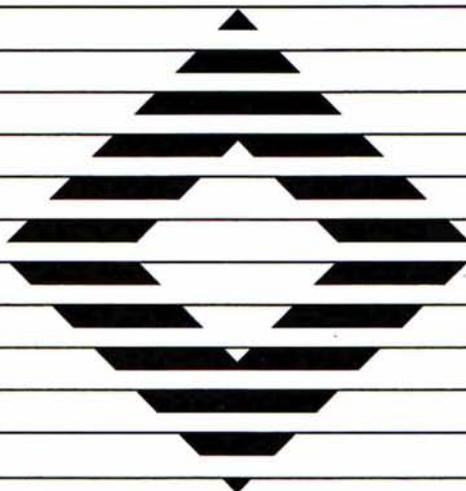


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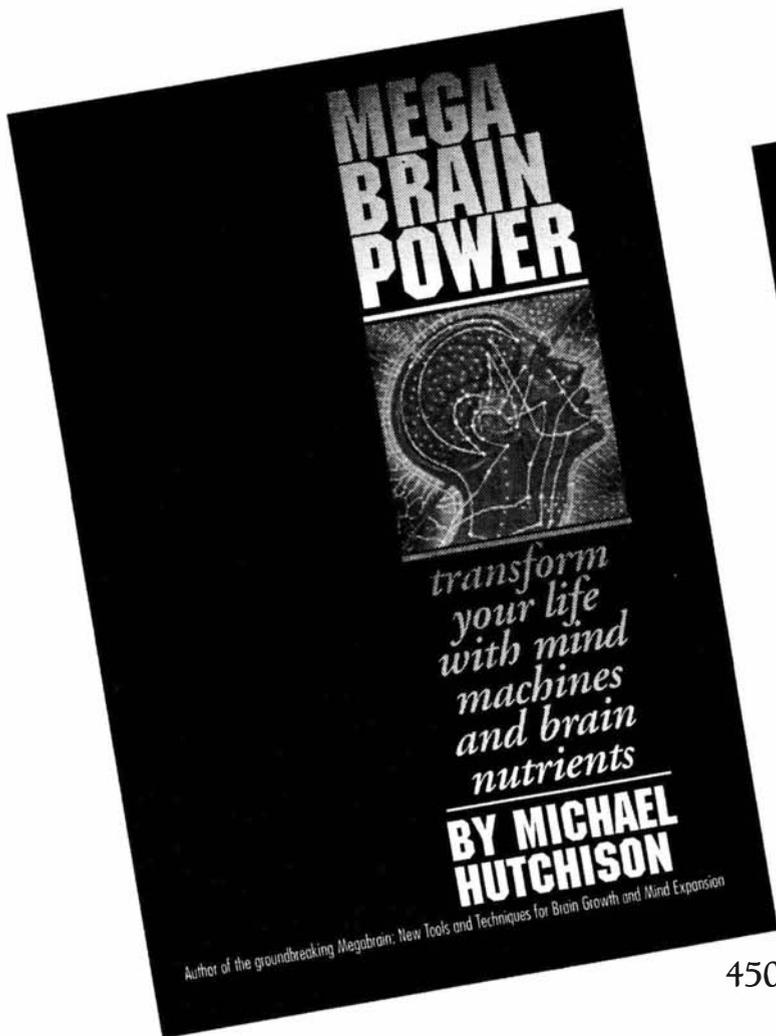
MEGABRAIN

R E P O R T

THE JOURNAL OF MIND TECHNOLOGY

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AFTERWORD

The Techno-Human Leap: Technology, Evolution and Spiritual Transformation

Autographed by Michael Hutchison

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Tools for Evolution?

by Michael Hutchison

Mind technology is evolving rapidly. New tools and techniques are emerging with dizzying speed. There's a sense of constant innovation that feels very much like the excitement of the early years of the development of the personal computer.

The Democratization of the Metanormal? There's no doubt we're in the midst of an unprecedented explosion of mind technology exploration and development. Many scientists and cultural analysts now believe such mind-enhancing devices may represent a historic breakthrough in human development. Think of the enormous implications: tools that will allow large numbers of humans to function consistently at levels of mental efficiency, creativity and intelligence that have in the past been attained only by the gifted few. It would be what Michael Murphy calls "a democratization of the metanormal."

Just as life once developed from inorganic elements and as humans developed from our primate ancestors, so now a new evolutionary domain is tentatively rising in the human race.

If such devices really do work, they could change not only our lives, but our concept of what it is to be human. Says Michael Murphy, "there's overwhelming evidence that most if not all of our human attributes have extraordinary or seemingly miraculous versions. We can now recognize the pattern of the extraordinary in human life to a degree that people in former times could not. From this pattern we begin to discern the outlines of a possible future, a future in which the extraordinary could become commonplace." Mind technology, it now appears, may be the means by which the extraordinary becomes commonplace.

Imagine a world in which peak performance states have become commonplace, in which most humans use "nonordinary" capacities and powers much of

the time. It would be different from our world not just by a matter of degrees, but qualitatively and essentially different – a new reality. What we are envisioning, of course, is a dramatic evolutionary leap, a radically new and different sort of life on this planet.

The development of these extraordinary capacities, in Murphy's words, "herald an evolutionary transcendence. With them, a new level of existence has begun to appear on earth, one whose patterns cannot be adequately specified by physics, biology, or mainstream social science. Just as life once developed from inorganic elements and as humans developed from our primate ancestors, so now a new evolutionary domain is tentatively rising in the human race."

ROOT HOG OR DIE

I believe there's an evolutionary explanation for our culture's increasing fascination with tools for increasing mental powers. A driving force of evolution has been the process of adaptation to environmental pressures. Under the pressure of environmental changes – a climate growing colder or warmer, dryer or wetter – species either adapt or become extinct. It's a process evolutionary biologists call "environmental selection," and what others have called "survival of the fittest."

Evolution is a ceaseless process. There is no guarantee that humans will continue to be a part of that process. Today we are under the pressure of enormous, unprecedented environmental changes. Our survival is uncertain. Over the past few million years, humans have responded to environmental pressures by developing new tools that gave them an advantage over other species – fire, flint stones, gathering bags, weapons. Perhaps today the humans "fittest" to survive are not the strongest or best hunters, but those most imaginative, adaptive, and capable of developing strategies to insure the survival of themselves, their offspring and (not incidentally) the species.

The unprecedented problems the world faces today demand mental solutions, new ideas. Human survival may depend on our ability to increase our mental powers and develop new strategies for overcoming our present crises. That is to say, evolution may involve developing new mental powers. Perhaps we have reached our species' "childhood's end". Seen in this light, mind machines, devices that enhance our mental powers, may be seen as evolutionary instruments – tools for human survival.

WAKING FROM THE DREAM

One way they may serve as evolutionary tools is by simply increasing our intelligence—making us smarter, able to create even better tools and devise

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better strategies for survival in this world, in this solar system, in this galaxy, in this universe.

But they may serve as tools of evolution in another way – by providing us access to extraordinary states of consciousness that are themselves gateways into an entirely different sort of reality, in which questions of evolution and survival take on entirely new meanings.

As the scientists investigating consciousness have discovered, the ordinary concept we have of human consciousness as something contained inside the human skull simply does not apply when we move into nonordinary states of consciousness – states such as may be experienced using mind machines, or reached through hypnosis, meditation, or the use of psychedelic drugs. In such states, reported by an immense number of people over the ages, it becomes clear that human consciousness is not bound by either the concepts of the realities of space and time. Stanislav Grof, M.D., observes that, “Modern consciousness research reveals that our psyches have no real and absolute boundaries; on the contrary, we are part of an infinite field of consciousness that encompasses all there is – beyond space-time and into realities we have yet to explore.”

Exploration of heightened states of consciousness using mind technology confirms for many that our consensus “reality” is only one aspect of existence. For most, the experience of this reality “beyond space-time” is one of transcendence.

THE MYSTICAL REVELATIONS OF OPRAH: OR THE MASS PSYCHOLOGY OF ESCAPISM

The human spiritual craving or transcendental impulse, says Grof is “the most vital and powerful force in human beings.” But it is a force that has been systematically repressed and denied by western culture, derided as superstition, wishful thinking and even pathological delusion. When such a powerful human force is repressed, it emerges in other forms. When people cannot transcend their individual identities and feel themselves a part of a larger, timeless whole, they will abandon their individual identities in other ways, and seek to feel part of a larger entity. It doesn't take a genius to look around and see a civilization in which most people willingly abandon their individual identities to lose themselves in television fantasies; in which mass entertainment substitutes for transpersonal experience; in which drugs, violence, soap opera, Michael Jackson, Oprah and the Super Bowl are the main socially approved paths to non-ordinary states of consciousness.

Denied direct, transcendent experience “beyond space-time,” we attempt to transcend (or escape) material reality by making our world itself something beyond space-time – a dream. As writer Michael Ventura observes, “We in the late 20th century live in the time-space of the dream. The dream's instan-

taneous changes, its unpredictable metamorphoses, random violence, archetypal sex; its constant cascade of supercharged imagery; its threatening sense of multiple meaning. For a quarter of a million years the dreamscape surrounded us only in our sleep, or in arts experienced by the very few, or in very carefully orchestrated religious rituals. Now, in our electronic environment, the dreamworld greets us when we open our eyes... What distinguishes the 20th century is that each individual life is a daily progression through a concrete but fluctuating landscape of the psyche's projections. The surrealism, simultaneity, sexuality and instantaneous change that occur in our dreams also occur all around us. So the condition of our subconscious is now also the condition of this physical environment we've built for ourselves... We reel between dream and dream – between the dreams of our sleep that speak to us alone and the dreamscape of this waking world in which we make our way through millions of dream fragments that collide around us...”

THE DEMOCRATIZATION OF THE ABNORMAL

Michael Murphy talked of a “new evolutionary domain” in which the extraordinary becomes commonplace – a democratization of the metanormal. But, denied access to the transcendent, ours has become world in which another more sinister sort of extraordinary has become commonplace – a democratization of the abnormal. But the way out of the dream, of course, is to wake up. Says Grof, “Experiential self-exploration is an important tool for a spiritual and philosophical quest. It can mediate the connection with the transpersonal domain of one's own being and of existence.” Many have found that mind technology provides an effective tool for experiential self-exploration.

To some it may seem odd and paradoxical that machines – the synthetic, hard, material devices of this electronic temporal reality – may serve as gateways to the spirit, tools of transcendence. But in fact this fusion of spirituality, or the “inner quest,” and science, the “external quest,” is the central force of the emerging new paradigm. Again I quote Stanislav Grof (whose work and writings, including *Adventures in Self Discovery* and his recent *The Holotropic Mind*, are at once visionary and supremely practical): “The rapidly processing convergence between the new science and the mystical traditions of the perennial philosophy offers an exciting perspective of a future comprehensive worldview that will heal the gap between scientific research and spiritual quest. Such an encompassing new paradigm could become an important catalyst in the evolution of consciousness that seems to be a critical condition for the survival of life on this planet.” ▲●■

Brain Tuning and State Change

by Michael Hutchison

Our research involving nonordinary states of consciousness thus supports the concepts of C.G. Jung, who suggested that in our dreams and visions we can experience myths that are not from our own cultures and that were previously unknown to us from our readings, viewing of art, or conversations with others. This is the world of the 'collective unconscious,' an infinite ocean of knowledge from which we can each draw. In this age of advanced technology, we might compare the collective unconscious to a transmitting station that constantly broadcasts every bit of program material and information ever transmitted by radio and television. At any time we can 'switch channels,' changing from the channel of everyday life to which we normally stay tuned, to an infinite number of other channels, crossing the boundaries of time, space, and even species. It is virtually impossible to imagine that we are always surrounded by this information and that we are able to tap into it whenever we wish. But our analogy of the radio waves gives us an approximation of the immensity of information we can access through the collective unconscious."

Stanislav Grof, M.D.
The Holotropic Mind

THE POWER OF CHANGING YOUR STATE

It was a classic subway rider's nightmare: rush hour in Manhattan on a sweltering summer afternoon. The downtown IRT pulled in – already jammed with tired and surly passengers. I was swept aboard with a mass of other people, pushing and groaning, and as the doors closed we were squeezed together so tightly no one was able to move an arm. The train departed the station at 42nd Street and was about halfway to 34th Street when suddenly it stopped. After an instant the hum of the motors stopped entirely. The train had shut down. A collective groan went up. And then the lights went out. The groan became louder, and in the midst of the groans were scattered screams. There we were, packed together like sardines in total blackness. The temperature in the car must have been above 110, and we were all pouring sweat.

From somewhere down the car came screams of terror. Someone else shouted, "Hey, some guy's having a heart attack here!" Voices shouted to punch out the windows, and someone cried out that they couldn't breathe. "I need air, I need air." Voices of panic cried out, and I felt my own chest constricting, my breathing becoming tight, and I began to wonder if I was going to have an attack of claustrophobia. The conductor's voice came over the loudspeaker system to tell us someone had apparently jumped onto the tracks at the 34th Street station and we would have to wait until the situation was cleared up. So, while some continued to

shout in panic, most of us settled back into that common New York City state you could call Ordinary Emergency or Nothing Special Panic.

I was in the midst of writing a book about the use of the flotation tank and had been floating several times a week. The thought appeared that maybe I could treat this situation like being in a float tank. After all, like the tank, this was a place of total darkness. So I took a breath, let it out slowly, and pretended that instead of being crushed between angry frightened sweating bodies, I was floating peacefully in a flotation tank. I remembered the heavy lightness that filled my limbs while in the tank, the feeling of release, the sensation of floating, free of gravity, in black, infinite space. And it happened – within a few seconds I felt the fear and tension flow out of my body. It had been hard to breathe, but now my chest relaxed and I breathed deeply and easily. The tension on my face flowed into a smile. I was floating... After a moment of peaceful rest, I remembered where I was and began laughing. The whole scene had a macabre comical air. I was relaxed. It was okay.

This was one of my first powerful experiences of intentional state change. By changing my mind/body state, I was able to change my behavior and attitudes: in a very real sense, I was able to alter my reality. It was, you'll notice, a direct result of my experience of mind technology – the float tank. This, I believe, is a key to the life-changing potentials of mind tools – they are state-change tools of enormous power.

