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Navaratri

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Hindu sages, while recognising and rejecting the phenomenal world as but a string of zeroes, posit as the basis of the series of evanescent nothingnesses the One, the Integer, the Absolute, which lends them a relative value and authenticity. The Brahman is beyond all dualities, beyond language and intellect, unknowable in space and time, unknowable through cause and effect. This wonderful phantasmagoria of Life is, however, a subjective projection, born of ignorance and capable of being annihilated when its real nature is grasped. "As soon as She is recognised, Maya flies away." And Brahman, alone, is seen in all effulgence. This cosmic energy or Sakti, creating and destroying name and form, ceaselessly modifying itself into multitudinous manifestations, is, therefore, both Tempter and Liberator, Grace and Terror, Executioner and Saviour, Kali and Jagaddhadtri. Siva is the Transcendent, and Sakti the Immanent, aspect of the one Brahman who is Sivasakti. As the Sage Medhas declares in the *Markandeya Purana* :

It is the inscrutable power of Maha Maya, which knits human souls together by the bond of love and brings about attachment between each other. She is the creative energy of the Universe and is the cause of its preservation. Go, worship and propitiate her.

The Navaratri is consecrated to the worship of this all-pervading Energy of the Universe in various aspects and through significant rituals.

During the Nine Nights, according to the *Markandeya Purana* Kali, the Mother, was engaged in combat with the demons and dark spirits, the chief of whom was

Mahishasura, the embodiment, in buffalo form, of physical passion. The *Saptashati* or "Seven Hundred Slokas" relate, with dramatic and simple directness, the overpowering of the world by demoniacal forces; the creation of Mahamaya ("a mass of light proceeded from the bodies of all the Gods and conglomerated in an effulgent lustre which revealed the glorious form of a woman reaching over the three worlds"); her battles with Madhu and Kaitabha, Sumbha and Nisumbha, Chanda and Munda. These Slokas are read and repeated with fervour and feeling throughout the nine days in most Hindu homes. "For all alike," as Sister Nivedita writes, "there is but one object of contemplation, the wars that were in heaven; one hope and one alone, the conquest of the demons by the gods."

Nowhere, however, is mythology permitted to smother mysticism, for wherever Durga is praised, she is revered as permeating every activity and function of Life. She dwells as "the sense in the heart of the wise, as faith in mankind, as modesty in the superior castes." She is "the essence of the substance of the

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various sciences.” She plays in the form of mind and intellect and memory, of power and splendour and prosperity, of repose and delusion and shadow, of appetite and gratification, of joy and wisdom. She is terrible only to the lust-ridden and the inert. He who conserves his child nature is blessed by her caress, as the Universal Mother. As Sri Krishna says in the Gita, “*Pitahamasya Jagato mats dhata pitamahah,*” “I am the father of the Universe ; I am its mother, its protector, its grandsire.”

The Durga Puja, of which the recital of the *Saptashati* forms an integral part, is the national festival of Bengal, an epitome of the Shakta side of her culture. There, the mother is revered in three forms. She is **Durga**, the Divine Energy, making and destroying, defeated and again conquering, indifferent to personal desires. She is **Kali**, the Dark Mother of Mystery, wielder of Destruction, receiver of Sacrifice, whose benediction is Death and Regeneration. Finally she is **Jagaddhatri**, the tenderness at the heart of Nature which shines in good women, and from which come forth the Madonnas of the World. In her social aspect, Durga has come to be installed as the daughter of the household, the little wedded girl, returning from her lord’s home for a three days’ stay among the clinging memories of childhood. Her arrival, stay and eventual departure have formed the theme of exquisitely poignant songs from Bengali devotees. Again, in Bengal, on the day when she leaves her home, “bijoya” greetings of reunion pass and repass from man to man, long nurtured quarrels being forgotten in the fraternal embrace. For “are not all bonds of kindred renewed and sanctified at the feet of the Divine Visitant”?

In other parts of India, also, beneficent aspects of Sakti are worshipped, such as Saraswati, the Sakti of

Brahma the Creator, and Lakshmi, the Sakti of Vishnu the Preserver.

Saraswati is knowledge and knowledge is creative. Hence on the eighth day called Durgashtami or Virashtami implements of culture, swords and spears, writing utensils and books—every little tool of hand and brain—are consecrated with prayers that her blessings might infill them. Such is the wise and virile adaptability of Hinduism that to-day not only old Sanskrit manuscripts are used, but also printed books, including Persian, English and German.

Lakshmi, the Goddess of Fortune, of Wealth, and the three Cosmic Impulses, is also offered special puja on the ninth day. The horse, the palanquin, the umbrella, the sword and other insignia of royalty and authority are venerated, and even supercilious cars can be seen rolling along the roads on Mahanavami bearing the garlands and sandal paste of homage to Sri or Glory.

In honour of both the Goddesses, the girls of every family arrange in competitive enthusiasm groups of toys, manufactured and decorated by their own hands, for the delectation of neighbours and friends. Special gifts and offerings are made to maidens as representatives of Sakti.¹

The tenth day is the day of victory over the demon and is known as Vijaya Dasami. No day is more auspicious for the initiation of human endeavour. Little tots of four years are introduced into the mysterious wonderland of symbolised thought; children of seven years, palpitating with excitement, are privileged for the first time to handle the tools of their ancestral craft. Hence the day is

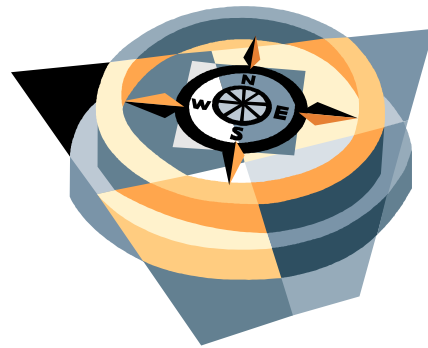
¹ In Gujerat and Kathiawar, the “garba dance,” with lighted lamps, is held as part of the universal rejoicing at the arrival of the Mother into every home.

also called Vidyadasami-the tenth day of Knowledge. It is also a day reminiscent of the inauguration of many a mighty campaign in Indian mythology and history. It was on this day that the immortal Pandavas, after their successful completion of the vow of exile, came out as protectors of the cow-the symbol of prosperity-and of Dharma-the Law-and resumed the use of their celestial weapon from the sacred Sami Tree (Acacia Ferugenia). Sri Rama set out on his expedition to slay the Rakshasas (demons) on that day; and Sivaji, the King of the Marathas but servant of Bhavani, led his intrepid horsemen, after the monsoon, on this very day, to exercise suzerainty over the four quarters.

Even today the Maharajas of Mysore, Travancore and Baroda proceed in regal splendour with all the Mangalas or auspicious accompaniments outside the bounds of their capital cities, and reenact the triumphal deeds of the heroes of the *Mahabharata* through the rites of Sfmollanghana (Crossing the Boundary) and SamT-Puja. The Sami, used during Vedic rites for generating fire through rotational friction, is a tree "impregnated with fire," and hence was considered by the Pandavas as able to increase the effectiveness of destructive weapons of war. **But behind the romance repeated year after year glimmers the significance of the loss of the spiritual kingdom, which has to be regained by more potent weapons than those of the flesh, weapons that can only be wielded by the hand that itself is the vehicle of the developed, disciplined and purified will. The Raja is felt by the popular mind not as a transient individual, but as the symbol of rulership: the function of ruling is reflected in every citizen's Free Will which must rule over all faculties and instruments, and, these subdued, become the channel of the Omnipotent Will which is creative. It is**

significant that one of the terms for the attainment of Supreme Bliss is Swarajya-Siddhi, the achievement of self Government, or rule of the self by the Self.

The Navaratri is thus universally observed in India as a festival of culture of moral victory, of communion with the Energy which permeates and plays in the phenomenal universe.



POINT OUT THE WAY

LVI

Chapter XI

II. — **Equilibrium and Liberation**

QUESTION: — What is the difference between being a helpless victim of fate and being bound to old Karma? Mr. Judge, referring to why it is that a child is born humpbacked, states on p. 92 of the *Ocean*: "His Karma for thoughts and acts in a prior life."

ANSWER: — Let us go back to physics and take the simple word, equilibrium. Any being is capable of a given degree of oscillation to one side or the other, forwards or backwards, up or down, while still preserving his equilibrium. But whenever the centre of gravity falls out of that on which he stands — that is, the base line — it would be a miracle if he didn't

lose his own equilibrium and fall. This only means **gaining a new centre of gravity**.

