Â Lunar eclipses happen when the moon passes through the Earthâ€™s shadow. Unlike with a solar eclipse, it is not dangerous to look directly at a lunar eclipse. This is because the moon does not produce its own light. Songs in album Elfenstaub, Vol. 16 - A Deep Electronic Journey Through Time & Space (2015). 1. Zula - One (Little Charles Remix).Â Verbund West - Time. 68. 06:27 320 ÐšÐ±/Ñ. 12. Maximilian Beck - RE 4039 (A.V.I.V. Remix). 55. 06:21 320 ÐšÐ±/Ñ.