EMPOWERING AND INHIBITING STATE

All of us know what states are, since we're in states every moment of our lives. Some of the states we get into are very nice: Joy, pleasure, confidence, belief, love, concentration, ecstasy, energy, lucidity, clarity, courage, determination, and so on. These are empowering states, since when we are in these states we have the power to act positively, to get things done, to enjoy our lives. These states sustain our most elemental power, the existential power to be. These empowering states are essential to achieving excellence, peak performance, and peak experiences.

Other states we get into are not so nice: fear, anxiety, depression, sadness, frustration, helplessness, anger, confusion, weakness, futility, loneliness, guilt, boredom, exhaustion. These are inhibiting states, since they have the effect of hindering, obstructing, restraining, suppressing, repressing, thwarting, blocking us from achieving excellence, peak performance, and peak experiences. At times they can threaten to undermine or destroy our power to be.

By changing my mind/body state, I was able to change my behavior and attitudes: in a very real sense, I was able to alter my reality.

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BRAIN TUNING AND STATE CHANGE *CONTINUED*

STATE DEPENDENT MEMORY

Scientists have discovered that memory is “state dependent.” That is, memories that are laid down while we are in a particular state are best remembered when we return to that particular state: things you learn when you’re happy you remember best when you’re happy; what you learn when you’re sad is remembered best when you’re sad. According to Dr. Gordon Bower, of Stanford University, one of the pioneer explorers of state dependent memory, states are like “different libraries into which a person places memory records. A given memory record can be retrieved only by returning into that library...”

We’ve all had the experience of trying to find our misplaced car keys. After a period of frantic searching “all over the place,” we then at a certain point stop and think to ourselves, “Now, what did I do the last time I came in and put those keys down?” If we’re successful in “reliving” the last time we had the keys, we will generally suddenly “remember” where they

keys are. In other words, we’re trying to get back into the state we were in the last time we had the keys: we’re accessing state dependent memory.

To look at this in another way, the present state we’re in acts like a magnet to memories that are linked to that state. When you’re in a sad mood, you tend to attract sad memories, recollections and associations. For example, there are streets of New York City that are forever linked in my mind with a former love, and the events of our relationship. When I am

melancholy and I walk through those streets, every place I look I see things that stir up melancholy and sad memories. Yet, when I am happy and I walk through those same streets, the things I see remind me of happy days gone by, moments of joy and love – all that I see makes me glad. It all depends on the state I’m in. “I just dropped in to see what condition my condition was in.”

STATE DEPENDENT BEHAVIOR

Many of us – perhaps even most of us – live with the attitude that these states are something that happen to us. That they are like weather fronts that pass over us, bringing sunny days, rainstorms, or pressure inversions, all beyond our control. “Hey, I’d like to go to the beach today, but it’s rainy.” “Yeah, I should probably go play with my children, but I’m too angry right now.” “I’d like to be sexy, loving and affectionate with my spouse, but right now I’m tired and depressed. Maybe later I’ll feel more like it...” We behave in certain ways because we’re in certain states.

What we’re talking about here, then, is something more than state dependent memory – it’s state depen-

dent behavior. To an extraordinary degree, our states control our behavior. Think of being in one state – fear – and entering a room full of people, or having to deliver a lecture to a strange audience. What would your behavior be? Now, think of being in a different state – happy self-confidence – and entering that same room full of people, or delivering a lecture to that same audience. Your behavior would be quite different from your fear-state behavior. To that degree, your behavior is state dependent.

Think of other behaviors. When we are in calm, centered, relaxed and happy states, our tendency to engage in certain behaviors – such as smoking, drinking, eating excessively, taking drugs – is markedly different from our tendency to engage in those behaviors when we are in states such as anger, depression or anxiety. To that degree, these unwanted behaviors are state dependent. What that means is that if we could change our state, we could change our behaviors.

EXCEPTIONAL STATES

And just as unwanted behaviors are state dependent, so are those much-wanted, oh-so-longed for exceptional behaviors. Think of the last time you hit that perfect drive that flew off the head of your golf club and shot 300 yards straight down the fairway... Or the time you had that breakthrough creative insight when you suddenly solved a problem that had been bothering you for ages... Or that time when you and your partner had a sexual experience that was sizzling, sublime and perfect ecstasy... What state were you in? If you could recall that state in its fullness and totality, and re-enter that state the next time you addressed the golf ball, wanted to learn or understand something new, or had sex, then you could make another perfect drive, have another breakthrough insight, have another peak experience.

Athletes know this intuitively, and go through what would otherwise be bizarre rituals in their attempts to re-enter their peak state. Watch the high jumper as he pulls his shorts up just so, and then spits just so, puts his head down, swings his arms, and places his foot forward, then backward, then forward, then backward, then pauses before he begins his run toward the bar... Watch the baseball hitter, as he pounds his bat twice on the plate, swings it around three times, spits, tugs on his shirt at the right shoulder, tugs on his shirt at the left shoulder, reaches down to adjust his cup, puts his hand on top of his helmet, swings the bat around twice more, pounds the plate once, spits once more, and then draws back the bat and stands ready to take the pitch... Unconsciously or consciously, athletes are always trying to remember themselves as they were at their remembered moment of perfection, trying to re-enter the state they were in the last time they made a perfect

high jump, the last time they made a perfect swing and hit the ball out of the park. Because they understand that if they could once again truly enter that state they were in during that past peak performance, then they can deliver another peak performance.

...if we could somehow put ourselves into the same states exceptional performers are in when they perform their extraordinary acts, then we should be able to perform exceptionally ourselves.

To the degree that behavior is state dependent, then if we could somehow put ourselves into the same states exceptional performers are in when they perform their extraordinary acts, then we should be able to perform exceptionally ourselves. "How do we access what we know, but don't know any more?" wonder Shiela Ostrander and Lynn Schroeder in their book *Supermemory*, "Why do we only use a smidgen of what is adjudged innate human ability? Perhaps we don't

enjoy the exceptional functioning of the supermemory star, of the Olympic high jumper, the brilliant business strategist, even the miraculous self-healer, because we don't know how to get into the state where these abilities live. If we should get there by accident, we don't know how to recall those states again when needed."

LIFE HAPPENS

States control behavior. But as I pointed out earlier, many of us feel that to a great extent our states happen to us. We are in a sad mood, so we will be sad until we stop being sad. And since we are sad now, we will behave in certain ways that are different from the ways we would behave if we were happy. So since our states control our behavior, then so as long as we believe our states happen to us, like weather, to a great degree we must believe our behavior happens to us.

That's the way it feels a lot of the time. Hey Wally, why did you insult the boss like that? Well, gee, I don't know, I was just angry and he kept talking on and on and I kept getting more and more angry and ... it just happened. Hey Karen, I thought you said you were going to quit smoking. Yes, well, the phone rang and it was an important sale I had to make and suddenly, the cigarette was just there in my hand and I was taking a drag. It just happened.

To say our behavior happens to us is another way of saying we're not responsible for our behavior, any more than we're responsible for the weather. Well, I know I'm eating too much/smoking too much/drinking too much, but I'm sad and depressed right now because my relationship has broken up. The implication is that sooner or later the weather will change, the sadness and depression will lift, and the problem with eating, smoking or drinking will disappear. Stuff happens to us. And then things change and other stuff happens to

us. And thus we see the philosophical underpinnings of the great T-shirt and bumper sticker motto of our era, "Shit Happens." To which we are meant to add the unstated but implied, "And I'm Not Responsible."

DISFUNCTIONAL STATES

The belief that we aren't responsible for our behavior has led in recent years to a peculiar cultural phenomenon, blaming unwanted behaviors on addiction. Addiction, it is argued, is a disease. Just as we don't blame someone for incurable diseases like diabetes or sickle cell anemia, which can disrupt and destroy lives, so we can't blame individuals for addictions to drugs or alcohol or cigarettes, which also disrupt and destroy lives. The best way to treat the disease of addiction, it is believed, is by going through the 12-Step Process, pioneered by Alcoholics Anonymous. The first step and most essential step in this process is for the addict to admit and accept completely that he or she is "powerless" over alcohol or drugs. It is also essential for the addict to accept that his or her disease is incurable. After the admission of total powerlessness, and the acceptance that the disease is incurable, the addict calls upon God or a Higher Power to change the unwanted behavior. This 12 Step or AA program seemed to work, at least for many alcoholics or drug addicts. And for over 40 years, these programs were strictly limited to dealing with alcohol or drug addiction.

Then in the 1980s came the explosive growth of the idea that we could become addicted not just to the classic addictive substances – drugs, alcohol, cigarettes – but to a variety of behavior patterns. Since the "disease model" and the 12 Step method had seemed helpful in treating alcohol and drug addictions, many people began to believe that the disease model and the 12 Step method should be equally helpful in treating other types of "addictions." This expansion process began with those whose lives had been influenced by alcohol or drugs: husbands, wives, and children of addicts – members of what came to be known as the "dysfunctional family." In 12 Step and Support Groups like Al-Anon and Adult Children of Alcoholics (ACOA), husbands, wives and children of addicts and alcoholics used the 12 Step program to admit their own powerlessness over addictive behavior, and to admit their own "addiction" to their addict mates.

And suddenly, within just a few years, there had emerged an astonishing variety of Step Programs and Support Groups based on the AA model, for people who wanted to overcome their "addictions" to sex, food, dieting, money, shopping, anger, romance, men, work, laziness, exercise, lying, food binging

To say our behavior happens to us is another way of saying we're not responsible for our behavior, any more than we're responsible for the weather.

MEGABRAIN REPORT

BRAIN TUNING AND STATE CHANGE *CONTINUED*

and vomiting, television, savings coupons, and much more. And from these emerged other Support Groups for people from the dysfunctional family members of people who were addicted to food, money, anger, and so on. Today, virtually any behavior that might lead to unwanted consequences has now been classified as an addiction and spawned a network of Step Programs and Support Groups.

The addiction model is enormously seductive. For if these unwanted behaviors are addictions, then they are by the accepted definition, diseases, and we're not responsible for our diseases, or the diseases of our parents or spouses or lovers. And of course the first step toward overcoming these addictions, as counseled by the 12 Step groups, is to accept and admit that we are powerless over our addiction. If we are powerless, we are not responsible. In fact, we are victims of our disease. And those who are members of dysfunctional families, "adult children" of addicts, are doubly victims, because they are "trapped" in unwanted behaviors not of their own making, but imposed on them by their addictive parents or their dysfunctional family. All these harmful behaviors are the result of addiction, which is a disease, which means they're not our fault. We're not responsible. Our behavior "happens" to us. It is the result of our mental states, and our states are the result of our dysfunctional family life. Our dysfunctional behavior is the result of our dysfunctional brain states that are the product of our dysfunctional family life or our dysfunctional childhood. We must accept we are powerless. Shit happens.

The neuroscientific evidence is absolutely clear: we can change states intentionally, quickly, at will.

CHANGING CHANNELS ON THE LIFE TV

But a central finding of the Brain Revolution is that our brain states (and thus our behavior) are not beyond our control. We are not powerless, we are not victims of our past or our environment. The neuroscientific evidence is absolutely clear: we can change states intentionally, quickly, at will.

It's a discovery many people make naturally in the course of growing up. It's a discovery that most of us must make over and over and over, in different states and different contexts, until it becomes no longer a surprise, but evident and dependable. I believe making that discovery is an essential part of becoming a healthy adult.

One of the first times I made the discovery was, back in the early 70s, when I wormed my way into a biofeedback research project at NYU and discovered I could make the alpha clicker go by doing certain things with my brain, and that by making the clicker go – by increasing my alpha activity – I could change my mood. I found that melancholy would dissipate and be replaced by joy. I found that I didn't have to

keep experiencing the emotions flowing through me if I didn't want to. What I was learning, in my own plodding way, was the process of state change. What I was learning is that to the degree that behavior is state dependent, behavior doesn't happen to us – we choose our behavior.

One way we choose our behavior is by choosing our state. If there are certain behaviors we want to change, then to change them we must change our state. And state change is not only possible, it is easy to learn. Just like changing the channel on the TV, we can learn to switch from inhibiting states to empowering states: changing channels on the Life TV.

Learning to change states is, I believe, a key to becoming a functional healthy adult. A central driving force of human evolution and a key to human history has been the search for and exploration of techniques for changing states. Humans have been tireless and determined in their attempts to devise reliable techniques for changing state. The methods they have explored and invented are countless, ranging from self-flagellation to masturbation, from waging war to taking drugs, from sticking needles in acupuncture points to sky-diving, and include various types of breathing, dancing, chanting, fasting, ritual, meditation, prayer, reading, story-telling, hypnosis, visualization, sex. Using technology to help produce state changes is nothing new. Humans have always used the latest technological or scientific developments to assist them in their quest for reliable state change tools. When the big breakthrough in technology was grasping a stick or stone in the hand and applying it to something else, you can be sure that one of the first uses to which this technology was put was rhythmic pounding, or drumming – still a highly effective state-change technique.

The great technological breakthrough of printing quickly spread throughout the world one of the most powerful and far reaching state change techniques of human history – reading.

In our century, a variety of technological developments were combined to create a state change technology of remarkable richness – the cinema, epitomized by the Hollywood Movie. You walk in off the street in one state (fatigue, boredom, loneliness, curiosity, etc.), and re-emerge on the street in a different state several hours later, having been catapulted through a variety of intense state changes – from fear and horror, to love and joy, anger and grief. Sometimes the state change produced is long-lasting – I can still remember vividly entering the movie theater as just one of hundreds of kids in t-shirts and Keds, and emerging two hours later as a swashbuckling pirate captain, running wild through the city

Just like changing the channel on the TV, we can learn to switch from inhibiting states to empowering states: changing channels on the Life TV.

streets, leaping over garbage cans with cutlass slashing, and seeking buried treasure with my shipmates through the back alleys of Pittsburgh.

STIMULATING STATE CHANGE

A central discovery of the Brain Revolution has been that all states are linked to and determined by physical conditions in the brain. Using electrical probes, scientists discovered, for example, very small but distinct “pleasure centers” in the brain, as well as nearby centers associated with such states as fear and rage. They discovered that certain neurochemicals, such as the endorphins, could produce pleasure states, while others, such as oxytocin, could produce states very much like love. They discovered that high levels of activity in the right frontal regions of the cortex were associated with depression and negative emotional states, while high levels of activity in the left frontal cortex were associated with happiness and positive emotional states.