Apply this in metaphysical terms to Karma: if our Karma is not consciously generated on the plane of Spirit by the use of the three higher powers which we call Atma-Buddhi-Manas, then at once it passes to the plane of ideation; in other words, to a new centre of gravity. But, if that Karma is not “caught” and adjusted there and equilibrium restored on the plane of mind, then of necessity there will be a fall to the next centre of gravity, which we call the plane of Kama. If Karma is not caught there, then there is a fall and a new equilibrium gained in what we name the Astral. If Karma isn’t caught, or stopped, on the astral plane, then it falls to the lowest world. — in which case we lose our centre of gravity on the higher planes of life and finally are upset here, physically. Not having studied the chain of cause and effect, which only means successive loss of centres of gravity, we fail to preserve equilibrium on any plane and get upset here. Then we say, “That is my Karma.” Now, that is like saying that a murder victim met his death by getting in front of a flying bullet, when what we mean is that he met some man with a gun who simply shot him. The bullet is not Karma — it is the last link of a long sequence of loss of equilibrium.

QUESTION: — On page 92 it is said that one is born hunch-backed because he had made fun or sport of another hunch-back in a previous life. Because I have a lame foot, I got to thinking why I got it and I want to guard against being further deformed in the next incarnation. Can this be done?

ANSWER: — Well, we can all understand that behind every one of our questions there is something within the range of our own experience, something of which we

are conscious, that has caused us to raise the conscious question. Yet it is just as impossible for us to determine the actual line of causation of a specific result, physical or otherwise, in this life, as it would be for someone standing on this platform and taking note of this audience to endeavor to speculate as to whence each one came, from the mere fact that he is here. This can’t be done, because you can come from a thousand different directions to a common focus.

So there are any number of ways by which any result can come about. A man might be a hunchback or a man might teach some erroneous doctrine in regard to hunchbacks. Perhaps his “hunch” is wrong.

Here is another man who has a foot that is very troublesome. He comes to a false idea of the chain of causation which produced this deformity or difficulty with his foot. Well, now, doesn’t the man need most to get back to the right cause of it? We have to proceed first from universals to particulars. The simplest person can see that in so far as he knows anything at all, everything that occurs, occurs under law. If any physical thing happens, there was a cause for it. The same thing applies in the moral world. If any moral effect occurs, there was a cause for it. If any intellectual result occurs, there was a cause for it. If there is any spiritual effect experienced by any man, there was a cause for it.

Without trying to attempt to trace the sequence — a long, long chain of cause and effect — by which any particular effect was achieved, Theosophy points out that if it was achieved, it was not an accident, not a miracle, not some God giving us something we did not deserve, or some God punishing us: it came about under Law. Once we get that perception, we know how it is that every good comes

about — under Law. We know how every evil comes about — under Law. It makes no difference what being is experiencing the good, or what good he may be experiencing. It makes no difference what being is experiencing the evil, or what evil he may be experiencing. Everything comes about under Law, regardless of the good or evil, regardless of the person to whom it comes.

Yet evidently there is an immense hiatus. Here am I with a lame foot or a humpback, and I know that that came about under Law, but how did it come to me, and not to my brother? How did it come to me, and not to my enemy? The answer to that question can never be found except in the man himself, because the man is the connecting link between the universal and the particular.

Looking a little further, we can see that all bad actions begin in bad motives, and a bad motive is in some way or another one of two things: either there is the desire to benefit ourselves without due consideration of whether our action is going to benefit or injure others; or else, and usually conjoined with it, there is injustice toward some other. Always there is that element of selfishness somewhere, or of preferential treatment for ourselves. If I want anything that I haven't earned, then in fact I am unconsciously unjust towards others. If I get what I don't earn, how can other men get what they do earn?

When a man sees that, he won't bother whether he has a humpback or a lame foot or what — not. He will say: Whatever it is that afflicts me is the same as whatever it is that afflicts all mankind. It is the sequence of colored motives, colored thoughts, colored feelings and colored actions. There is no dodging. No matter how many misfortunes are lying in wait for me as the result of my own acts, they are not to be dodged, and I don't

want to dodge them. I will take them as they come, I will recognize them when they come, and I will do what is needed to patch up the situation. But from now on I am going to scrutinize my own motives so as to get this idea of preferential treatment for myself, this idea of injustice to others, out of my system. I never can get it out of my system if I don't check my own motives scrupulously, if I don't check my own thoughts scrupulously, if I don't check my own acts and conduct scrupulously.

In other words, if I begin to watch myself spiritually, mentally, morally, and know that if I keep on doing so, this being a universe of law, two things will be the result: I shall undo all the mistaken actions of my past and I shall atone for the two evils that I have done — the taking of what didn't belong to me and the failure to do what I should have done. I'll have repaired my sins of omission and commission.

We seldom think of what Karma means — equilibrium. Equilibrium means poise; equilibrium means balance; equilibrium means rest; it means freedom.

QUESTION: — Isn't it difficult for beginners to get the right idea of Theosophy when there are so many bogus "theosophies" abroad? For instance, there is that story of the hunchback put forth by a so-called clairvoyant who claimed to have come back into life.

ANSWER: — Suppose it is. What have we to do with that? Mr. Judge cites the hunchback as a specific illustration in the Ocean. But all of us are "hunchbacks" somewhere — visibly or invisibly; all of us have deformities, and one deformity is certainly no better than another.

Some may remember a story in a school reader about how a great being came to the earth and told the people that

if they all came to him with their troubles, he could suggest a way to help them. So everybody came with his troubles; one had this tendency, the other had that tendency or defect. Then the visitant said: —

“I’ll tell you what you can do. You take all your troubles, and I shall give you a magic power — you can pitch them over there in that valley! But there is one condition. You know, probably few of us realize that the other fellow has *his* troubles too; whatever our trouble is, to us it seems like the biggest and only trouble in the world. It really isn’t so, but the great difficulty is to see that it isn’t. So the condition attached to this offer is that after you go and throw all your troubles in a heap, you can’t leave the valley until you have picked out *some other trouble* which suits you better.

They all thanked him and felt greatly relieved. Everybody rushed away and pitched his disability, his defect, his disease, over in the valley. Then they raced down-hill, holding hands — all as brotherly as they could be. Then they started prowling around. One man who was driven crazy with headaches traded for the stomachache; another man traded his disease for Bright’s Disease, and so on, and were they happy. Then they all wanted to go back up-hill to say farewell to this heavenly visitor and thank him once more. But as they started on the way up-hill, they found these new troubles didn’t suit them. Each one began to complain: I could get along with my own trouble, but now I have this other trouble and I don’t know how to deal with it.”

By the time they all got back, there was the heavenly visitor, smiling blandly, with his hands clasped behind his back, and as they came up — looking so sick — he said:

“My dear children, what is the trouble?”

One fellow said, “I could stand the boil in this place but I can’t stand pain here.”

“Well,” the visitor replied, “I will be glad to make any adjustment necessary.” It seemed that every one had a thousand times worse complaint than before, and so finally the Master said, “It looks as if I made a mistake. I’ll tell you; I’ll use this magic power again, and then each of you can go back and pick up his own trouble.” So all the people pitched their new troubles overboard and raced down-hill like children. Each one got his own trouble back again, and they all came back hand-in-hand — the happiest clan.

Isn’t this what the Ninth Chapter of the Gita means — the chapter just preceding the initiation of Arjuna into the Divine manifestations of Krishna and the vision of the Divine Form as including all forms, which covers the Tenth and Eleventh Chapters? That Ninth Chapter begins:

“Unto thee who findeth no fault. . . .” If we do injustice in any sense, conscious or unconscious, that injustice will come back to us sooner or later for adjustment, and then it will weigh on us doubly heavy — because of the other man’s sense of injustice plus our own — and that is why it is that we now “find fault.” If we want to talk about sins, the greatest sin of humanity is the sin of fault finding — with Nature, with the operation of Law, with our neighbors and with ourselves. Faultfinding never did anybody any good.

QUESTION: — In a selfish nation can an individual who overcomes selfishness in himself be liberated from the national Karma?

ANSWER: — Why, that *is* liberation from the national Karma! The man who quits stealing in a thieving world is liberated from theft, isn’t he? The man who quits

lying in an untruthful world is liberated from falsehood. That is what liberation means. The man who overcomes selfishness in himself, through and through, is no longer a man; he is a Buddha; he is a Christ; he is a Master of Wisdom. Could he live here in a selfish world and still be free? Why, of course. If he couldn't, then such beings as Buddha and Christ and the Masters of Wisdom are unfortunate beings indeed. Can a man be at peace in the midst of a physical storm? Of course he can — or he can share the nature of the storm.

QUESTION: — The statement is made that certain Karma, or certain causes have been set up in the past — myriads of causes, as a matter of fact, by all of us — that those causes don't all ripen together. Partly they are prevented by the force of Karma already ripened; in other words, they are suspended and can't precipitate until the appropriate instrument or environment is obtained. The question is: Does Karma depend upon the instrument?