Even more important, the scientists of the Brain Revolution have discovered that by changing the physical conditions of the brain, they can change the states. With a mild electrical stimulus in one area of the brain, they could produce such pleasure that a subject would do virtually anything – including going without food, sleep or sex – to continue to experience it. By moving the electrical stimulus to a nearby area of the brain, they could produce utter terror. Scientists found that by actively inducing releases of beta-endorphin, they could produce feelings of euphoria. They also found that by using simple stimuli such as flickering lights or precise combinations of sounds, they could cause subjects to change the amount of brainwave activity of a certain frequency and produce trancelike states and feelings of oneness with the universe. That is, scientists found that they could produce rapid and dramatic state changes using simple and safe technologies.

The next step was to take these simple and safe laboratory techniques for state change and package them in a way that made them accessible to large numbers of people. These mind technologies are now widely available.

Let me summarize. We know that our states largely determine our behaviors and attitudes. If we want to change, or have control over our behaviors and attitudes, we must learn how to change our states on demand, with the same ease that we change the TV channel. We know that we can change state, which means we can choose our behavior. Which means that we are *responsible* for our behavior. The key to state change is changing the activity of the brain. There are now numerous tools and techniques on the market that can help change the activity of your brain, and thereby

change your state. And thereby, perhaps, change your behavior. That’s your responsibility.

To return to the metaphor of weather: many of us used to think our states were like weather. When a storm swept over us, we just had to wait it out. The bright and sunny days would often come at the wrong time – just when we had to spend all day indoors working on a rush project. Now and then a hurricane or flood or earthquake would totally disrupt our lives for a few days. Now we know that we can change our states. The mind technology for state change is widely available. So now we have a new question, and a new responsibility: what state do we want to be in? If we have the capacity to select our states, then we have the responsibility to select the states that will help us to reach our goals.

And so another question arises: what are our goals? Do we want wealth? Love? Creativity? Power? Happiness? Peace on Earth? We now have the capacity to switch ourselves out of inhibiting states into empowering states, out of destructive behaviors into constructive behaviors – states and behaviors that will help us accomplish the things that are important to us. But what is important?

Mind technology opens up new possibilities for human achievement. These state-change tools can be “labor savers” by helping us quickly get out of inhibiting states and into empowering states – and to change from unwanted behaviors to desired behaviors – something that might have taken us hours or days or months – and for many people would have been inconceivable – before the development of mind technology (MT).

Because MT seems to offer such rapid and powerful effects, some have accused them of being “too easy.” But this is like accusing cars or airplanes of being “too easy.” Yes, just like cars and planes get us places far faster than we could get there by walking, MT can produce state changes, and get us into productive empowering states far faster than we could get there by years of disciplined work at “self control” or “will power.”

But MT, like cars and planes, are neither bad nor good in themselves. They are simply tools to help us do things more rapidly than we could otherwise do them; helping us get places faster than we could through ancient techniques. But the fact remains: whether we walk or fly by jet, whether we meditate or use a mind machine, we still have to decide on our destination.

Mind machines exist; the possibility of rapid state-change exists. The difficult questions still must be answered by each of us: what states do we seek, what behaviors do we desire, what are the goals of our lives,

The mind technology for state change is widely available. So now we have a new question, and a new responsibility: what state do we want to be in?

MEGABRAIN REPORT

BRAIN TUNING AND STATE CHANGE *CONTINUED*

and how can we use these state-change devices to help us reach those goals?

If you do want to answer these questions, I believe that mind tools themselves offer some of the most effective techniques yet devised for the kind of contemplation and self-exploration that will be required to answer these questions.

Whether we meditate or use a mind machine, we still have to decide on our destination.

Of course there's no reason whatsoever that using mind tools has to involve the slightest bit of introspection. Many people are interested in using mind tools for very straightforward and self-evident state-change purposes: to reduce stress; to relax; to lower blood pressure; to increase sexual pleasure, to alleviate insomnia; to increase memory, and so on. And it goes without saying that MT can be used simply for fun – put it on, switch it on, and see what happens. Change your state: that's the reason we use drugs, watch tv, have sex, and so on. We do it anyway, why not do it more safely, more quickly and more healthfully with MT?

BICYCLE TRAINING WHEELS EFFECT

Some critics and skeptics have raised the objection to MT that, while it's important to learn how to change states, mind machines are simply too "easy," and, like drugs, can become a crutch, keeping us from learning how to change states by our own powers. The answer is that in my experience these machines seem to have quite the opposite effect – stimulating and helping people to learn.

It's what I've called the bicycle training wheels effect. Some children use training wheels to help them learn how to ride their bicycles. But once they have learned how to ride, they quickly discard the wheels – who needs training wheels when you can whizz along on two wheels?

In a similar way, MT helps many people get into mental states they could not easily, or would not ordinarily, enter by themselves. MT gets them there quickly and reliably. They learn what that state feels like. They learn that they can, for example, go from a state of normal consciousness or uncomfortable stress, into a deeply relaxed theta state, and do so in a matter of minutes – and then return back to normal consciousness again. By repeatedly going through such rapid state changes with the assistance of MT, they learn that such state changes are not only possible but easily accomplished. By repeatedly entering heightened states, they can learn what those states feel like, and learn to associate them with physical sensations (such as feelings of lightness or heaviness, tingling in the fingertips) or imagery (visions of deep blackness, or being filled with light). Having learned what those states feel like, and having gone through the transition between normal states and heightened states numerous times with the assistance of MT, they

can learn how to get into those states themselves, without the assistance of MT. They have learned to ride without the training wheels. At that point the lessons of state change can be applied in every aspect of one's life. By that time, the discovery has been made: state change is possible. State change can lead to behavior change. We are responsible for our behavior. If shit happens, it's because we make it happen. ▲●■

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Recent Studies in Sound and Light

by Julian Isaacs, Ph.D.

As *Megabrain Report* readers will be aware, light-and-sound devices (L/S) appear to be effective in promoting relaxation and stress reduction, and are also reportedly being used to facilitate a wide range of other functions including imagery production, intuition, creativity, accelerated learning, insomnia control, psychotherapy, hypnosis and the remediation of attention deficit disorder (ADD). While the effectiveness of S/L for relaxation appears reasonably well established, most of the other uses remain undocumented in terms of formal high quality research. This is one of the consequences of the newness of the technology and its marginal status within the academic community, leading to a lack of funding for investigation of S/L in university settings.

However, a number of pioneers are establishing some very interesting preliminary evidence for possible applications of S/L, and a brief review of some recent studies may be useful in communicating the wide scope of the growing applications of S/L. All but one of the studies reviewed here have to be considered as pilot studies because they suffer from major limitations which prevent the cautious researcher from feeling certain that the effects reported were unambiguously due to the L/S treatment. But my point here is not to harp upon the weaknesses of these investigations, but rather to suggest that they be used to help guide the design of more controlled and extensive future research.

AUTISM

The first two studies I shall review were conducted by Dr. Ruth Olmstead of San Diego. In her "Autism Study" she informally documents case studies of three autistic individuals, two children and a man. Autism is a little understood condition with early childhood onset where individuals appear to be out of contact with their environment, unable to integrate sensory inputs or to learn very effectively, do not relate to others, and are difficult to manage. The condition is also very resistant to treatment so that improvements of any sort are rare and therefore potentially significant. Dr. Olmstead used a DAVID 1 device and found marked improvements in all three cases she treated. Her first patient was a boy of 11, described as a low-functioning autistic with very poor communication skills who showed violent mood swings and frequent tantrums when she first encountered him (his father had to hold him down on the floor for 20 minutes during the first meeting!). After a total of 29 sessions of 35 minutes over a period of 8 months Dr. Olmstead reports that she "witnessed remarkable changes in his alertness level and in his ability to handle his environment without tantrums and aggressive behavior. . . he has not only demonstrated affectionate behavior with his father – previously not seen – but has also initiated personal contact with me, including hugs,

taking and holding my hand, and clearly showing pleasure in arriving for his sessions".

The second patient, a 28 year old man, had much better initial functioning but found it very difficult to communicate emotionally and lacked confidence in his ability to learn. After 21 sessions over a period of 10 months he became better able to integrate his internal states and halfway through treatment enrolled in a community college and "surprised himself" by his ability to keep up with the written text and by his ability to comprehend instructions.

The third patient, another boy, had been evaluated as borderline autistic. He had very poor speech articulation and vocabulary, frequent tantrums and abnormal eating and sleeping patterns. After 16 DAVID 1 sessions over a period of nine months he was much calmer and no longer hyperactive, exhibited greatly improved speech articulation and vocabulary and had normalised his sleeping patterns. These results are very promising and certainly deserve follow-up by other professionals treating autistic patients.

DYSLEXIA AND ATTENTION DEFICIT DISORDER

Dr. Olmstead's second paper, jointly authored with Aaron Kaufman D.O., "A Preliminary Report on a New Non-Drug Approach to the Treatment of Dyslexia and Attention Deficit Disorder" very briefly outlines her past year's work using the DAVID 1. She reports using the device for treatment of early Alzheimer's disease, migraine, Meniere's disease, depression, emotional disorders, cerebral palsy and whiplash injuries, with overall "moderate to complete improvement". However, most of the two page report deals with the use of L/S for correction of attention deficit disorder and dyslexia, with "essential cure of these disorders in virtually all cases treated" – a far-reaching claim! Dr Olmstead has now created a special ADD program for the DAVID Paradise, together with an explanatory booklet and tape of relaxing music.

Dr Olmstead's ADD program differs from the "classic" ADD L/S program developed by John Carter and Harold Russell, the original pioneers in the use of S/L for ADD. [For more information about Russell and Carter's use of S/L for treatment of ADD see "Brain Tech Breakthroughs in Treating Learning Disorders," MBR Vol. 1 #4 pp. 24-25.] Her program consists of a relaxation L/S program to be used in conjunction with a special relaxation tape having music on it, combined with binaural beats. There is also an instructional booklet packaged with the tape. By contrast, the ADD program available from Synetics Systems, in their Mastermind devices, is in the classic pattern pioneered by Russell and Carter, in

The use of L/S for correction of attention deficit disorder and dyslexia produced "essential cure of these disorders in virtually all cases treated."

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which half a minute of 10 Hz stimulation alternates with half a minute of 18 Hz stimulation for a total of 20 minutes. This latter is available through *Tools For Exploration*, although the user has to contact Russell and Carter's clinic for remote diagnosis, after which a release for the device is then generated.

STRESS REDUCTION

The next group of five reports originate from two clinical psychologists, Drs Juan Abascal and Laurel Brucato, using the Synchro-Energizer and the DAVID in Miami at the Miami-Dade Community College and at Mind/World (now Mindworks), a psychotherapy and stress reduction center in Miami. The research was performed between 1989 and 1991. The reported studies are of variable quality, although Drs Abascal and Brucato should be congratulated on some imaginative and trail-blazing work.

The treated group showed statistically significant reductions in heart rate.

In "*Mindworld Study #2*", done with co-experimenters Dominic Brucato, Sarah Cornell Abascal and Gerald Stephens, they document a pilot investigation of the use of S/L for stress reduction with 5 officers of the Metro-Dade Police Department. The treated group was given 10 L/S sessions of 35 minutes, together with two nutritional consultations, two consultations with a staff psychologist regarding goal setting and a massage. Prior to the start of the first session and after the end of the last session four physiological and two psychological measures were taken: heart rate, blood pressure, muscle tension (EMG), skin temperature, the State-Trait Anxiety Inventory and the Coping Resources Inventory. This battery of measures seems a good choice, although the addition of an EEG channel and skin electrical conductance measure would have made the relaxation measures more complete (and more work to administer!).

The treated group showed statistically significant reductions in heart rate compared to the 6 officers who served as controls. However, like some of their other reported studies, this study has some limitations. The most obvious problems are that first, the control group was composed of officers who originally were to participate in the study, had one session and then refused to participate further. The control group was therefore self-selected and this conceivably could have ensured that its members were less able to acknowledge and handle stress than the group which cooperated and became subjects. It is a definite no-no in experimental design to allow some non-random process to decide membership of the treatment and control groups, although one sympathises with the experimenters who were clearly very pressed for time and resources.

Second, the post-treatment measures were performed immediately after the treated group's last relaxation session, so that it is very likely that the lower heart rate measured then was due to the session just completed, rather than being a sign of a longer term increase in relaxation level, yet it is the latter hypothesis which presumably was tested (the closest the write-up gets to specifying a formal hypothesis is: "pilot studies are being conducted in industry to determine what benefits can accrue from the regular practice of relaxation with L/S").

Third, the post treatment measures on the control group were performed several months after they were performed for the treated group. In this kind of study it's essential that the measurements on the two groups be performed at the same time because other factors could have elevated the control group's stress levels in the intervening period. These features of the study should lead to caution in interpreting the reported results.

The next report by Drs Abascal and Brucato, "*Results of Study #3 - Effects of 10 Mindflights*" is a one page report of work in progress (the statistical analyses had not been performed when the report was written). Thirteen members of the Metro-Dade Police Department were given 10 L/S sessions and nutritional, counseling and massage sessions, similarly to study #2. No control group was utilised, so results have to be treated with caution since S/L probably has powerful placebo effects associated with it. The treated group showed a possibly significant reduction in heart rate (subject to the reservations expressed above about the measures being taken immediately after the last relaxation session) and a substantial increase in available coping resources as measured by the Coping Resources Inventory.

ANXIETY

In a single page abstract of Mindworld Study #4, "A Comparison of High Vs. Low Anxious Subjects in Response to Brainwave Synchronizer Assisted Relaxation Training", the authors report an unanalysed study in which the 41 college student subjects were split into three groups (low, medium and high anxious). The authors hypothesised that the high anxious group would show the greatest increase in relaxation levels, using the four measures of heart rate, blood pressure, state-trait anxiety (STAI) and Coping Resources. It was hypothesised that low anxious subjects might not show pronounced relaxation responses to the L/S treatment because they were already in relaxed states. Subjects were given 8 L/S sessions of 35 minutes. The results, although not statistically analysed at the time of the abstract's writing, were reported to favor the authors' hypothesis, with the self-report psychological measures (state-trait anxiety and Coping Resources measures)

showing larger effects than the physiological measures which were predicted to be non significant.

Only the L/S group showed a significant reduction of trait anxiety.