ANSWER: — Karma depends upon more than one factor. Part of our Karma is connected with the physical body. At the end of the Fifth Round there will no longer be any physical body. What becomes of the unharvested Karma sown in physical bodies since the middle of the Third Race in the Third Round? After the middle of the Fifth Race in the Fifth Round we can't reap what we sowed on earth because our earth would not exist any longer; we can't reap in or through physical bodies because we would not have physical bodies any more. What becomes of such Karma? It remains in suspension until the next Manvantara.

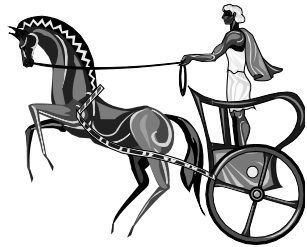
So, when we come to die, there are innumerable causes set up in a physical

body, with a physical instrument, in physical, human, earthly relations, that can't come to fruition until we come back to the earth again and into another physical body in which to sow and reap. The same way with the Karma which we experience after death. We can't reap disembodied Karma as long as our consciousness is confined to a body. We only reap the disembodied Karma after we cease at death, or cease, through wisdom in this lifetime, our identification with the body.

Looked at in this way, all these problems begin to clear up. It is not so much that the books clear up a problem, not that anyone can clear them up for us — the clarification is in ourselves. All our confusions come from principles out of place, principles unrelated, a confusion of the elements of our being. As our thoughts are turned inward to the principles of things, our confusion at once begins to lessen; in degree as the confusion lessens, clarification takes place. It is like light and darkness — darkness is not the reality; light is. Darkness is only the absence of light. The moment light begins to dawn, darkness begins to disappear. So the moment our minds are turned inward towards the source of our being here, to the elements which compose our being here, to the principles involved in our coming here, there is the shining of the Spiritual Sun in us. Then we begin to see for ourselves.

[TO BE CONTINUED]





DNYANESHVARI

LV

[The *Dnyaneshvari* is mentioned many times by Madame Blavatsky, always in glowing terms. The following rendition is extracted from Manu Subedar's translation. The great Sage, Dnaneshwara Maharaj sang this work to his people when he was quite young. He did it in their native language, Marathi, about 700 years ago. It is his commentary on the *Bhagavad Gita*.]

CHAPTER THIRTEEN

Shri Krishna says to Arjuna: I have shown you wisdom, just as one shows a little fruit on one's palm. I will now tell you the characteristics of 'unwisdom.' Everything which is opposed to wisdom and its characteristics, is unwisdom. There are only two things, wisdom and unwisdom, just as at the end of the day there is night, and at the end of night there is day. Yet I will tell you a few points. Milk fed to the serpent turns into poison. So, he is jealous and intolerant of good actions, proud of his learning and showing off his austerities. ... So much absorbed is he in his own physical and worldly pursuits, that he has no idea of either previous or subsequent births. An ungrateful person forgets obligations. ... Like a cart falling over a precipice or a stone rolling down a mountain, he proceeds headlong, unable to see what is ahead of him. ... He speaks when he should be silent. He listens where he should be deaf. The only criterion for him is bodily and mental pleasures and he has a craze for novelties

such as these. In this pursuit he does not worry about sin or retribution. ...

Further, he is elated when something pleasant occurs and is depressed when it is otherwise, in the same manner as a small boat rises and falls in stormy weather with the successive waves. His deep concern for pleasant and unpleasant things is a sure sign of unwisdom. ... When you see a worshipper constantly on the move, recognize him as full of unwisdom. The man of unwisdom dislikes sacred places, embankments, groves or solitary spots. He rejoices in a town and prefers the bustle and applause of the mass. He is proud of his mundane learning and ignores spiritual knowledge, by means of which the Soul is revealed. Neither the Upanishads nor the books of Yoga attract him and he has no heart in gaining true wisdom. He turns back on every thought, which will lead him to true knowledge of Self, but he will do anything to gain other knowledge. He performs rituals, he can recite the Puranas and he knows astrology. He is often well versed in other arts, also. He can cook to excellence and he sometimes knows the secret and mysterious doctrines (of Japan, Maran and Vasikaran). He is adept in erotics, great at eloquence and is often well versed in scriptures, ethics, medicine and poetry. He sometimes knows the Shastras, grammar and logic, but he is blind to spiritual learning, without which every branch of learning is useless. His knowledge is like the feathers of the peacock with an eye depicted on every one of them, but an eye that cannot see. ... The whole range of learning is thus pointless without spiritual learning.

How can he who drops into a deep pit at the gate of the house, know what is inside the house? Without even an approach towards spiritual learning, how can he ever gain real knowledge? With

such a man, O Arjuna, never even discuss spiritual matters.

[TO BE CONTINUED]



Secret of radiation-proof bugs proposed

Helen Pearson

Internal antioxidants may shield cells from radiation damage.

Deinococcus radiodurans survives extreme blasts of radiation.

© Dr Michael Daly

US researchers have come up with a novel theory for how a tiny, tough bacterium can survive doses of radiation 2,000 times those that would fry a person.

The unassuming red bacterium, called *Deinococcus radiodurans*, was discovered around 50 years ago in a batch of irradiated meat. Ever since, scientists have wondered how it can withstand radiation better than almost any other organism in the world. "They're better than cockroaches," says microbiologist James Imlay at the University of Illinois, Urbana.

Researchers know that the bug is particularly good at patching up DNA damage wrought by radiation. Now Michael Daly of the Uniformed Services University of the Health Sciences in Bethesda, Maryland, and his team have come up with a possible explanation why.

By comparing bacteria with different sensitivities to radiation, the

team found that the most resistant bacteria tend to store up high levels of manganese and relatively low levels of iron. By contrast, the bacteria that shrivel up at a hint of radiation have little manganese and more iron.

Artificially lowering the manganese levels also made bacteria more susceptible to radiation damage, the team reports in *Science*¹. "It was quite stunning to us," Daly says.

The marvels of manganese

Daly suggests that the manganese helps to clear up damaging molecules, such as free radicals, that are released by the bugs' metabolism. This leaves the bacteria in a healthier state and better able to patch up DNA damaged by radiation. To test this theory, the team is now trying to create radiation-resistant strains of *Escherichia coli* by pumping up their levels of manganese.

If manganese also proves protective in human cells, Daly foresees numerous uses. A dose of antioxidants that mimic some of the effects of manganese, such as vitamin E, might safeguard the cells of those who are exposed to radiation by a nuclear accident, for example.

The discovery might also help those receiving radiation therapy for cancer, Daly speculates. A drug might be designed that boosts the amount of manganese in healthy cells, but leaves cancerous ones alone. This would render healthy tissue resistant to the radiation, and avoid some side-effects of the therapy. "There's some really important stuff here," Daly says.

But Imlay cautions that such speculation is premature, because the radiation-resistant bacteria might have high manganese for another reason unconnected to their hardiness. The team needs to show exactly how manganese

helps bacteria recover from radiation damage, he says.

Before this, scientists have come up with other explanations for the robustness of the bacteria. Last year, a team of scientists proposed that peculiar circular rings of DNA in the bacteria help them patch up their damaged DNA. But Daly grew bacteria in which these rings were missing and showed that they were just as hardy.

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Notes from Serapis

Purity of earthly love purifies and prepares for the realisation of the Divine Love. No mortal man's imagination can conceive of its ideals of the divinity otherwise but in the shape familiar to him. One who prepares for solving the *Infinite* must solve the *finite* first.

The Ideal of the Spiritual can penetrate only through the imagination which is the leading path and first gate to the conceptions and impressions of the earthly Atma. (letter 18 to HSO)

SERAPIS

(A)

THE law of compensation can reward but those *who have resisted the cruel stings of earth-born desires. Where there is no temptation, the merit of withstanding its feeble voice is null and cannot claim its reward.*

(B)

We fear but whom we hate or love. We avoid but those who repulse us or *attract us too much. We never avoid those for whom we feel indifferent.*

(C)

. . . the greatest of all living crimes—*Suicide*

CORRESPONDENCE

Perseus B. Munshi, a friend of *The Aquarian Theosophist* in Australia sent us the following article as a validation of Theosophy by science:

HUMAN POPULATIONS ARE TIGHTLY INTERWOVEN

Michael Hopkin

Family tree shows our common ancestor lived just 3,500 years ago.

The most recent common ancestor of all humanity lived just a few thousand years ago, according to a computer model of our family tree. Researchers have calculated that the mystery person, from whom everyone alive today is directly descended, probably lived around 1,500 BC in eastern Asia.

Douglas Rohde of the Massachusetts Institute of Technology in Cambridge and his colleagues devised the computer program to simulate the migration and breeding of humans across the world. By estimating how different groups intermingle, the researchers built up a picture of how tightly the world's ancestral lines are linked.

The figure of 1,500 BC might sound surprisingly recent. But think how wide your own family tree would be if you extended it back that far. Lurking somewhere in your many hundreds of ancestors at that date is likely to be somebody who crops up in the corresponding family tree for anyone alive in 2004.