In their fourth and most fully written up study, "The Effects of Multiple Afferent Sensory Stimulation Enhanced Relaxation", Abscal and Brucato split their subject population of 33 Miami Dade Community College students into three groups, each of which performed six experimental sessions. One group received L/S treatment together with music (the "Mindflight" treatment), the first control group listened to the same music for the same length of time and the second control group rested quietly for the same length of time. Using this design enabled the component of relaxation due exclusively to the L/S treatment to be somewhat separated from that due to the music or to resting in a reclining position. However, the authors correctly point out that there could have been a placebo response favoring the L/S treatment because of its novelty and from subjects' expectation of relaxation from its use, since the L/S treatment was described as a "new and innovative technological breakthrough in relaxation" in the description of the study given to subjects as part of their orientation. The investigators did attempt to engender the same expectations in the two control groups, and apparently were successful in doing so, since all subjects thought that they were in the experimental treatment group, but the actual experience was surely very different for the group using L/S.

The results of the study appeared to favor the combined L/S and music ("Mindflight") treatment. The measures used were heart rate, blood pressure, state-trait anxiety and Coping Resources. The heart rate measure was significant only for the L/S group and showed a reduction between pre session 1 and post session 6, but similarly to the other studies reviewed, the authors made this measurement right after the last relaxation session, thus confounding the long term establishment of a lower heart rate with short term effects from the session just completed. The authors reported that the skin temperature measures were confounded by differences in ambient temperatures in the rooms used for running the subjects. The blood pressure measure was not significant but the L/S group showed the largest decline over time. This would be an important factor to investigate in further research, since Herbert Benson in his work on the Relaxation Response established that regular meditation could lower blood pressure.

Perhaps the most interesting results were those relating to the three psychological measures, state anxiety, trait anxiety and Coping Resources. Two groups showed significant reductions in state anxiety (anxiety experienced right at the time the questionnaire was administered), these being the L/S group and, surprisingly, the "just resting" group. As the

authors point out, it is very likely that subjects in experimental sessions would experience less state anxiety in successive sessions, as they became comfortable with the session protocol. However, only the L/S group showed a significant reduction of trait anxiety. Trait anxiety is supposed to measure the long term disposition of individuals to experience anxiety, and is generally fairly stable over relatively short periods of time, so this result might be indicative of some cumulative reduction of anxiety in the L/S group. Similarly, only the L/S group reported a significant increase in coping resources, which seems to suggest that at the least, the L/S group perceived themselves as being less stressed by events after the series of L/S sessions than before, a promising result.

In "The Therapeutic Uses of Light and Sound", the authors present a very interesting three page summary of their clinical findings regarding the use of L/S in psychotherapeutic applications. The summary is a preview of the series of reports which the authors intend to produce, detailing their clinical uses of S/L, which will eventually be compiled into a book. The authors have developed a stress-management "Core Program" which teaches relaxation training and "cognitive/behavioral interventions focusing on the development of internal locus of control and stress hardiness attitudes".

Brucato and Abascal believe that L/S provides the quickest and most effective technique for producing deep relaxation and is superior to traditional relaxation techniques like progressive relaxation or autogenic training because it provides a much more interesting and entertaining experience, reducing the likelihood of clients becoming bored and resistant. Because L/S is so effective in creating the relaxation response they recommend it for any counter-conditioning procedure where the client learns to remain relaxed in the presence of previously anxiety-inducing stimuli (as in Systematic Desensitization for phobias) and for application in treating anxiety based disorders such as phobias, insomnia, post-traumatic stress reactions, sexual dysfunctions, psychosomatic disorders, depression and pain. They also strongly recommend L/S for hypnosis where it helps to initiate and maintain trance as well as facilitating hypnotic age regression and imagery formation. They close their report by predicting that L/S will become a standard clinical tool by the mid 1990s.

The L/S group perceived themselves as being less stressed by events after the series of L/S sessions than before, a promising result.

CHRONIC PAIN

The last paper I shall review here, "The Use of Repetitive Audiovisual Entrainment in the Management of Chronic Pain" was authored by Frederick Boesma and

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RECENT STUDIES IN SOUND AND LIGHT *CONTINUED*

Constance Gagnon of the University of Alberta's Department of Educational Psychology. In their review of the chronic pain literature they remind the reader of the relationship between the psychological impact of chronic pain, methods of treatment and the perception of pain. Pain causes more suffering when the sufferer feels unequipped to deal with it - that the pain is out of their control. They also point out that treatment of chronic pain which is only medication centered may establish a vicious cycle of pain because the use of high levels of pain medication probably depresses the individual's natural production of endorphins, leading to a lowering of pain thresholds in the absence of medication.

Effective treatment of chronic pain requires that the responsibility for pain control be shared between the patient and the medical profession - leaving all control in the hands of the doctor exacerbates the learned helplessness and consequent depression which tends to be created by chronic intractable pain. The investigators then review some research demonstrating that trance, relaxation and imagery procedures can elevate endorphin levels. These considerations provided the rationale for their study which was based on the loaning of DAVID Paradise L/S units to three chronic pain patients for use at their discretion. In this way the authors hoped to provide both an effective means for sufferers to rapidly reduce their

The effect of L/S did not seem to diminish with time, but seemed to improve in effectiveness with use, as the patients learned to relax.

pain by relaxation in the short term, and in the longer term to change their perceived control over the pain, providing weapons for fighting pain which the sufferers could use at their own discretion, reducing their helplessness, anxiety and depression and restoring some sense of control over the pain.

The study followed three male chronic pain patients over periods of 9 to 17 months. Progress during treatment was monitored on three sets of variables: (i) the DAVID (helpfulness and use); (ii) Stress (amount of physical pain, medication usage, suicide ideation, anxiety/stress); and (iii) quality-of-life (coping ability, hopefulness, self esteem, family stability, rest/sleep). The participants were asked to rate these variables subjectively on a ten-point scale with 10 being the maximum and zero the minimum value. At each weekly visit to the pain clinic they were asked to report the magnitude of each factor and monthly scores were computed for each variable and plotted to reveal the effect of L/S treatment. Interestingly, the authors report that DAVID L/S treatment using blue filters "was more conducive to entrainment than red filters which tended to exacerbate pain and cause side effects such as headaches". The three patients were instructed to use their DAVID at least twice per day. For the first few sessions Ericksonian dual induction

relaxation tapes were used (similar to the HPP or Changeworks tapes). At the outset of the study all three individuals experienced much pain and stress caused by the disabling and psychological effects of their pain, to the point that two of them were seriously contemplating suicide.

Although the data collected shows complex patterns, since pain is determined by many factors, including the patients' tendencies towards re-injuring themselves or performing activities until they became intolerably painful, the overall assessment of the usefulness of L/S given by all the men was very positive. The effect of L/S did not seem to diminish with time, but seemed to improve in effectiveness with use, as the patients learned to relax. The men's use of medication diminished and they learned to tailor the application of L/S to their own specific needs. Consistent usage of L/S seemed to be associated with lower pain levels, easier sleep and improved handling of stress. Long term usage seemed to reduce and then abolish the incidence of thoughts of suicide. The patients also reported that learning how to use L/S has given them greater control over their lives.

In conclusion, the results of the studies reviewed are very encouraging. However, it gives pause for thought to appreciate that these studies were not supported by any external funding and that consequently they had to be conducted in a less exacting fashion than would have been possible if adequate funding had been available. In addition, the studies have not been published and there seems to be no professional journal available which unites all of the varieties of psychotechnology and provides a medium of communication for this field. What is needed is an adequate forum for the publication of professional research into the applications of psychotechnology and much more funding for the exploration of what is surely a rich field for investigation. Sooner or later a professional association and publication will be founded and at that point the field will start to consolidate. Until that time, it is to be hoped that interested professionals will continue to communicate their researches to Megabrain Report, which at present offers the only readily available outlet for news of psychotechnological research.▲●■

Consistent usage of L/S seemed to be associated with lower pain levels, easier sleep and improved handling of stress.

New Sound & Light Machines

by Terry Patten

These last-minute reviews are intended to be helpful, accurate, and occasionally brutally honest, but they're purely the opinion of one person. These reviews are essentially positive because I have reviewed three new machines that I think are "news" in that they offer features or value that make them significant. Also: I take the liberty of referring to "my" experiences but also to "our" experiences when I'm passing along observations from others at Tools For Exploration or elsewhere.

THE PHOTOSONIX NOVA

The Nova, at \$350, offers a wide array of flexible features: 4 LEDs per eye, 50 internal programs, flexible programmability (and editing - a new feature) plus many subtle refinements. Several L/S machines (the Mind Gear PR-2 & PR-2X, and the Photosonix Galaxy & Nova) appear almost identical outwardly, and differ primarily in electronic functions; of these, the Nova has the largest array of functions.

Of its many and complex feature, one stands out for me. Frankly, I think it may be the best S/L machine innovation in years. The manufacturer calls it "fill-in-the-blanks" programming: you specify four parameters: program "shape", a level of "changeability", top frequency and bottom frequency, and it gives you a program based on those "specs" - which you can store to memory and modify, using the edit feature.

It may be the best S/L machine innovation in years. The manufacturer calls it "fill-in-the-blanks" programming...

Why am I so excited? Convenience when you want to be in control and "design" a L/S experience. Hitherto, you've had to put in a half-hour or more doing the laborious work of entering every change in a program. Here, you can design a program according to your own criteria, not having to use an off-the-shelf program designed by somebody else, without putting a lot of time into it. If it's not quite right, you can use the edit function to make corrections in just a few minutes. This is perfect for therapists or other professional practitioners who want to conveniently "prescribe" a certain type of program (even progressively modifying it over a series of sessions) or for meditators or other consciousness explorers who want to do the same thing for themselves.

The Nova boasts another heavy-duty function: it can author and read Polysync™ signals on cassette. The new Synetic Systems machine, The MindLab DLS (for Down Load System) can be plugged by patch cord into a cassette player, from which it can read up to 5 programs (in the form of fax-like tones recorded on the tape) and store them to memory. These programs can be used for a period of time, then replaced with 5 different programs, giving the MindLab DLS access to a theoretically infinite supply of different programs. The Nova shares this capa-

bility (although it simplifies audio crossfades by rendering them as simple fade-out, fade-in transitions). But, perhaps more importantly, it can be used (by professional practitioners or audiotape developers or hackers) to create or author those audiotapes — another rather remarkable capability for a \$350 machine!

Since the other Nova functions are very similar to the excellent Galaxy & PR-2, & PR-2X, which are among the best-loved of light & sound machines, the Nova is a tremendous value, worth considering by anyone looking for a first-rate L/S machine!

THE MIND GEAR SLX

This machine caught my attention immediately: A brand-new \$150 machine with 16 programs, each program playable at 4 different time settings, and with optional blend (most liberally interpreted, that implies 128 "different" programs) plus optional manual operation and digital display, including frequency display, with pulsed sound or binaural beats synchronized with the lights.

It is the first machine under \$200 to combine these features. I think manual operation is the biggest single factor, because it's essential to anyone who wants to explore the subjective effects of different frequencies.

Some of the new programs are borrowed from Mind Gear's PR-2, but others are unique, and really quite good.

Limitations? Only 2 LEDs per eye, but quite bright. The frequency settings jump by full integers from 1 to 20 Hz, and then 2 Hz at a time to 40, except for 7.8 and .5 Hz settings, so it doesn't ramp smoothly. Also, the sound isn't all that pure and pretty.

But the bottom-line is very positive. For \$150, it's a heck of a machine - really a whole new standard in entry-level L/S. It's probably the first time an inexpensive machine really "delivered the goods" with a flexible range of L/S features and functions.

Manual operation is the biggest single factor, because it's essential to anyone who wants to explore the subjective effects of different frequencies.

THE META-4

A new idea? Definitely! Strictly speaking, the Meta-4 is not rightly regarded as a sound & light machine, but a "Light & Sound Player (LSP)". The manufacturer points out that conventional L/S machines are like computers, while a L/S player can be compared to a VCR. And with a similar advantage; for the money, this approach delivers a much more complicated, richly-textured audio experience, fully synchronized with the flashes of the lights — one program per tape.

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WORKING OUT IN THE MIND GYM:

The Brain Tech Athlete

by Michael Hutchison

For the past century high-performance sport has been a vast, loosely coordinated experiment upon the human organism. The first unstated aim of this great project has been to investigate how the human mind and body react to stress. Its second aim has been to adapt the athlete's mind and body to greater and greater degrees of stress. Athletic training, after all, is the pursuit of stress in order to prepare the athlete for the even greater ordeals of competition.

John Hoberman
Mortal Engines: The Science of Performance and the Dehumanization of Sport

In one of my Megabrain workshops a middle-aged M.D. had a session on a motion system that slowly tilted his body in all directions. "I feel really limber and energized," he told me when he got off, moving his body with a palpable sense of pleasure. Suddenly he crouched and then leaped up and did a back flip. He gasped with delight and said, "Wow! That's the first time I've been able to do that since college!"

Legendary bodybuilder Frank Zane, three-time Mr. Olympia – the most prestigious bodybuilding title – intersperses his daily iron pumping sessions with sessions on CES, LS and binaural beats machines. "I just turned 50," he told me recently, "and yet I'm in the best shape of my life. Mind machines help me work out more effectively, recover more quickly and rest more deeply. I also believe they stimulate growth hormone."

I first stumbled upon the powerful effect brain technology can have on athletic performance when, one day after a long mind tech session, my euphoric meanderings through Greenwich Village led me to the old playground, where Angelo, local handball legend, was cleaning house. I hadn't come close to beating Angelo for ten years, but I felt energetic and strangely loose, and challenged him. From the first serve it was like some other force was moving my body. I didn't hit the ball so much as simply alter its direction, and I watched my perfect shots with as much astonishment as Angelo. I was relaxed even in the midst of the fastest flurry of shots, and as I put away the final kill the voice in my head said, Son, that's about as close to perfection as you'll ever get.

In sports, it's clear when you're performing at your peak. You're out there, in the zone, grooved, magic, flowing, moving effortlessly through a slow-motion world. Most of us would like to be there all the time, but for most of us it's rare and memorable. That's why athletes are always experimenting with new tools or techniques. Like scouts far in advance of the rest of society, they're on the lookout for new approaches that will give them an edge; help them jump higher,

run faster, lift more; help them get into those peak performance realms more frequently, more reliably.

Athletes were among the first scouting out practical uses of self-hypnosis, autogenic training, visualization, progressive relaxation, positive suggestion. Long before the technologies were accepted by the medical establishment athletes were using whirlpool baths, electrostimulation, ultrasound, soft lasers, infrared, biofeedback, computerized training devices, videotape analysis and much more. Now, increasing numbers of athletes are using mind technology to help them reach and maintain peak fitness, to help them master the "inner game," and to boost them into peak performance states, and to help trigger the release of the essential peak strength and fitness biochemical, growth hormone.

SPORTS AND STRESS

As sports psychologist John Hoberman asserts above, sports training in recent years has become increasingly not so much an escape from stress as a confrontation with stress. So it's important to remember that brain tools are most widely known, and have their greatest clinical use, as "stress reduction devices." Increasing numbers of athletes are finding that by producing unmatched states of deep relaxation, mind technology can help them overcome the stress of training, thrive under the stress of competition, and learn to operate at peak performance levels under greater and greater degrees of stress.

Many athletes I've spoken with have noticed dramatic improvements in their fitness and performance as a result of their use of mind technology. As the anecdotes above suggest, the improvements take place on a number of levels. I'll briefly describe a few of the areas where the use of mind technology has produced striking and in many cases unprecedented benefits. For the most part I'll deal only with areas in which mind tech is producing pronounced physiological effects, and leave for another time an in-depth exploration of the effects of mind tech on that other peak performance realm of the "inner game." For now, muscle, bone, lactic acid, growth hormone.

MUSCULAR RELAXATION

Peak athletic performance flows from relaxation; our descriptions of peak play emphasize looseness, fluidity, effortlessness, maintaining cool. By comparison, the athlete who's making errors is a study in muscular tension – jerky and struggling, making the simplest plays look difficult. A growing body of research using electromyographs (EMG), which measure muscular tension, has proven that brain tools can produce physical relaxation far deeper than levels produced by traditional relaxation techniques.

Peak athletic performance flows from relaxation; our descriptions of peak play emphasize looseness, fluidity, effortlessness.

Loose muscles lead to improved performance, greater stamina, speed, strength, coordination. According to bodybuilder Frank Zane, his mind machines provide him with “The deepest form of relaxation that I’ve experienced.” What’s most important, he says, is that “It’s there when I need it. Sometimes after a high intensity workout I wake up in the middle of the night. I just put on my light-sound machine, and it eases me right back to sleep. And it feels like the sleep I get with the mind machines is more restful somehow than ordinary sleep. Somehow, the machine helps counteract the physical stresses of the high-intensity workout.”

DECREASE IN INJURIES

More relaxed muscles means not only better play and training, but safer play and training. According to sports doctors, most sports injuries are not contact injuries, but are the result of “inappropriate muscular tension,” and could have been prevented by proper relaxation. The best defense against injury is looseness. Many athletes start their workouts with stretching, but the relaxation stretching provides is only relative. Many runners, for example, often stretch conscientiously, yet they still have piano-wire-tight hamstrings, calves and lower backs. In fact, many authorities believe that most people have never experienced complete relaxation, so they have no conception of what it feels like, and no idea of how to make their bodies reach

According to sports doctors, most sports injuries are not contact injuries, but are the result of “inappropriate muscular tension.”

that state. Brain tech can ease users into states of relaxation so profound that they last for days.

MIND-BODY RELAXATION

Muscular tension is just one component of the mind-body reaction called the fight-or-flight response. Triggered by stress, pressure, or emotions generated in the heat of competition, this whole-system response cranks up blood pressure, heart rate, oxygen consumption, and levels of such stress biochemicals as adrenaline and cortisol. It also disrupts normal brain activity, scrambling brainwaves into bursts of random static. This automatic response is great for running like hell from sabretoothed tigers or tearing out someone’s liver in a mindless frenzy, but it’s not great for the kind of mental clarity and fluid mind-body coordination required in most sports. But when the Relaxation Response is triggered, it quickly counters the deleterious effects of stress. The

most effective tools for helping trigger a powerful relaxation response are the mind tools. Scientific studies, and an enormous and growing amount of anecdotal reports indicate that a mind tech session, by triggering a strong relaxation response, can lower heart and pulse rate and blood pressure, decrease muscle tension, decrease oxygen consumption, increase visual acuity and manual dexterity, decrease levels of lactic acid in the blood and muscles, decrease levels of the stress hormone cortisol, and increase intellectual functions such as learning and problem solving, among other effects.

There is also evidence in the form of blood tests and tests of cerebral-spinal fluid that some brain tools (most notably the float tank, CES and light-sound devices) can sharply decrease levels of stress neurochemicals like cortisol and produce elevated or enhanced levels of various neurochemicals, including serotonin and beta endorphin, that are experienced as both physically relaxing and mentally calming. These effects are cumulative and can last long after your session.

FASTER REACTIONS

Along with deep relaxation, mind technology can also dramatically speed up reaction time for athletes. This mat at first seem paradoxical – how can your reactions be faster when you’re more relaxed? The paradox disappears when we note that reaction speed is a function of neural efficiency, and that mind tools, even as they increase relaxation, can increase neural efficiency.

Consider the story of the book editor/tennis fanatic. He was also a long-term meditator – he’d meditated daily for over 20 years. He had begun using a light and sound machine to help him to get into a deep meditative state when he felt too tense to meditate easily. But the LS stimulation produced an unexpected side effect – his tennis game blossomed. “Suddenly,” he told me, “I was playing so much better that I had to jump up a level in my tennis league. My friends accused me of taking secret lessons! After using the machine I was so relaxed and alert, my reactions so fast, I almost felt like I was watching myself play.”

How can mind machines enhance neural efficiency? Brain researcher and clinician Dr. Lester Fehmi of the Princeton Biofeedback Research Clinic has had extensive use of brain technology with tennis and other racquet sport players. He has focused on using brain tech to increase whole-brain-wave synchrony. Whole-brain-wave synchrony is a very specific state. It does not mean simply that the whole brain produces dominant waves of the same frequency. If you visualize brain waves as a series of peaks and valleys, then synchrony occurs at the same time, or “in phase”. When neurons throughout the

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brain are “in-synch”, their power increases. In addition, when in-synch, they seem to communicate with each other more efficiently – like a whole network of tiny light bulbs flickering on and off at the same time. When in-synch, the neural network becomes more coherent.

What are the effects of synchrony? Fehmi believes that “synchrony represents the maximum efficiency of information transport through the whole brain.”

Using his Brainwave Biofeedback Synchronizer, Fehmi teaches athletes (among others) to learn to synchronize their brainwaves at various frequencies, by speeding up information transport to the “maximum efficiency” as they speed up their reaction time.

Fehmi’s device is a specialized EEG. However, there is strong evidence that other types of brain tech, ranging from float tanks to ganzfelds to motion systems to light-sound devices also produce noticeable increases in brainwave synchrony. For anyone engaged in a sport where reaction speed is important, from martial arts to racquet sports, mind tech sessions could make the crucial difference between a hit or a miss.

RECOVERY

High intensity training and peak output in competition pushes the body to its limits. Muscle tissue is ripped and torn, and filled with lactic acid, which causes fatigue and pain. The system is flooded with fight-or-flight biochemicals such as ACTH, cortisol, and adrenaline, which can cause irritability, depression and anxiety. After a hard workout or competition these substances must be cleared away and damaged muscle tissues rebuilt, a process that can take days or even weeks.

Intense workouts demand intense rest. Maximum efforts require maximum rest. Mind tools, by providing uniquely deep, total rest and relaxation, are the perfect technological answer to the increased physical demands of high-intensity training created by high-tech training devices. These high-tech mind tools speed up the recovery and rebuilding process enormously.

Intense workouts demand intense rest. Maximum efforts require maximum rest.

The deep whole-body relaxation they produce causes blood vessels to relax and dilate, which speeds up the flow of healing, tissue-building nutrients to all cells as well as the clearing away of lactic acid and other wastes. Some marathon runners, for example, have found that a single brain machine session can speed up their post-race recovery by several days. Body builders and other athletes engaged in high-intensity training intersperse hard-workout days with mind machine sessions, to allow for quicker recovery, more efficient protein synthesis, and therefore more rapid muscle growth.

OVERTRAINING, OR: THE CORTISOL-TESTOSTERONE CONNECTION

Peak effort is stressful. Too much stress and not enough rest leads to a condition of chronic tiredness, irritability, and depressed immune functioning known as overtraining, in which muscle growth stops and muscles actually begin to weaken.

In the past, overtraining was rare. Compared to the workouts of today’s Danskin-clad Yuppies in their step-aerobics classes, the training regimens of even top athletes of 100, 50, or 20 years ago seem absurdly modest. In every health club you can see fierce seekers of instant muscle growth pump iron with a balls-to-the-wall, full-tilt, over-the-edge, no-pain-no-gain intensity that is scary even to look at. The result is an epidemic of overtraining.

A key indicator of overtraining is the stress hormone cortisol. When you are overtraining, your levels of cortisol rise and remain elevated. The symptoms of elevated cortisol levels are identical to those of overtraining: depressed immune function, diminished sex drive, moodiness, chronic tiredness. Scientists have also found that elevated levels of cortisol accelerate the process of protein breakdown: that is, instead of building muscles, cortisol actually tears them down. That’s why athletes who are overtraining find it hard to improve their strength or performance.

One key effect of cortisol is that it inhibits testosterone production. Testosterone is absolutely essential to athletic training and performance, since it promotes muscle, bone and blood-cell growth. Optimal levels of testosterone are also associated with feelings of well-being and confidence – important for peak athletic performance. Exercise increases testosterone, and thus helps increase physical strength and fitness. Overtraining, on the other hand, increases cortisol levels, and thus suppresses testosterone.

So it’s crucially important to know that mind machines can both directly and indirectly reduce cortisol and increase testosterone levels. Studies of CES devices, for example, have shown that after only a few minutes of use, cortisol levels decline substantially. Users of flotation tanks show dramatic drops in cortisol levels. LS produces rapid drops in cortisol. One recent study of photic stimulation (using the Lumatron) has shown rapid increases in a variety of neurochemicals and hormones, including luteinizing hormone (LH). Significantly, LH stimulates the release of testosterone.

Mind machines can both directly and indirectly reduce cortisol and increase testosterone levels.

Thus, by decreasing cortisol and increasing testosterone, mind technology can help increase your ability to exercise at your peak without overtraining.

INCREASE TOLERANCE FOR STRESS

All well and good, you say, it's nice to be able to use my mind-technology when I get a chance to relax, but how can I take a find a quiet spot, take a passive attitude, and divert my attention from externally oriented thoughts when I'm in the heat of competition or training?

Fortunately, the beneficial effects of the relaxation response are cumulative – that is, as you use mind tech regularly, day by day, you will not only become more relaxed more quickly, but will tend to stay at that more relaxed level throughout your daily activities. Not only are the effects cumulative, they can be extremely long-lasting – in some tests certain salutary effects of mind machine-induced deep relaxation lingered for weeks.

What this means for athletes is that you will not only be relaxed – which means looser muscles and less tension-related injuries – but that you will carry this deeper state of day-to-day relaxation into training and competition with you. In other words, brain technology not only keeps you relaxed, it actually increases your tolerance for stress, or makes you more resistant to the effects of stress, by readjusting the level at which the body begins to pour out fight-or-flight biochemicals. According to researchers Thomas Fine and John Turner of the Medical College of Ohio, a deeply relaxing session “could alter the set points in the endocrine homeostatic mechanism so that the individual would be experiencing a lower adrenal activation rate.”

So a pressure situation that might ordinarily have put your choke meter up to level ten may, after a mind machine session, only be perceived as a mildly arousing level three or four. For athletes, this means competitive pressure that might once have caused choking will be easier to tolerate.

THE RELAXATION ANCHOR

Also, increasing numbers of athletes have found that by using mind tools to get into deep relaxation states, they can learn to quickly and reliably re-experience that deep relaxation even in high-pressure situations. They do this by first practicing using their mind tools to get into deep relaxation states, and then making use of some of the self-suggestion and self-programming techniques discussed in “Beyond Entertainment: How to Use Mind Machines for Peak Performance and Self-Transformation,” in MBR Vol. I #4 (such as “anchoring” the deep relaxation state with a verbal or finger signal). They then can reactivate that sense of relaxation and confidence by triggering their anchor in the game or training situation. At that instant, they feel their bodies releasing tension, letting go, becoming loose, limber, supple, ready to function at peak capacity.

Brain technology not only keeps you relaxed, it actually increases your tolerance for stress.

PAIN REDUCTION

Bob Said is a race driver – a Grand Prix champion in the 50s, he set a speed record at Daytona Beach. For over 20 years he focused on driving a four-man bobsled down an icy course, and has been on two Olympic teams and captained five U.S. World Cup Teams. In 1984, at the age of 50, he was still driving hard, preparing his team, his sled and himself for the Olympic trials. Each morning he would rise before dawn and climb into his flotation tank. He originally began using it to help his visualization. But he soon found it was an extraordinary tools for pain reduction. He told me that each rattling bobsled run was like “falling down a long flight of stairs,” and the stress of five or six practice runs a day “the equivalent of running a marathon.” Even so, at 50 years old, he told me, “I come jumping out of that tank at 7:30 every morning feeling just great. I mean loose and ready for it!” Even a severe injury in a sled crash didn't stop his training. “Floating just blotted out a lot of aches and pains,” he said.

Mind tools have been proven to eliminate or significantly decrease pain (for one recent study see “Recent Studies in Sound and Light” by Dr. Julian Isaacs, elsewhere in this issue). One reason for this is the stress reduction provided by the mind tools – when you're relaxed, pain is not only actually reduced, but also seems less painful and stressful.

A variety of studies have also proven that brain tools sharply increase the levels of the body's own opiates, the endorphins. One recent study of CES, for example, documented a 90% increase in beta-endorphins within minutes of beginning use. Other studies of both flotation tanks and LS devices have found significant increases in endorphins. These natural pain-killers, thought to be the cause of the “runner's high,” also create pleasure, and could explain some of the euphoria frequently noted by mind tool users.

Some sports, such as running and swimming, require competitors to tolerate and move through increasing levels of pain. A brain tech session before competition in such sports could enable us to go farther before experiencing pain and increase our capacity for bearing pain when it does come. A session following a high intensity performance can help eliminate or reduce any aches and pains, while boosting the body's natural recovery and repair systems.