In fact, if it were not for the fact that oceans helped to keep populations apart, the human race would have mingled even more freely, the researchers argue. "The most recent common ancestor for a randomly mating population would have lived in the very recent past," they write in this week's *Nature*

Striking out

To work out how much different groups of humans mingled, Rohde's team simulated the rates at which a few pioneering people made journeys across the world to meet and breed with other populations. Their model gave each individual a certain probability of quitting their home town, country or continent and striking out for pastures new.

They were then able to name a time and place at which our most recent common ancestor lived. But who was this person? He or she must have had a flourishing family, says Rohde. "Maybe it was someone who happened to have 40 children or some such astronomical number," he says. "But it could equally have been someone with above-average productivity for a few generations." Instead of two kids, Rohde suggests, maybe the person and his or her direct descendants had three.

The fact that the person probably lived in Asia is down to its prime position along the most commonly used migration routes, Rohde suggests. "East Asia is at a crossroads," he says. "It's close to the Bering Strait and the Pacific."

No isolation

Rohde's simulation aims to include everyone alive today, and therefore relies on the assumption that no population has remained completely isolated for any significant length of time. Rohde is confident that this is the case; even Tasmania, once thought to be isolated by choppy seas, contains no people with purely Tasmanian blood.

If we discount those living in the world's remotest places, the common ancestor becomes more recent still, says Mark Humphrys, who studies human family trees at Dublin City University in Ireland. "Looking at the whole sweep of the Americas, Europe, Asia, right across to Japan, I wouldn't be

surprised if we had a common ancestor in the AD years," he says.

A single prolific parent can have a vast influence once their descendants begin to multiply, Humphrys says. "The entire Western world is descended from Charlemagne, for example," he says. "There's really no doubt."

All or nothing

Besides dating our most recent common ancestor, Rohde's team also calculates that in 5,400 BC everyone alive was either an ancestor of all of humanity, or of nobody alive today. The researchers call this the 'identical ancestors' point: the time before which all the family trees of people today are composed of exactly the same individuals.

This recent date is not really surprising either, Rohde says. Anyone whose lineage survived for a few generations was likely to have descendants spread all over the world. At the identical ancestors point, then, our ancestors came from every corner of the globe, although those from far afield are unlikely to have made a significant contribution to our genetic make-up.

Nonetheless, the results show that we are one big family, Rohde says. As he and his colleagues write: "No matter the languages we speak or the colour of our skin, we share ancestors with those who planted rice on the banks of the Yangtze, who first domesticated horses on the steppes of the Ukraine, who hunted giant sloths in the forests of North and South America, and who laboured to build the Great Pyramid of Khufu."

I answered like this:

Dear Mr. Munshi,

I am hard put to understand how the article is a *validation* of Theosophy.

According to Theosophy we are over 18 million years old as reincarnating self-conscious units. This article puts forth the claim that we are only 3,500 years old!!! To me it seems to be a *strong disproof* of using computer-driven software as anymore than a tentative tool for investigation. For example, this is what *The Secret Doctrine* says:

"As regards the evolution of mankind, the Secret Doctrine postulates

three new propositions, which stand in direct antagonism to modern science as well as to current religious dogmas: it teaches (a) the simultaneous evolution of seven human groups on seven different portions of our globe; (b) the birth of the *astral*, before the *physical* body: the former being a model for the latter; and (c) that man, in this Round, preceded every mammalian — the anthropoids included — in the animal kingdom.” (SD II, p. 1)

Even orthodox scientists admit 100,000 years for mankind. Are these investigators claiming that every 3500 years we all intermingle with one another? If that’s their claim, it is interesting and might be within shooting distance of the truth if you leave out the Brotherhood and very advanced humans — but science, in my opinion, needs more than a computer model for evidence!!

However, I do appreciate your putting me in touch with the NATURE.COM site as it is most valuable. We are using an article from there entitled: “Secret of Radiation Proof Bugs Proposed.” A very valuable article as it corroborates a healthfood claim that scientists have been pooh-poohing for about 40 years!!

Thanks again for your help,
jerome

=====

--And Persy answered like this:

Dear Jerome,

Thanks for your feedback. I agree with you 100%.

My comment was really meant to be a very basic observation that slowly but surely the recent discoveries and conclusions by science seem to be bringing the overall knowledgebase closer to the claims of theosophy more so than ever before. While I totally agree that

science has still a long way to go in admitting and/or discovering a lot that Theosophy reveals (especially in terms of going beyond the material sciences and into occult science), this article is a way of science admitting the inherent “oneness” in all life. It is probably more accurate for me to say that science at least agrees that separateness is not a natural order of things. Even though this conclusion applies in a *material* sense, the next logical conclusion will have to be that what drives this one material manifestation must also be one. Perhaps equally important is that with discoveries like these, science helps in destroying religious superstitions. In my opinion, while science may still be very deficient in its methods and discoveries, it does a great service of destroying the materialistic dogmas of ignorant religious institutions; and to me, that has to be a move in the right direction. Just as HPB says, people have got a lot of “unlearning” to do before they can do any real learning.

To be frank, I wasn’t focusing as much on the numbers in the article as I was on the theosophical concept of oneness and universal brotherhood.

Just some thoughts of a struggling student of Theosophy.

Persy

The communications between us show how very easy it is for an editorial worker to fly *far to fast* into a position of thinking they understand the “why” of an offering before they really do! Jw

Open-Shut Case

By Rene Ebersole

National Wildlife, Vol. 42, #5, Aug/Sep 2004

A curious scientist investigating how the world is perceived by other animals stumbles upon the alligator's "sixth sense"

IT WAS THE BUMPS that got her. What were those strange nodules rimming the jaw of that alligator? Do all crocodilians have such pimply beards? What are they for? These questions gnawed at Daphne Soares in the days after a close encounter with a gator in a Louisiana marsh.

The petite, freckle-faced University of Maryland graduate student had originally set out to discern the difference between the way birds, such as barn owls, and some of their closest living ancestors, alligators, perceive sound. But she couldn't help but also indulge herself in the mystery of those bumps. Soares never imagined that before she would even finish her graduate research, she would uncover an undiscovered alligator sense organ — in fact, the key to the reptile's predatory prowess.

Soares was drawn to the field of neuroscience because she was curious about the ways animals sense and perceive their unique environments. When she began looking into what was known about the alligator bumps five years ago, she quickly learned that all American alligators (*Alligator mississippiensis*), along with the 22 other members of the crocodilian family alive today, have them.

For the better part of the last century, the leather industry referred to the nodules as "pit glands," and used them to discern a croc skin from that of a gator. (Crocodiles have the characteristic bumps all over their bodies, while alligators have them only on their jaws.)

A few decades ago, herpetologists started calling the nodules "integumentary sense organs," or ISOs, based on a hunch that

the bumps had some sort of sensory function.

Details

Alligator Bites

- An average 12-foot-long, 400-pound American alligator has a brain that is roughly the size of three olives.
- Alligators are one of the most vocal reptilians. They growl, grunt and bark. Babies call to their mother to help them out of the nest after they hatch. Males sit at the edge of a bank and create a low-frequency sound called a bellow that makes the surface of the water dance and attracts females.
- The species has the most powerful bite known to the animal kingdom. While a full-grown lion chomps with 940 pounds of force, an adult male gator delivers a crushing 2,125 pounds.

Some hypothesized that they might detect salinity. Others said they might be used to sense the odor of food. Some even thought the bumps might help gators detect a suitable mate. But no one ever clearly determined the bumps' function.

Soares decided to attempt to solve this intriguing mystery. Fortuitously, she had returned from Louisiana with a box of alligator eggs for her thesis — and, surprisingly, some babies in tow. Half of the 40 eggs had hatched during her flight home. "I was holding the box in my lap so the eggs wouldn't break,"

Soares says. "Then I heard this *eeewww*, *eeewww*. I started coughing loudly so no one would know. The lady next to me looked really annoyed."

Back at her Maryland lab, she began to investigate if the raised pimplelike structures on the hatchlings' small snapping jaws were merely pigmented spots by washing them with a dye. She found the dye was quickly sucked up by a nerve in the skin and transported to the brain, meaning "the bumps weren't freckles," says Soares. What's more, she adds, the part of the brain that received the dye was enormous. "And if something is big in the brain, it's usually important. Humans, for example, have a big auditory cortex because we're all about language. This was very exciting."

Knowing the nerves that took up the dye had to travel through bone to reach their final destination, Soares called upon James M. Clark, a paleontologist and crocodilian expert at George Washington University, to see what the fossil record might reveal. Clark directed her to consult several museum collections that included the skulls of crocodilian fossils dating as far back as the Mesozoic era, 245 million years ago.

The crocodilian creatures ruling this "Age of the Reptiles" were a motley crew that ranged from a terrestrial, rabbit-sized sphenosuchian, with its doglike legs and the facial features of a lizard, to the fierce and aptly named "SuperCroc," or *Sarcosuchus imperator*. A SuperCroc unearthed by University of Chicago paleontologist Paul Sereno in 2000 is thought to have lived in sub-Saharan Africa 110 million years ago, weighed as much as ten tons and measured as long as a city bus.