BODY AWARENESS

Most mind tool users find that during a session their attention turns away from external events and stimuli. As attention turns inward, it first tends to focus on the physical body. Many athletes who use these tools have found that they improve their fitness and performance by sharpening their sensitivity to their own body. My

Brain tools sharply increase the levels of the body's own opiates, the endorphins.

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friend Herbie, a marathon runner, explained to me how his use of a float tank helped him avoid injuries by making him aware of points of stress or imbalance before they became actual injuries. “While I was floating,” he said, “there might be a feeling of heat or tightness in the back of my leg, and I’d know my hamstring was getting ready to act up again, so I’d be extra careful to keep it super loose.”

This predictive-preventive effect has been frequently noted by brain-tech-trained athletes, who spend a part of most sessions simply paying attention to their bodies, becoming aware of tension, rigidity, misalignments, and points of weakness or imbalance. They can then work to heal, correct or avoid any problems by using visualizations and suggestions.

A key to the increase in body sensitivity experienced by mind technology users was explained by body therapist Moshe Feldenkrais, who observed that

All sensations in which muscular activity is involved are largely dependent on the smallest amount of tonus persistent in the musculature. When the tonus is the smallest possible, you sense the finest increase in effort. Easy and smooth action is obtained when the aim is achieved by the smallest amount of exertion, which, in turn, is obtained with the minimum tonus present. . . People with a fine kinaesthetic sense tend to a low tonic contraction, and are not satisfied until they find the way of doing which involves the smallest amount of exertion. . .

What this means is that tight muscles don’t feel, or at least don’t feel as well as loose muscles. It also explains why what Feldenkrais calls “easy and smooth action” is produced by loose and not tight muscles.

THE CURARE EFFECT

It also provides insight into how the deep relaxation provided by mind tools can increase our control over the autonomic nervous system, including our body’s self-healing mechanisms: our sensitivity to and awareness of the body’s subtle processes is enhanced when extraneous muscle tension, “background muscle noise,” has been turned down low. This is, in essence, “the curare effect” discovered in biofeedback experiments which showed that rats whose muscles had been totally relaxed to the point of immobility with the drug curare leaned control of autonomic functions far faster and better than did nonrelaxed rats.

If we could restore our body’s ability to secrete growth hormone, we could reverse many if not most of the effects of aging.

Researcher Leo DiCara pointed out that the curare effect works because the drug “helps to eliminate variability in the stimulus and to shift the animal’s attention from distracting skeletal

activity to the relevant visceral activity. It may be possible to facilitate visceral learning in humans by training people . . . to breath regularly, to relax, and to concentrate in an attempt to mimic the conditions produced by curarization.” To a greater or lesser degree, from float tanks to binaural beats tapes, mind tools clearly “facilitate visceral learning” by means of the curare effect.

INCREASED MUSCLE GROWTH AND GROWTH HORMONE RELEASE

The key to muscle growth is growth hormone. In response to high intensity or peak effort exercise, the pituitary gland releases GH. The body rushes blood to the muscle tissue that has been stressed, flooding it with GH and nutrients. Thus, in the period that follows high-intensity exercise, the body rebuilds the overworked muscle tissue, so that the new muscle tissue is larger and stronger than before.

As teenagers, we produce large quantities of GH – virtually any kind of exercise or physical activity, in addition to deep sleep, will cause our brain to release a pulse of GH. Which explains not only our ability to grow and put on lots of muscle fast, but also our capacity to eat unlimited quantities of burgers and chocolate shakes and never gain an ounce of fat.

Exercise induced GH release continues into our twenties. Once we’re past thirty, however, most of us can no longer trigger any significant GH release with exercise. That’s why it’s so hard to put on lean body mass (i.e. muscle tissue) after we’re out of our twenties. Most adult GH release takes place in a brief spurt when we’re in deep sleep. Apparently, either the profound relaxation or the slow delta brainwaves of sleep send a signal to the pituitary to release a pulse of GH.

As GH flows through our body, it performs a number of valuable functions: it builds and repairs muscles, burns away fat, and stimulates the immune system. GH is so essential to the body’s powers of growth, repair and regeneration, that it is no exaggeration to call it our natural rejuvenation biochemical. Sadly, like youthful vitality, our levels of GH naturally decline with age.

The researchers astonishing finding: “The effects of six months of human growth hormone ... were equivalent in magnitude to the changes incurred during 10 to 20 years of aging.”

Many people are so eager to increase their levels of GH that they will stimulate it artificially by taking dangerous (and illegal) steroids. And no wonder: it seems to be the key to the fountain of youth. One recent sensational study has suggested that if we could

restore our body's ability to secrete GH, we could reverse many if not most of the effects of aging.

RESTORING THE FOUNTAIN OF YOUTH

The sensational study linking GH to rejuvenation got splashed all over front pages when it was published in the New England Journal of Medicine. No wonder—it had all the elements of a science fiction saga. The researchers selected elderly frail men between 61 and 81 years of age, and gave them GH injections to bring their GH levels up to those of healthy young adults, where they stayed for six months. The old men rapidly put on muscles and increased their lean body mass by 8.8%, decreased

New evidence has emerged that at least some types of mind technology produce rapid and significant increases in growth hormone levels.

their adipose (fat) tissue mass by 14.4%, increased skin thickness by 7.1% and actually increased the average density of their lumbar vertebrae. Each of these four measures indicate clear reverses in the normal aging process.

The study concluded that, "Diminished secretion of growth hormone is responsible in part for the decrease of lean body mass, the expansion of adipose-tissue mass, and the thinning of the skin that occur in old age." In their breathtaking conclusion, the researchers asserted that "The effects of six months of human growth hormone on lean body mass and adipose-tissue mass were equivalent in magnitude to the changes incurred during 10 to 20 years of aging."

The before and after photos were astonishing—men who were sickly, stooped and fragile before now stood erect, filled with vigor, skin taut, faces glowing. It was as if they had grown 20 years younger overnight. Then, after the study was completed, and the GH injections stopped, the men's GH levels plummeted again. Inexorably they lost their briefly regained youth and re-aged by 20 years, returning to their former frail state, saddened and a bit confused by the experience.

The story is poignant and thought-provoking, and illustrates the crucial importance of GH—not just to athletic fitness and training, but to health and longevity. As I mentioned, people now go to great lengths to stimulate GH release. Black market GH is now being sold to wealthy buyers who are willing to pay \$25,000 to \$50,000 a year for a steady supply.

MIND TECH AND GH RELEASE

Intriguingly, recent evidence has emerged that at least some types of mind technology produce rapid and significant increases in GH levels. In a recent study, C.

Norman Shealy, M.D., Ph.D., measured the levels of a variety of neurochemicals and hormones before and ten minutes after subjects were exposed for 20 minutes to a mind machine that flickered violet, green, or red lights in their eyes at a rate of 7.8 flashes per second, and in one case 31.2 flashes per second (4 times 7.8) of red. Among the results he noted: "significant increases of more than 25%" in growth hormone in response to the 7.8 Hz flickers of each color. He also noted that the changes were "significantly more substantial" in response to the 31.2 Hz flickers of red.

One of the more mind-boggling aspects of these findings is that the sharp increases in GH levels took place virtually immediately, and in response to a short 20 minute session.

Shealy also noted significant increases of more than 25% in levels of luteinizing hormone (LH). LH stimulates the secretion of testosterone, which promotes muscle growth, as well as increases sexual drive.

The study is intriguing, because it raises several questions. First, each color—violet, green, red—triggered GH in certain individuals. Does that mean that any colors would trigger GH? GH was triggered at 7.8 Hz. 7.8 Hz of course is the Schumann Frequency, the resonant frequency of the earth ionosphere cavity. As I wrote in Megabrain, "This has been found to be one of those 'window' frequencies that appear to have a wide range of beneficial effects on human beings, ranging from reports of enhanced healing to accelerated learning. When a biological system vibrates at this frequency, it can be said to be in a state of resonance or entunement with the planet's own magnetic frequency... the 'natural' electromagnetic matrix for all life on this planet, the frequency in which all life formsevolved, and, until recent decades, the dominant electromagnetic frequency in which all life took place."

Do Shealy's findings mean that 7.8 Hz is in some way a "window" frequency for GH release? Does that mean that any LS device that is set to 7.8 Hz will also trigger GH?

One individual Shealy tested received red lights on different occasions at both 7.8 and 31.2 Hz, and secreted greater amounts of GH in response to the higher frequency. Does that mean that the higher, and probably more arousing frequency, would trigger GH in other individuals? It's interesting to note that GH release is triggered in adults by a number of occurrences that are highly stressful and/or arousing, including trauma, the extreme heat of a sauna, hypoglycemia (low blood sugar), fasting, and certain dopamine-stimulating drugs. Do Shealy's findings suggest that the colors, or the flickers, or the specific

Do Shealy's findings mean that 7.8 Hz is in some way a "window" frequency for GH release?

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frequencies trigger GH through similar sort of arousal mechanisms? These and other questions must remain unanswered for the time being. What is clear, however, is that at least certain types of mind tools can directly and quickly increase GH levels. This in itself is electrifying news. It is news of great importance to all users or potential users of mind tech, not just athletes.

THE GH DELTA WAVE NEXUS

For most adults, our greatest GH release takes place in deep sleep. For most adults, this GH pulse happens about an hour and half after we first fall asleep, when our dominant brainwave frequency is very slow, regular delta. Intriguingly, there is evidence that mind tools (ranging from biofeedback EEGs to LS systems to floating to binaural beats to certain CES devices) can induce this delta sleep state, and trigger GH release.

The first suggestion that it might be possible to induce GH release with MT came from an evocatively-named aerospace engineer, Michael Hercules, who had designed a variable frequency CES device he called Pulstar. In 1987 and 1988 he and I had frequent discussions concerning an informal study he was conducting with a group of individuals who were suffering from a variety of chronic illnesses, ranging from AIDS to MS to Chronic Fatigue Immune Deficiency Syndrome (then known as “Epstein Barr virus”). All subjects used the CES device and spent at least an hour each day stimulating their brains at a delta frequency of about 1 Hz.

The subjects noted that this delta stimulus made them extremely drowsy. But they also noted some interesting side effects. According to Hercules, one man with male pattern baldness not only found his hair growing back, the new hair was the same color of red his hair had been when he was young! Others also reported increased growth of hair, nails, improved complexions, and rapid healing of wounds. Some noted increased immune system strength, such as increased T cells. Some recovered completely from their ailments. Could it be, Hercules asked me in a series of breathless late night phone calls, that by entraining brainwaves at this slow delta frequency, and bathing the brain with an electrical current pulsed at the same frequency, the CES device was hitting a “window” frequency that tripped the pituitary’s growth hormone switch, stimulating the immune system and helping the body to repair itself? Michael was preparing to conduct a more rigorous study into possible links between EEGs, electrical stimulation and GH release when he died unexpectedly of a longstanding heart ailment.

However, there is clear evidence that a variety of brain tools – including LS, float tanks, acoustic field systems, pulsed electromagnetic field devices and

others – can also alter brainwave activity into the delta range, and help thrust users into profoundly relaxed hypometabolic states. And there are suggestions that these deep delta states seem to produce effects very much like you might expect GH to produce, including extraordinary healing, boosted immune function (such as increases in immunoglobulin A, or IgA, reported by float tank researchers), and – most relevant to those interested in fitness and sports training – increased strength and muscle growth.

BRAIN TECH TRAINING TIPS

What follows are some ways you might incorporate brain tools into your training or fitness program. I have placed them in a roughly step by step progression that leads from initial simple relaxation, to techniques that require more and more sophisticated mental involvement, such as visualization, self-hypnosis and anchoring. The steps mirror the downward and inward arc of a single advanced mind tech session. You will find it equally rewarding to focus on a single one of these areas in each session.

RELAX

The harder you exercise, the more you need to relax. If you work out frequently, use brain tools every day for at least a 20 minute relaxation session, getting yourself down into deep alpha, theta, or even delta, so that your whole body has a chance to let go, release tension, and reach a state of total rest. Remember, if you use brain tech actively – for purposes such as rescripting, visualization, self-suggestion – you should also give yourself a session in which you simply let go, do nothing, and let your body rest and recover. For a variety of mind tech deep relaxation techniques, see “Beyond Entertainment: How to Use Mind Machines for Peak Performance and Self-Transformation,” in MBR Vol. I #4

RELEASE

Become aware of your emotions, particularly any emotions that might affect your training or competition. Are you anxious about the upcoming game? Do you have fears about your own abilities? Are you letting your anger at someone or something carry over into your training, and disrupt your concentration? What are your wants? Do you want to excel so much that you’re pushing yourself into overtraining? Is wanting someone’s approval causing you to behave unwisely? Once you feel your emotions and your wants, release them. Simply let them go. But remember, you must really feel and experience these emotions first before you can release them – they

must become real and clear to you before you can let them go.

MINDFULNESS BODY SCAN

One of the most valuable ways you can use brain tech in training is to increase your awareness of your body. To use it in this way, use your brain tech relaxation techniques to get down into a state of profound relaxation (if you're using a device like LS, program it to ramp you down into theta). Then, simply be there, in a state of relaxed attentiveness. Let your being unfold without prejudice. Be open to whatever sensation or perception that arises. If it is a thought, be aware of it and then let it go and return to your state of relaxed attentiveness. Let yourself experience whatever is going on in your body. Soon you will begin to notice your attention moves to a specific part or parts of your body. You may notice discomfort in your lower back, or tension in your neck, or a deep ache in your foot. Let yourself become aware of your body. Along with your awareness of tensions, torsions, aches and pain, you may find thoughts arising – thoughts that are associated with the specific ache or tension. Pay attention to these thoughts – they may have something important to tell you – and then let them go, return your awareness to your whole body, and continue. Soon, you should have a sense of your entire body, and an idea of how you need to treat it.

BREATHING

Having completed a body-scan, you might want to then use one of the breathing techniques described in “Beyond Entertainment” MBR Vol. I #4. For example, visualize each breath as a white light that flows to specific body parts or systems – as you inhale, the energizing light flows directly to the source of your tightness, or the place you want to strengthen, where it creates a glowing ball of light. With each inhalation, the ball of light grows in intensity, with each exhalation, you visualize yourself exhaling pain, toxins, fatigue. In a very short time you'll find your body feels different.