Most crocodilians remaining today — mere midgets compared to the SuperCroc — go back 80 to 90 million years. From South American caimans and Cuban crocodiles to American alligators and Asian gharials, these species are found in semiaquatic habitats throughout the world's subtropical and tropical zones.

Soares discovered that beneath the bumps on the jaws of all of these living crocodilians there is a pattern of holes, called foramina, in the shape of a beehive. Ancestral crocodilians that lived entirely on land, however, lacked the pattern. The presence of the foramina pattern in semiaquatic crocodilians suggested the reptiles had a special adaptation for spending most of their lives submerged up to their eyeballs in water. "I knew I had found this ancient organ that is important to these animals," says Soares. "But I still didn't know what it does."

Over the course of several weeks, during a three-month fellowship in 2001 at the Marine Biological Laboratory in Woods Hole, Massachusetts, Soares introduced captive alligators to an array of potential stimulants, from ground-up fish bits to

electric fields. She determined that the bumps were neither chemodectors nor mechanical detectors, like those that a platypus uses to find and catch shrimp. In desperation one night, she even tried stimulating the bumps with a beam of light. "Who knows," she thought, "maybe they're like eyes." But she ended up ruling out that possibility, too.

Then one day she accidentally dropped a screwdriver into the alligators' tank, and the animals reacted. Could the bumps be unique sensory organs that allow crocodilians to detect water ripples? The theory made sense to Soares, given these animals' environments — shallow, muddy waters where visibility tends to be low — and the way in which they wait patiently for unsuspecting prey to float past or pierce the water's edge with their tongues.

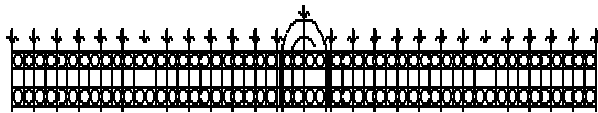
She tested the idea by plugging the alligators' ears, turning out the lights and releasing a drop of water into the tank. Again, the alligators responded, lunging and snapping at the air. With additional experiments, Soares confirmed that the bumps were indeed a sensory organ: tiny motion detectors triggered by water vibrations, which she renamed "dome pressure receptors," or DPRs.

Further investigations by the neuroscientist revealed that alligators are able to use the DPRs to distinguish between a morsel of prey and other water disturbances in their environment. "They're pretty good," says Soares, standing near a tub filled with eight young alligators back at her University of Maryland lab after her research was published in the journal *Nature*. "If an unlucky bird falls from a tree into the water, an alligator knows where it is, even in the rain."

Part of the DPR mystery still remains, however: Why do alligators have the motion detectors only around their mouths while crocodiles have them all over? Are the crocs' bodies essentially floating antennae? Are they better at localizing prey? Soares plans to look into this.

In the meantime, the now 32-year-old scientist is focusing on how other animals, such as a blind cave fish from central and northern Mexico, perceive the world around them. These colorless fish are thought to have evolved 100 million years ago. They have eyes when they're born, but lose them as they mature. Although adult cave fish lack vision, they have taste buds all over their bodies. "The question is," says Soares, "are they creating a world where taste defines their environment? Now that would be very exciting."

Rene Ebersole is an associate editor for National Wildlife magazine.



Perseverance

It's not that I'm so smart, it's just that I stay with problems longer.

I think and think for months and years. Ninety-nine times, the conclusion is false. The hundredth time I am right.

ALBERT EINSTEIN

We can do anything we want to if we stick to it long enough.

HELEN KELLER

Fall seven times. Stand up eight.

JAPANESE PROVERB

Only he who keeps his eye fixed on the far horizon will find his right road.

DAG HAMMARSKJOLD

Many of life's failures are people who did not realize how close they were to success when they gave up.

THOMAS EDISON

Nothing in the world can take the place of persistence. Talent will not; nothing is more common than unsuccessful men with talent. Genius will not;

unrewarded genius is almost a proverb. Education will not; the world is full of educated derelicts. Persistence and determination are omnipotent.

CALVIN COOLIDGE

I've missed more than 9,000 shots in my career. I've lost more than 300 games. Twenty-six times I've been trusted to take the game-winning shot and missed. I've failed over and over and over again in my life. . . . And that is why I succeed.

MICHAEL JORDAN

Champions keep playing until they get it right.

BILLIE JEAN KING

All great masters are chiefly distinguished by the power of adding a second, a third, and perhaps a fourth step in a continuous line. Many a man had taken the first step. With every additional step you enhance immensely the value of your first.

RALPH WALDO EMERSON

When you get into a tight place and everything goes against you, till it seems as though you could not hang on a minute longer, never give up then, for that is just the place and time that the tide will turn.

HARRIET BEECHER STOWE

It's a little like wrestling a gorilla. You don't quit when you're tired, you quit when the gorilla is tired.

ROBERT STRAUSS

You have not lived today until you have done something for someone who can never repay you.

— JOHN BUNYON

If you stand up and be counted, from time to time you may get yourself knocked down. But remember this: A man flattened by an opponent can get up again. A man flattened by conformity stays down for good.

— THOMAS J. WATSON, JR

The Body Politic

Could it be that
 What stands in the way
 Of our country, while it
 Pleads the case of freedom,
 Is stalemated amongst its
 Self-chosen leaders.
 Isn't that the issue really?

The exercise of the
 Human cause, by the American
 Nation, seems plagued by the inability
 Of its people to choose. For its power
 Of leadership is owned by the few.

They were granted this state of affairs
 By the many, as they exercised their vote.
 And time and again,
 they were bought and sold
 by those who said,
 they were there for them.

As the karma of the past
 Cyclically returns,
 So do the men, who were behind it, again
 Stand at the bully lectern.

We are free to choose who will
 Take us into the future.
 But, we are foolish to allow
 The past's refuse to buy our confusion.
 That happens through our
 Refusal to pay attention.

The Right and Left, are two sides
 Of the same coin.
 Just as in the body politic joined.
 Therefore, let us be led by the heart of
 the middle ground and no longer
 Allow extremists to usurp our freedom.
 Let us not vote for the selfish few.
 Let us vote only for them who
 Will respect the needs of all humans

Are there any of such pedigree
 Amongst the politically astute?
 And if not,
 what are we to do?
 Can't we choose to treat others
 As they would want us to?
 The Nation we want is at home
 In the Ancient Heart of us all.
 Let us each call upon that
 And allow the old "Machine" to fall.

The Heart in Holistic Education¹

Lourdes Arguelles, Rollin McCarty,
 and Robert A. Rees

Educational programs based on new
 scientific discoveries about the heart
 lead to improved emotional stability,
 cognitive functioning, and academic
 performance.

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 Rees taught literature at UCLA where he was also active in
 the arts and in innovative education.

In recent decades, neurophysiological
 research related to learning and
 education has focused predominantly
 on the brain. This emphasis, which is
 reflected in Western pedagogy, is a logical
 extension of the ascendancy of rationalism
 since the seventeenth century. Until that
 time, however, *logos* and *mythos*, mind
 and heart, were seen not as conflicting but
 rather as complementary ways of making
 meaning of the world. Many of the world's
 ancient civilizations — including the
 Egyptians, Greeks, Chinese, Japanese,
 Hindus, Hebrews, and early Christians—
 respected the heart for harboring an
 "intelligence" that operates independently of
 the brain, yet is in communication with it
 (Elder 1996; Eliade 1987; Godwin 2001;

¹ ENCOUNTER: Education for Meaning and Social
 Justice Vol. 16 #3 Autumn 2003

Young 2003). This perspective, reflected in the language, customs, writings, art, spiritual practices, and even medical systems of these civilizations, survived for centuries. Indeed, the view that the heart is a key center of cognition, emotion, volition, discernment, wisdom, and spirit may be the strongest common thread uniting diverse cultures throughout human history as well as most of the world's major religions and spiritual traditions.

However, with the Enlightenment, the Industrial Revolution, the beginnings of capitalism, and the dawn of modern science, the West at least gave ascendancy of the mind over the heart. Gail Godwin refers to this as "The Great Heart Split" (2001, 111). As James Hillman says in his essay about William Harvey's anatomical explorations of the heart, "At that moment when Harvey conceived the heart to be divided, ... thought lost its heart, heart lost its thought" (as quoted in Godwin 2001, 112). Speaking of Harvey's anatomical study of the heart, Godwin (2001, 113) says:

At the moment the anatomist held up the excised heart, ... a sort of Eucharistic celebration of the literal heart could be said to have occurred. In the church of the anatomical theater, the heart became demythologized.