VISUALIZE

The scientific evidence is very clear: what our mind perceives in the form of vivid mental imagery our body tends to believe is actually true. Visualizing shooting basketballs, for example, has been found to be as effective as actually practicing. Visualizing your muscles growing stronger actually strengthens your muscles.

Mental imagery experts have found that there's a direct correlation between relaxation and visualization: the deeper the relaxation, the more vivid and controllable are the mental images. Mind tools, by

helping produce profound relaxation, dramatically amplify and intensify mental imagery. There are a wealth of visualization techniques. Two examples that have been found to be extremely effective for athletic training are the mental workout and the mental rehearsal.

Mental Workout. See yourself going through a training session. If it's weightlifting, see yourself doing each set at an accelerated rate of speed and with enormous strength and endurance. Bodybuilders have found that since there's no need to wait or rest between sets, they can run through an entire hour's workout in just a few minutes of mental imagery, and that the muscle-growth effect of the visualized workout seems to be as strong as the actual workout.

Mental Rehearsal. Whatever sport or move you want to improve, see yourself doing it perfectly from beginning to end. Go through your performance step by step. See yourself executing each move perfectly. If you make a mistake, go back and do it correctly. Practice over and over again.

HYPNOSIS AND SUGGESTION

After completing your releasing and body-scan, you may want to do a self-hypnosis induction (for an introduction to self-hypnosis see “Beyond Entertainment” in MBR Vol. I #4). While in trance, you are in a state of hypersuggestibility. This is the ideal time to offer yourself positive suggestions and affirmations. These can range from general suggestions (e.g. “my body heals itself at all times,” “I enjoy enormous vitality,”) to specific personal suggestions (e.g. “Each time I kick the ball I keep my head down and follow through,” “I enjoy doing situps everyday,” “I am now releasing growth hormone”) to short “self-talk” action phrases that you can use later to trigger specific actions (“Power now,” “Push off,” “Follow through”). Some of your suggestions should be in response to your mindfulness body scan – suggest to yourself that your pain or tension is gone, or the area that needs to be strengthened is growing stronger.

Such suggestions can be strengthened by using different sensory modalities, such as auditory, visual and kinesthetic. For example (visual), see your bruise or tense muscle as a tight knot and then see it loosen, expand and dissolve, like a Chinese paper flower in water; or (kinesthetic) feel your pain as being red hot, and then replace it with ice, and feel it become cool; or (auditory), hear your bloodstream rushing with growth hormone like a roaring river, and so on.

IDEOMOTOR FINGER SIGNALS. While in a trance state one has more direct access to hidden or unconscious material. One effective way of learning information that is hidden away in your unconscious mind is the use of ideomotor finger signals: suggest to yourself that you will ask yourself questions, and

MEGABRAIN REPORT

THE BRAIN TECH ATHLETE *CONTINUED*

that if the answer to a question is “yes” you will respond by moving your right forefinger; if the answer is “no,” you will move your left forefinger (or allow your own unconscious to suggest to you which signals to use).

This is an enormously useful technique for high-performance sports training. For example, competitive athletes are constantly on the edge of over-training, which leads to sickness or injuries. So, many athletes use ideomotor signals to ask themselves questions such as, Should I work out hard today? Should I take it easy today? Is today right for upper body weight work? and so on.

ANCHORING

One of the most remarkable features of being in a trance state is that you can plant suggestions so that they take effect at some later point, when you're no longer in trance. One technique has been developed and refined that permits individuals in trance to give themselves a trigger mechanism that when it's employed later can automatically activate specific desired behaviors or states. The device is called an anchor (for a description of anchors and anchoring, see “Beyond Entertainment” in MBR Vol. I #4).

Athletes seeking peak performance will want to anchor peak states, such as being filled with energy and power. To do so, once you're in a deeply relaxed state, remember as vividly as possible an occasion when you experienced that rush of boundless energy and power. Don't just think of it – actually be there, experience it with every cell of your body, using every sensory modality you can – see, feel, smell, taste, hear the experience and yourself being the experience.

As you are at the peak of your experience of this high energy, power state, at that instant create your anchor – perhaps a finger signal (such as putting your thumb against your first knuckle), a signal word (such as “power!”), a vivid image (such as white light pouring through your body), or all of these combined. Suggest to yourself that every time in the future that you give yourself this anchor, you will instantly activate these bodymind neural circuits, and you will fully experience this energy state. Suggest to yourself that the more you use this anchor, the more powerful and effective it will become.

HIGH-INTENSITY RECOVERY

If you do high-intensity workouts, your need for deep rest and recovery increases. On hard workout days, end the day with an extended deep relaxation session – at least 45 minutes to an hour of deep theta or delta “do nothing” relaxation. This will speed your recovery, by accelerating the clearing of lactic acid and other toxins, and increasing the flow of proteins and other anabolic nutrients to your cells. It will also

speed up your body's recovery by stimulating the release of calming, counter-stress neurochemicals such as serotonin and beta endorphins. Your mind tech session may also trigger the release of GH. Alternate hard workout days with days of rest, including another extended brain tech session. During this off-day session you might want to include some visualizations, suggestions and other sorts of mental training.

SUGGESTED READING

An excellent guide to training and fitness that includes information about such techniques as visualization, deep relaxation and suggestion, is Frank Zane's *Fabulously Fit Forever* (Palm Springs, Zananda Press, 1993), available from Zananda, PO Box 2031, Palm Springs, CA, 92263. *Creative Visualization* by Shakti Gawain (NY: Bantam, 1986) offers a wealth of visualization techniques. See also *Peak Performance: Mental Training Techniques of the World's Greatest Athletes*, by Charles Garfield and Hall Bennett (L.A.: Tarcher, 1984); and *The Ultimate Athlete*, by George Leonard (NY: Viking, 1975). An introduction to self-hypnosis is included in *The Book of Floating* (William Morrow/Quill, 1984), which I wrote before writing *Megabrain*. For more, see Leslie LeCron, *Self-Hypnotism* (Prentice-Hall, 1964).

For anchoring, the best introduction is Richard Bandler's *Using Your Brain for a Change* (Moab, UT: Real People Press, 1985). ▲●■

Mind as the Projection and Reception of Electroholomorphic Fields by the Brain

by Jonathan D. Cowan, Ph.D.

PRESENTED AT THE FUTURE HEALTH SEMINAR
ON EEG BIOFEEDBACK/NEUROTHERAPY
KEY WEST, FLORIDA, JANUARY 23, 1993

The relationship between mind and brain has puzzled philosophers, neurophysiologists, and others for many years. Recently, physicists such as David Bohm have related this debate to an even broader question – the relationship between the implicate order, his term for the true ground of being, and the explicate order, which roughly corresponds to the ordinary way in which we view reality. In his classic book, *Wholeness and the Implicate Order*, Bohm has suggested that the implicate order transforms by a process he calls unfolding to form the explicate order. By a constant process of folding and unfolding into each other, the implicate and explicate orders continuously form the totality of what is, which he terms the holomovement. He states that “This enfoldment and unfoldment takes place not only in the movement of the electromagnetic field, but also in that of other fields, such as the electronic, protonic, sound waves, etc. There is already a whole host of such fields that are known, and any number of additional ones, as yet unknown, that may be discovered later (Bohm, 1980, pp. 177-178).”

To my knowledge, Bohm has not yet worked out the details of these transformations within the human nervous system. To bridge this gap, I will set forth a new synthesis of currently accepted

scientific principles and facts, which predicts that parts of the brain continually act like lasers – as sources of phase synchronous and (therefore) coherent electromagnetic radiation – and enable the brain to project and receive energy fields that are related to ongoing thoughts.

As shown schematically in FIGURE 1, life events give rise to experiences and thoughts, which are reflected in the electrochemical changes in the outer layers of the cerebral cortex. These patterns of activity are projected by radiation from the “brain laser”, to form fields that are complex, rapidly shifting holograms.

Recognizing the potential similarities of these fields to the implicate order in Bohm’s holomovement, and to Sheldrake’s morphic fields, as well as the holographic transformation involved here, I have termed them electroholomorphic fields. In his book, *The Presence of the Past* (1988), Sheldrake refines his far-reaching hypothesis, which states that morphic fields are responsible for perpetuating all types of forms in the universe, from the physical organization of atoms to the forms related to human thought.

This paper will focus on the example in which the object to be projected as an electroholomorphic field is the chemical activity in a small area of cerebral cortex, although there are probably many other physiological systems in which this proposed mechanism can take place. For purposes of exposition, the constant motion of the neurochemicals in this small area will be temporarily set aside in order to first understand the formation of a static hologram.

FIGURE 1

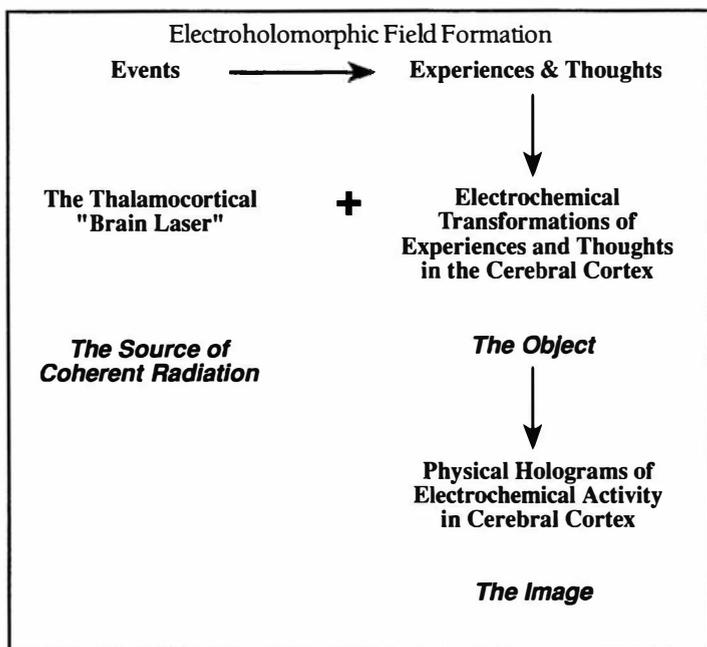


FIGURE 2: To create a hologram, it is necessary to have a coherent energy source as well as the object to be projected. A photographic plate would only be necessary if the hologram were to be recorded. The holographic image exists as an interference pattern in space whether or not a picture is made.

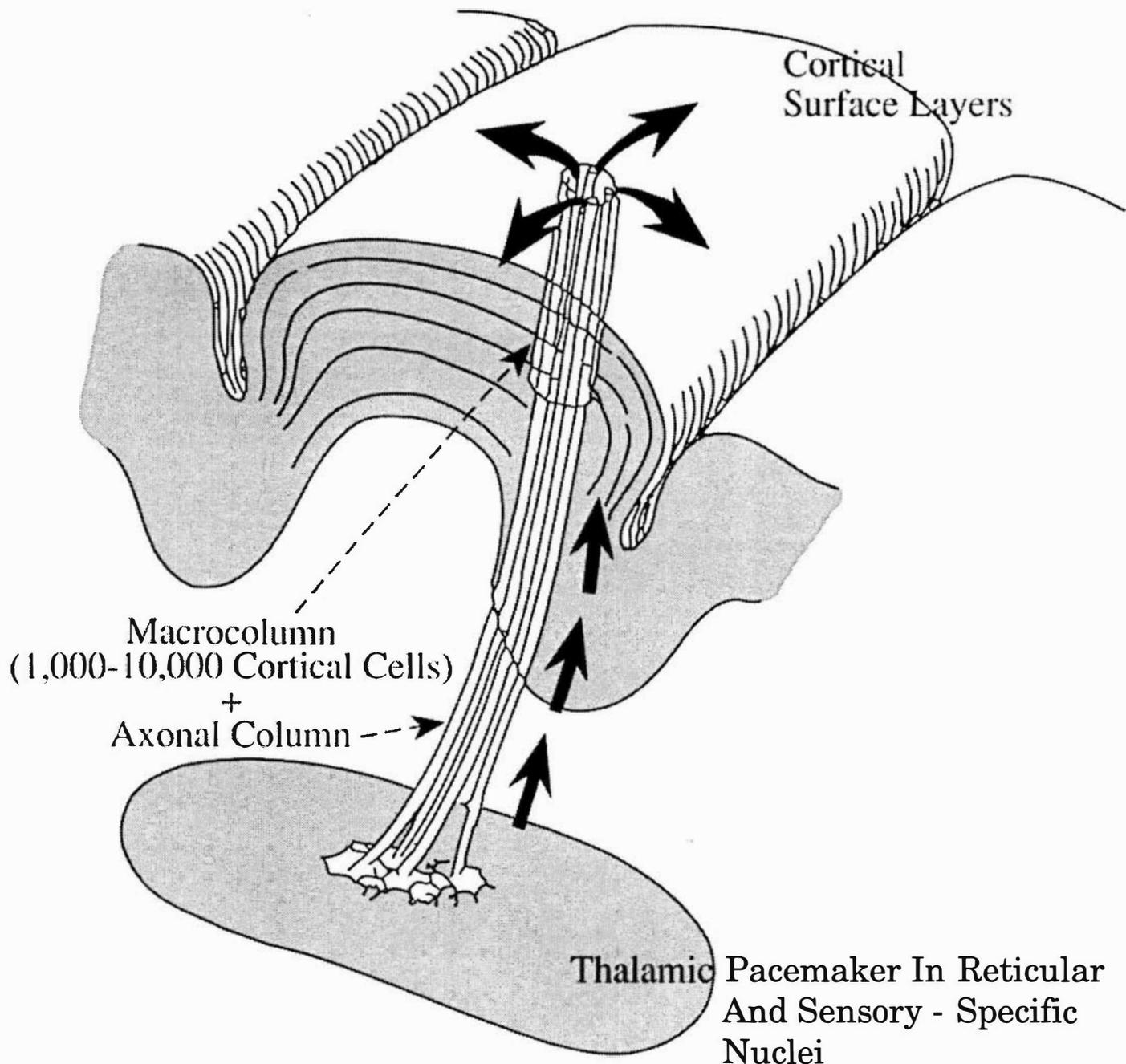
The source of coherent energy is the vibration of parts of the membranes of the axons that connect the neurons in the thalamus to the cerebral cortex, as shown schematically in Figure 2 above. These axons run parallel to each other, forming columns that are essentially perpendicular to the cortical surface, with excitation flowing from the deeper structures (the thalamic nuclei) to the surface. The patterned activity of these columns, in combination with the reciprocating messages from cortex to thalamus, is thought to be responsible for the formation of the synchronized activity of the electroencephalogram (EEG) in certain states of consciousness (Andersen