With that demythologizing (which resulted in the heart being reduced essentially to either a simple pump or a sentimentalized valentine), Western culture has placed almost total emphasis on the mind/brain. With the brain seen as the sole or essential governing organ of the human body and psyche, it was rather easy to shift from an emphasis on holistic, integrated learning to a focus on cognitive-based learning. This perceptual paradigm has dominated formal education in the West for over two centuries and currently exerts considerable influence in the schooling systems of the modernizing East and of neocolonial countries around the globe.

Recent research in cardiology and neurobiology has uncovered some astonishing insights about the human heart and its place in physiological, psychological, and cognitive functioning. This article focuses on new scientific discoveries about the heart and the importance of a reintegration of the heartmind dynamic in teaching and learning.

New Science and the Heart

While many cultures and spiritual traditions throughout history have shared a regard for the heart as a source of wisdom and of positive emotions such as love, care, appreciation, and compassion, recent scientific discoveries suggest that these long-surviving associations may indeed be more than merely metaphorical. In particular, new understandings of the physiology of positive emotions and the key role played by the heart in the generation of emotional experience have exciting implications for holistic education.

A New View of Emotion

Research conducted throughout the past decade has challenged several longstanding assumptions about emotions. For example, psychologists once maintained that emotions were purely mental expressions generated by the brain alone. However, we now know that emotions have as much to do with the body as they do with the brain. Research has shown that neurological and hormonal signals flowing to the brain from many bodily organs and systems not only play a role in regulating physiological functions, but also influence higher brain centers involved in perception and emotional processing (Frysinger and Harper 1990; McCraty, forthcoming; Sandman, Walker, and Berka 1982; van der Molen, Somsen, and Orlebeke 1985). Furthermore, it appears that pertinent information is

transmitted not only in the amplitude (strength or amount) of these bodily signals, but also in their rhythm and pattern (McCraty and Atkinson, forthcoming; Schofl, Prank, and Brabant 1995; Schoner and Kelso 1988; van der Molen, Somsen, and Orlebeke 1985)

The Role of the Heart

Although input originating from many different bodily organs and systems is involved in determining our emotional experience, recent research provides evidence that input from the heart may play a particularly important role (McCraty and Childre 2002; McCraty and Childre, in press; McCraty, forthcoming). **As a primary and consistent generator of rhythmic information patterns in the human body, and possessing a far more extensive communication system with the brain than do other major organs, the heart exerts a unique and far-reaching influence on the brain and the entire body. It is now well-established that the heart is far more than a simple pump. It also functions as a hormonal gland, a sensory organ, and an information-encoding and -processing center, with an extensive intrinsic nervous system sufficiently sophisticated to qualify as a "heart brain." Its neural circuitry effectively enables it to learn, remember, and make functional decisions independent of the cranial brain** (Armour and Ardell 1994; Armour 2003). With every beat, the heart transmits to the brain and throughout the body complex patterns of neurological, hormonal, pressure, and electromagnetic information, which form a major component of the physiological backdrop that ultimately determines our emotional experience.

Emotions are Reflected in the Heart's Rhythms

One tool that has proven particularly valuable in examining the interactions between the heart and brain is the analysis

of heart rate variability. Contrary to many people's beliefs, the rhythmic beat of the heart is not monotonously regular, but rather varies dynamically from moment to moment. The term *heart rate variability* (HRV) is used to refer to these naturally-occurring, beat-to-beat changes in heart rate, which are reflective of heart-brain interactions and autonomic nervous system dynamics. Recent research has revealed that heart rate variability patterns, or *heart rhythms*, are remarkably responsive to changes in emotional states (McCraty et al. 1995; McCraty et al. 1999; McCraty et al. 1998; Tiller, McCraty, and Atkinson 1996). Specifically, during the experience of stress and negative emotions such as anger, frustration, and anxiety, heart rhythms become more erratic and disordered, indicating desynchronization in the reciprocal action between the parasympathetic and sympathetic branches of the autonomic nervous system. In simple terms, feeling stressed causes our system to get "out of sync" — not only mentally and emotionally, but also physiologically. When the two branches of the autonomic nervous system are out of sync with each other, it is similar to driving a car with one foot on the accelerator (the sympathetic nervous system) and the other on the brake (the parasympathetic nervous system) at the same time. The result is emotional incoherence, increased energy drain, and added wear and tear on the body.

In contrast, sustained positive emotions, such as appreciation, love, and compassion, are associated with highly ordered or *coherent* patterns in the heart rhythms, reflecting greater synchronization between the two branches of the autonomic nervous system and increased physiological efficiency (McCraty et al. 1995; McCraty et al. 1999; McCraty et al. 1998; Tiller, McCraty, and Atkinson 1996).

Thus, sincerely experiencing positive feelings helps us get (and stay) "in sync."

Different patterns in the heart's rhythms and nervous system activity also affect the synchronized activity in the brain, which is the very basis of perception and cognition, including higher-order thinking skills. During emotional stress, when the heart transmits a disordered signal to the brain and activity in the nervous system is chaotic or desynchronized, higher cognitive functions are inhibited—limiting our ability to think clearly, focus, remember, learn, and reason. (This can help explain why we often can't think clearly, make careless mistakes, and have trouble retrieving information from memory when under stress.) In contrast, during positive feeling states, when the heart transmits an ordered, coherent signal to the brain and nervous system activity is harmonious and synchronized, our higher cognitive abilities are facilitated — often resulting in enhanced focus, memory recall, comprehension, and creativity.

Physiological Coherence: Increasing Nervous System Harmony and Emotional Stability

Research conducted by the Institute of HeartMath on the heart's rhythms and emotions has identified a distinct mode of physiological functioning that is associated with the experience of heartfelt positive emotions. The term *physiological coherence* has been introduced to describe this mode (McCraty and Atkinson, forthcoming; McCraty and Childre, in press). Correlates of physiological coherence include a smooth, sine wave-like pattern in the heart rhythms; decreased sympathetic nervous system activation and increased parasympathetic activity; increased heart-brain synchronization (the brain's alpha rhythms become more synchronized to the heartbeat); increased vascular resonance;

and entrainment between diverse physiological oscillatory systems (McCraty and Atkinson, forthcoming; Tiller, McCraty, and Atkinson 1996). These physiological changes result in a highly efficient state in which the body, brain, and nervous system function with increased synchronization and harmony — in other words, we're highly "in sync."

Increased physiological coherence has been found to directly correlate with improvements in cognitive performance in tasks requiring abilities such as focus, attention, and discrimination (McCraty 2002b; McCraty and Atkinson, forthcoming). Physiological coherence is also associated with greater emotional stability, a reduction in the perception of stress and negative emotions, and an increase in the experience of sustained positive emotions (McCraty, Atkinson, and Tomasino 2001; McCraty et al. 1999; McCraty et al. 1998; McCraty and Childre, in press). Further, the practice of techniques that increase physiological coherence has been associated with favorable health-related outcomes in both healthy and various clinical populations (Luskin et al. 2002; McCraty, Atkinson, and Tomasino 2001; McCraty Atkinson, and Tomasino 2001; McCraty et al. 1998; Rozman et al. 1996).

Heart-Based Tools and Technologies For Teaching and Learning Coherence-Building Tools

Based on the research described above, new, positive emotion-focused tools and technologies have been developed that enable students to systematically increase physiological coherence and emotional stability, thereby improving both academic and social-emotional outcomes (Childre 2001; Childre and Martin 1999; Institute of HeartMath 2002). Collectively known as the HeartMath System, these tools utilize the heart as a point of entry into the

psychophysiological networks that underlie emotional experience (Childre and Martin 1999; Childre and Rozman 2002; McCraty and Childre 2002). As discussed, because the heart is a primary generator of rhythmic patterns in the body — influencing brain processes that control the autonomic nervous system, cognitive function and emotion — it provides an access point from which system-wide dynamics can be quickly and profoundly affected (McCraty and Childre 2002; McCraty and Childre, in press; McCraty and Atkinson, forthcoming).

In brief, HeartMath tools combine a shift in the focus of attention to the area of the heart (where many people subjectively feel positive emotions) with the intentional self-induction of a sincere positive emotional state, such as appreciation. Such a shift in focus and feeling serves to increase heart rhythm coherence and nervous system harmony, which results in a change in the pattern of neurological signals sent to the cognitive and emotional centers in the brain. This, in turn, facilitates higher cognitive faculties and emotion regulation abilities that are normally compromised during stress or negative emotional states, thus sharpening one's discernment abilities, increasing resourcefulness, and often enabling problematic issues, interactions, or decisions to be assessed and dealt with from a broader, more emotionally balanced perspective.

Positive emotion-focused, coherence-building tools are effective in helping to stabilize nervous system dynamics in real time—for example, when used in the midst of a potentially stressful situation that otherwise might have drained both physical and mental resources. However, the use of such tools is also associated with

benefits that extend well beyond the present moment. Research studies have shown that people of all ages who regularly use HeartMath tools experience enduring improvements in health, emotional well-being, attitudes, behaviors, and relationships, affecting many aspects of their lives (Luskin et al. 2002; McCraty, Atkinson, and Tomasino 2001; McCraty et al. 1999; McCraty et al. 1998; McCraty and Childre, in press). Research suggests that these enduring benefits stem from the fact that as people learn to generate physiological coherence with increasing consistency, *a system-wide repatterning process occurs*, whereby the associated synchronized, harmonious patterns of activity become ever more familiar to the brain and nervous system. These patterns thus become established in the neural architecture as a new, stable baseline or norm, which the system then strives to maintain. The result is that unhealthy or maladaptive patterns are progressively replaced with ones that foster increased physiological efficiency, mental acuity, and emotional stability. Moreover, even at times when stress, challenge, or emotional instability are experienced, the familiar, coherent, stable state is more quickly and easily accessible.

At the physiological level, the occurrence of such a repatterning process is supported by data showing that individuals well-practiced in coherence-building techniques often enter and sustain this mode spontaneously during their day-to-day activities, without conscious application of the techniques (McCraty and Atkinson, unpublished results). We propose that the progressive establishment of new, healthier patterns in the neural architecture is what permits the practice of coherence-building techniques to produce the long-term improvements in emotion

regulation abilities, behaviors, and health that have been documented by research studies in diverse populations.

HeartMath tools include positive emotion-refocusing techniques, which enable individuals to intercept and modify their response to stress as it occurs, and emotional restructuring techniques, which build the capacity to sustain positive emotions and physiological coherence for longer periods. One example of a positive emotion-refocusing technique is the Freeze-Frame tool (Childre 1998). This technique consists of five simple steps in which the individual identifies a stressful or disturbing feeling, puts a temporary pause on it—like freezing the frame of a movie or video, shifts her focus to the area of the heart, breathes as if the breath were coming in through the heart area and out through the solar plexus, and self-generates a genuine positive feeling, such as appreciation or care. The combination of focus in the heart area and truly experiencing a positive emotion leads to increased synchronization and harmony in nervous system dynamics (as reflected by a coherent heart rhythm), thus interrupting or preventing the body's normal stress response. This shift has a salutary effect on both physiological and cognitive functioning, and typically enables the individual to address the original stressor from a more balanced and objective vantage point.

Examples of emotional restructuring techniques include the Attitude Breathing and Heart Lock-In tools (Childre 2001; Childre and Rozman 2002). Attitude Breathing is used to shift a mood, feeling, or attitude that one desires to change. After acknowledging an undesirable feeling or attitude, the individual shifts his attention to the area of the heart, asks himself what would be a better attitude to maintain, and

then focuses on sincerely breathing the feeling of the new attitude as if it were coming in through the heart and out through the solar plexus area. This process facilitates a shift towards increased coherence and helps to stabilize the new feeling or attitude. The Heart Lock-In technique, designed to promote sustained states of physiological coherence, involves focusing attention in the heart area while sincerely experiencing a positive feeling such as appreciation or care, generally for a period of 5 to 15 minutes. With practice, emotional restructuring techniques reinforce the coherent psychophysiological patterns associated with heartfelt positive emotions, thus helping establish increased physiological efficiency, mental acuity, and emotional stability as a new, familiar baseline or norm.

HeartMath tools are designed as simple, easy-to-use, low-cost interventions that can be adapted to virtually any culture or subculture, age group, or educational context. In addition, a number of these tools have recently been incorporated into an educational curriculum known as TestEdge (Institute of HeartMath 2002), which focuses specifically on reducing test anxiety and improving test performance in order to empower students to survive and even thrive in the stress-ridden environments of standards-based education and violent communities.

Heart Rhythm Coherence Feedback Training

Heart rhythm feedback training is a powerful tool to assist students in using positive emotion-focused techniques effectively and learning to self-generate increased physiological coherence (McCraty 2002a). Physiological coherence can be noninvasively monitored, quantified, and facilitated using practical technologies adaptable for classroom and counseling

settings. One such device is the Freeze-Framer® heart rhythm-monitoring and coherence-building system (Quantum Intech, Boulder Creek, CA). This interactive hardware/software system monitors and displays individuals' heart rate variability patterns in real time as they practice the positive emotion-focused techniques taught in an online tutorial. Using a fingertip sensor to record the pulse wave, the FreezeFramer plots changes in heart rate on a beat-to-beat basis. As students practice the coherence-building techniques, they can readily see and experience the changes in their heart rhythm patterns, which generally become more ordered, smoother, and more sine wave-like as students feel appreciation and other positive emotions (See Figure 1). This process reinforces the natural association between the physiological coherence mode and positive feelings. The realtime physiological feedback also essentially takes the guesswork and randomness out of the process of self-inducing a positive emotional state, resulting in greater consistency, focus, and effectiveness in practicing emotional shifts.

The software also analyzes the heart rhythm patterns for coherence level, which is fed back to the user as an accumulated score or success in playing one of three enjoyable on-screen games designed to reinforce the emotion-refocusing skills. Finally, the software includes a multi-user database to store results and track users' progress.

Studies in School Settings

Programs incorporating HeartMath tools and the Freeze-Framer coherence-building technology have been introduced at the elementary, middle school, high school, and college levels across the U.S. and have been demonstrated to improve

emotional wellbeing, classroom behaviors, learning, and academic performance (McCraty, Atkinson, and Tomasino 2001). One collaborative research study by the Institute of HeartMath and the Miami Heart Research Institute was conducted in a predominantly Latino middle school with sixth, seventh, and eighth grade students. In this study, a HeartMath program was incorporated into the curriculum, first as a 16-hour in class program conducted over a period of two weeks, and subsequently as a full-year elective course. The program was designed to reinforce resiliency skills and positive citizenship among students, while counteracting the negative effects of mental and emotional stress on learning. Application of the HeartMath tools was reinforced through a variety of fun, experiential games and activities, including participation in a cross-age mentoring program with elementary school students. The course also included an emotional physiology education component, using HeartMath's interactive Freeze-Framer system, in which students were given the opportunity to see changes in their heart rhythm patterns in real time as they practiced the Freeze-Frame and Heart Lock-In techniques. The Achievement Inventory Measure (AIM) was used to assess changes in psychosocial functioning, including measures of achievement aptitude, mental attitudes, and interpersonal skills, in 32 seventh grade students enrolled in the two-week in-class program.

While many of the students initially demonstrated anxiety, lack of motivation, and risky behavior problems or were at risk for school dropout, after learning and practicing the HeartMath tools the group exhibited significant improvements in 17 of the 19 areas of psychosocial functioning assessed. These included stress and anger management, risky behavior, self-reliance,

motivation, work management and focus, and relationships with teachers, family, and peers. Further, a follow-up analysis indicated that many of these improvements were sustained over the following six months (McCraty et al. 1999).

A second phase of the study, involving 60 students in the sixth through eighth grades, examined the impact of the HeartMath tools on children's physiological responses to stress. A randomly selected group of 30 students enrolled in the full-year elective HeartMath course participated in this phase of the study, while an additional 30 students, randomly selected from classmates not enrolled in the course, formed a control group. As a measure of cardiovascular and nervous system dynamics, students' heart rate variability was assessed immediately prior to, during, and following a structured interview designed to elicit emotional responses to real-life stressful issues. Results showed that children who used the Freeze-Frame technique to recover from acute emotional stress were able to favorably modulate their physiological stress responses in real time, thus demonstrating increased stress resiliency in comparison to the control group that did not learn the technique (McCraty et al. 1999).

Another study conducted by clinical psychologist Dr. Pam Aasen and reading curriculum specialist Stephanie Thurik, in collaboration with the Minneapolis Public School District, examined the impact of HeartMath tools and technology on reducing test taking anxiety and improving test scores in high school students. Twenty high school seniors who had previously failed their state-required exit exams and who needed to re-take the tests in order to graduate participated in a three-week intensive program. The course included

approximately eight hours of instruction in HeartMath tools, with an emphasis on reducing test-related anxiety and instilling greater emotional stability and self-confidence. Students received heart rhythm feedback training with the Freeze-Framer to help them learn how to self-generate physiological coherence and increase nervous system harmony.

After the program, the students showed improvements in test-taking performance that greatly exceeded those achieved through standard academic preparation alone. The HeartMath group demonstrated a mean increase of 35% in math scores and a 14% increase in reading scores on the Minnesota Basic Standards Tests — gains that represented one to two years' growth in academic skills. Students' passing rates on the exams also improved substantially after the three-week program. Of the trained students re-taking the math test, 64% passed, as compared to the district average of 42% for all seniors retaking the test at that time. For reading, the trained group's passing rate was 55%, as compared to the district average of 31%. As compared to a control group of 20 untrained students, the HeartMath trained students also demonstrated significant improvements in emotional well-being following the program, as measured by the Brief Symptom Inventory. These included reductions in hostility, depression, interpersonal sensitivity (feelings of personal inadequacy, inferiority, and self-doubt), paranoid ideation (fearfulness, suspiciousness, and mistrust), somatization (physical symptoms due to stress), and global indices of distress (McCraty et al. 2000).

The success of the Minneapolis pilot program led to a small subsequent study with 32 at-risk students in Houston, which substantiated the positive impact of the

HeartMath system on test-taking. As part of their preparation for the Exit Level Texas Assessment of Academic Skills (TAAS) test, a group of 15 high school juniors and seniors, all of whom lacked mastery of one or more portions of the test, practiced the HeartMath coherence-building skills while studying the TAAS preparation materials to help raise their test scores. Before beginning the test, the students used the Heart Lock-In technique to promote a state of physiological coherence. They were also encouraged to use the Freeze-Frame technique while answering test questions to facilitate the easy retrieval of information. Test results were compared to those of a control group of 17 of their peers (matched according to demographics, socioeconomic standing, and ethnic balance) who received standard test preparation alone. All seven of the seniors in the HeartMath program passed the TAAS Test compared with five of the seven seniors in the control group. Of the junior program participants, five of eight passed the test, compared to five of ten of those in the control group.

Although the results of the above study are merely suggestive, they conform to an overall pattern of success when the HeartMath System has been implemented in school classrooms across the nation.

One independent study conducted at an innercity Phoenix elementary school examined the impact of HeartMath tools on a small class of seven fifth and sixth grade students with learning disabilities. Most of the students suffered from a high level of emotional stress and had significant behavior and academic problems. In their regular classes, the students had already practiced a variety of learning methodologies for years, with very minimal improvement, and their self-

esteem was extremely low. The students took part in a three-week summer course designed to improve reading skills and thereby allow many of the children to be promoted to the next grade. The class met for 1¼ hours each day for a total of 14 days within a three-week period. Given the short time period available and the instructor's perception of the children's needs, the course focused primarily on teaching the students the HeartMath tools and provided very little traditional reading instruction. Pre- and post-intervention evaluations of students' reading proficiency were conducted using the Wide Range Achievement Test (WRAT). Additionally, changes in classroom behaviors were assessed by observational methods.

By the end of the three weeks, tremendous improvements in the classroom environment, reflected in children's attitudes and behavior, were readily apparent. Moreover, every student's reading scores improved dramatically, ranging from a two-month jump in reading proficiency for a bilingual student to over three years' growth (average growth of 1.5 years in grade level) (McCarty, Atkinson, and Tomasino 2001). The teacher's conclusion:

When techniques are presented that children are able to internalize and use to reduce stress, reduce the emotional pain of perceived failure, develop more sensitive communication, and relax, they are able to access what they have already learned.

Teachers who were trained in the HeartMath system at Claremont Graduate University and have begun to introduce its tools and technologies into public schools have found its secular, semi-populist, and developing nature both helpful and compelling. Illustrative of their comments

are the words of a seasoned teacher trainee:

The science behind the HeartMath system helped me avoid the threat of being accused in my school of trying to violate the separation of church and state by teaching meditative practices derived from religious traditions. HeartMath's easy-to-use developmental and complementary character makes me feel that I am not buying into an exclusivist, elitist, and static pedagogy. It has complemented beautifully my brain-based holistic teaching practice and probably will continue to do so in years to come. (Arguelles, McCraty, and Rees 2003)

Summary and Conclusions

In sum, research suggests that by learning to increase physiological coherence, students can increase nervous system harmony and thereby improve emotional stability, cognitive functioning, and

academic performance. Physiological coherence can be noninvasively measured and facilitated in school settings using heart-based, positive emotion-focused tools in combination with heart rhythm feedback technologies. Such approaches have been associated with improvements in test scores, classroom behaviors, and social-emotional outcomes within a relatively brief time frame in studies conducted among diverse student populations. Collectively, results suggest that the integration of heart-based tools and technologies in educational curricula may be an efficient and effective means to facilitate the academic and emotional development of both students and teachers.

Since, as was pointed out in the beginning of this paper, the heart was central to the belief systems and therefore the teaching-learning traditions of ancient societies, and since new research has established a dynamic relationship between the heart and the brain that significantly affects learning, it may be that a new heart-focused pedagogy could

dramatically impact holistic education. A new consciousness about the heart may have profound implications not only for the transference of information and knowledge in our learning systems but for the cultivation of those aspects of human experience that are associated with wholeness: caring, giving, appreciation, nurturing, and love. As Jung says, "The utterances of the heart — unlike those of the discriminating intellect — always relate to the whole" (*The Symbolic Life*, as quoted in Godwin 2001, 13).

It is our hope that the discussion of scientific discoveries and humanistic rediscoveries about the heart presented in this paper will lead to a national dialogue about the ways in which the heart can affect learning, performance, and behavior.

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Use Humming and Toning to Tune Up Your Brain

<http://www.brainplace.com/bp/music/default.asp>

In the Mozart Effect, Don Campbell, founder of the Institute of Music, Health and Education, lists the benefits of using your voice to enhance mood and memory. He says that all forms of vocalization, including singing, chanting, yodeling, humming, reciting poetry, or simply talk can be therapeutic. "Nothing rivals toning," he concludes. The word 'toning' goes back to the fourteenth century and means to make sounds with elongated vowels for extended periods of time. Ah, ou (such as in soup), ee, ay, oh and om are examples of toning sounds.

Campbell writes that when people tone on a regular basis for 5 minutes a day, "I have witnessed thousands of people relax into their voices, become more centered in their bodies, release fear and other emotions, and free themselves from physical pain...I have seen many people apply toning in practical ways, from relaxing before a dreaded test to eliminating symptoms of tinnitus or migraine headaches..."

Toning has been effective in relieving insomnia and other sleep disorders....Toning balances brain waves, deepens the breath, reduces the heart rate and imparts a general sense of well-being." Campbell reports that in his experience certain sounds tend to have certain effects on the body and emotions:

Ahhh — immediately evokes a relaxation response,

Ee or Ay — is the most stimulating of vowel sounds, helps with concentration, releasing pain and anger,

Oh or Om — considered the richest of sounds, can warm skin temperature and relax muscle tension.

Try toning for 5 minutes a day for 2 weeks to see if it will help you.

In a similar way, humming can also make a positive difference in mood and memory. Mozart hummed as he composed. Children hum when they are happy. Adults often hum tunes that go through their minds, lifting their spirits and tuning their mind. Consciously focus on humming during the day. As the sound activates your brain, you will feel more alive and your brain will feel more tuned in to the moment.

THEOSOPHICAL DIVISION¹

[LOWER QUARTERNARY]

Sanskrit Terms	Exoteric Meaning	Explanatory
(a) Rupa, or Sthula-Sarira	(a) Physical body.	(a) Is the vehicle of all the other "principles" during life.
(b) Prana.	(b) Life, or Vital Principle	(b) Necessary only to a, c, d, and the functions of the lower Manas , which embrace all those limited to the (physical) brain.
(c) Linga Sharira.	(c) Astral body.	(c) The Double , the phantom body.
(d) Kama rupa.	(d) The seat of animal desires and passions.	(d) This is the center of the animal man, where lies the line of demarcation that separates the mortal man from the immortal entity.

[The Upper Imperishable Triad.]

(e) Manas — a dual Principle in its functions.	(e) Mind, intelligence: which is the higher human mind, whose light, or radiation links the MONAD, for the lifetime, to the mortal man.	(e) The future state and the Karmic destiny of man depend on whether Manas gravitates more downward to Kama Rupa, the seat of animal passions, or upwards to Buddhi , the Spiritual Ego . In the latter case, the higher consciousness of the individual Spiritual aspirations of mind (Manas), assimilating Buddhi , are absorbed by it and form the Ego , which goes into Devachanic bliss.
(f) Buddhi	(f) The Spiritual Soul.	(f) The vehicle of pure universal spirit.
(g) Atma	(g) Spirit	(g) One with the Absolute, as its radiation.

¹ Now so plain is it that Plato and even Pythagoras, while speaking but of three "principles," give them seven separate functions, in their various combinations, that if we contrast our teachings this will become quite plain. Let us take a cursory view of these seven aspects by drawing a table.

In Mr. Sinnett's *Esoteric Buddhism*, **d, e,** and **f,** are respectively called the Animal, the Human, and the Spiritual Souls, which answers as well. Though the principles in **Esoteric Buddhism** are numbered, this is, strictly speaking, useless. The dual **Monad** alone (**Atma-Buddhi**) is susceptible of being thought of as the two highest numbers (the 6th and 7th). As to all others, since **that** "principle" only which is predominant in man has to be considered as the first and foremost, no numeration is possible as a general rule. In some men it is the higher Intelligence (Manas or the 5th) which dominates the rest; in others the Animal Soul (Kama-rupa) that reigns supreme, exhibiting the most bestial instincts, etc.