MEGABRAIN REPORT

ELECTROHOLOMORPHIC FIELDS *CONTINUED*

The "Brain Laser"

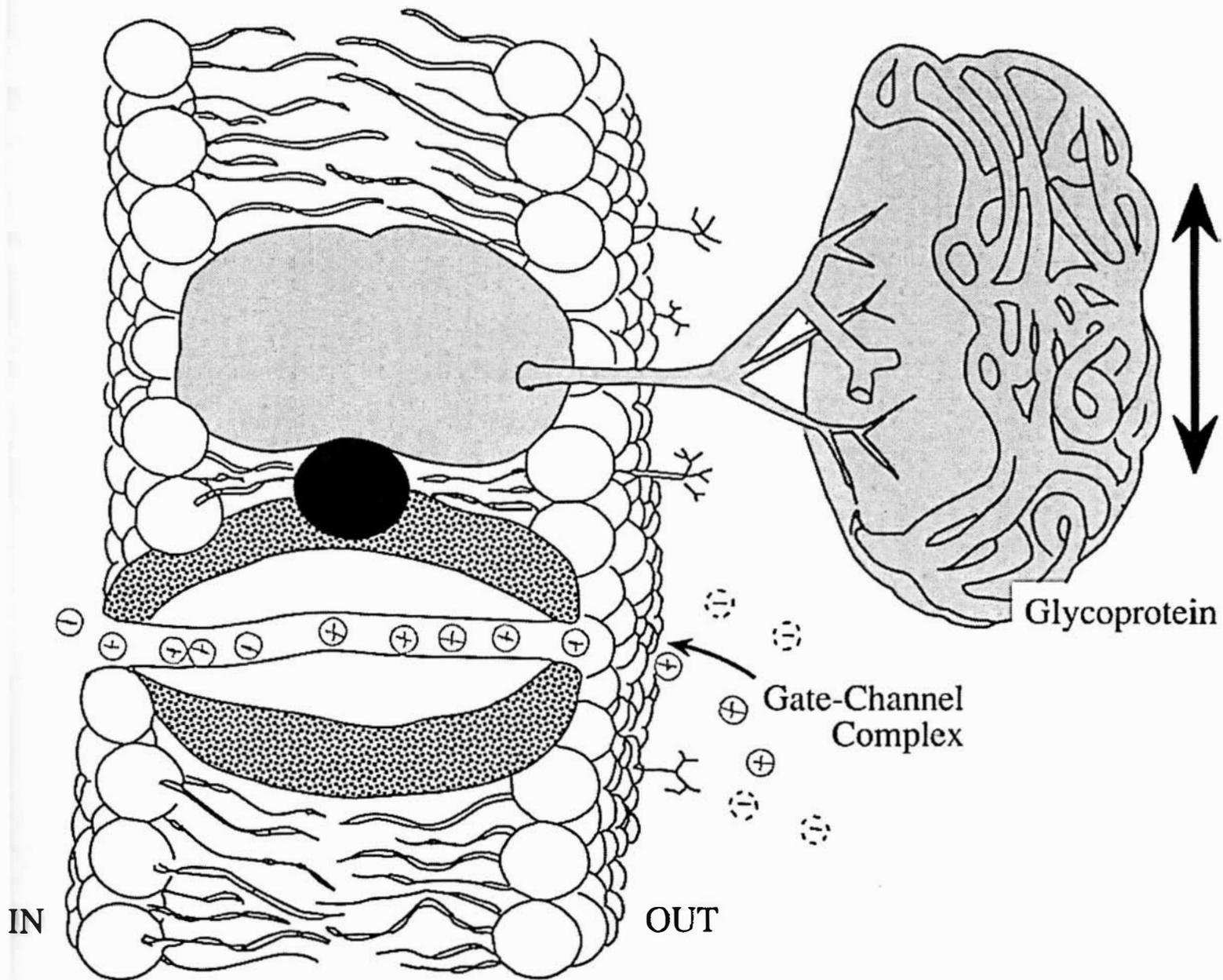
FIGURE 2



The Column Transmits Impulses Synchronously from Thalamus to Cortex

FIGURE 3

One Mode of Vibration of Glycoprotein



Axon Membrane

Modified from Lipton (1988)

MEGABRAIN REPORT

ELECTROHOMORPHIC FIELDS CONTINUED

& Andersson, 1968; Thatcher & John, 1977). Recent experiments have led an international committee of scientists (Steriade et al, 1990) to conclude that the reticular nucleus of the thalamus, a thin grid of neurons surrounding the egg-shell shaped thalamus, is responsible for originating and organizing these brain rhythms. (This evidence slightly changes the depiction of the thalamus in Figure 2.) Input from this surrounding sheet of cells causes neurons in the thalamus beat in complete synchrony, forming the pacemakers that drive each column of several thousand parallel axons, and excite the slightly larger macrocolumn of 1,000 to 10,000 cortical cells.

The constant, synchronous excitation of the axons from the neurons in the thalamus to the cortex provides the energy for the "laser" formed by each macrocolumn. For each time that a nerve impulse – a wave of depolarization – flows down the axon, metabolic energy is consumed at each point that it passes. With each impulse, the axonal membrane and its constituent molecules move and vibrate in an organized fashion.

After the impulse passes, many of the molecules and atoms, as well as their constituent charged particles will continue to vibrate at their characteristic fast resonant frequencies for some time. Charged particles in motion create electromagnetic waves. Coherent and synchronous waves result when these moving charged particles vibrate in phase with one another – that is, when their peak motions in the same direction are at precisely the same time. The molecular structure of each axonal membrane undoubtedly has many repeating units – the same pattern of constituents, embedded in very similar chemical environments. The presence of many axons in a synchronously-excited column multiplies the number of repeating units.

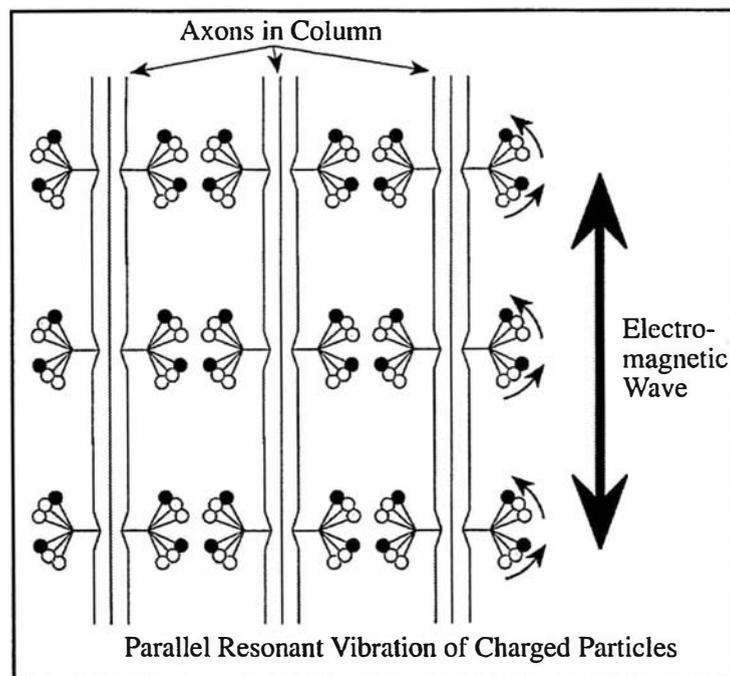
One particular membrane structure that should give rise to coherent energy beams is the glycocalyx, or sugar coating, shown in Figure 3. This is a schematic diagram of the membrane of a single axon in the column, with the outside on the right. Glycoproteins, which are common constituents of these membranes, have an uncharged protein end, which dissolves in the fatty membrane, and a multiply-charged sugar end, which sticks out into the external fluid, somewhat like a ball on a rubber stick. Together, these sugars form the glycocalyx. The diagram also shows a gate/channel complex, which changes conformation to allow ions into the axon briefly during a nerve impulse, thus causing the nerve cell to depolarize, and then returns to its original shape when the impulse has passed.

FIGURE 3: When this gate/channel complex in the membrane moves rapidly in response to a nerve impulse, the charged sugar ends that line the axonal membrane should all vibrate back and forth. These

glycoproteins are either directly or indirectly (through the linking peptide shown as a ball) connected to the channel protein. As the channel opens and then closes in response to each impulse, its kinetic energy is transferred to the glycoprotein and to other surrounding structures, which will vibrate and emit an electromagnetic wave until this motion is damped out. Other vibrational modes and frequencies and the related electromagnetic waves result from the movements of charged atoms within the membranes.

FIGURE 4: One type of movement is shown schematically in Figure 4, which depicts small portions of three axons in a macrocolumn. The balls represent charged portions of the glycoproteins in a simplified fashion. The molecular structure of each axonal membrane has many of these repeating units, and there are many axons in a macrocolumn. When they all vibrate in response to the depolarization, they should follow a basic law of the physics of resonance, and entrain each other so that they vibrate more closely in phase with each other. This should produce some synchrony and coherence in the energy beams resulting from these character-

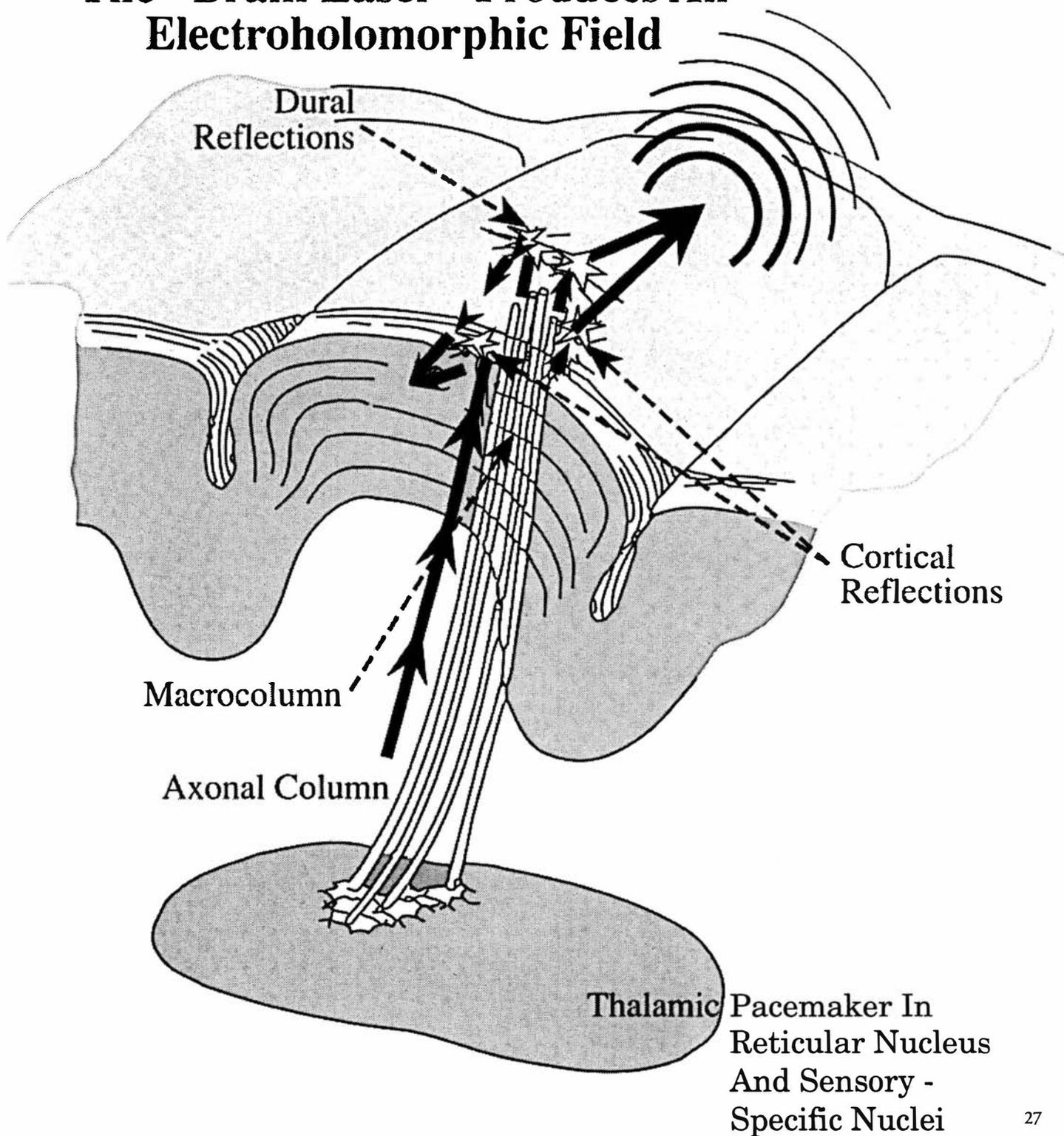
FIGURE 4



istic vibrations; the remaining non-coherent energy is not important here, since it is random noise. Each characteristic vibration resulting from a different type of moving charge will have its own frequency, as well as a characteristic direction, in which the coherence is maximum. If the macrocolumn has

FIGURE 5

The "Brain Laser" Produces An Electroholomorphic Field



MEGABRAIN REPORT

ELECTROHOMOMORPHIC FIELDS *CONTINUED*

some curves, there will be several directions in which the coherence is maximum.

FIGURE 5: An analogous phenomenon was demonstrated experimentally over 20 years ago. The emission of coherent microwave radiation from the surface of stimulated axons was first demonstrated by Fraser and Frey (1968) in sensory nerves taken from the legs of the blue crab. Further work by Frey (1988) and others he cites established the coherence of this radiation.

The coherent energy beams formed by each pacemaker in the thalamus and its associated column of axons will, to a greater or lesser degree, reach the nearby cortical surface layers, as shown in Figure 5. Beams from nearby columns may be coherent with one another, since the repeating units in these columns are very similar – particularly if there is widespread phase synchrony between electrode sites in the EEG. This will increase the breadth of the coherent wavefronts. These coherent wavefronts will be partly reflected from neighboring neurochemical structures in the cortical layers. Some of these wavefronts should also be partly reflected from other structures, such as the dura shown in Figure 5, as well as pia, arachnoid, and skull. The multiple reflections at the same wavelength will interfere with each other, forming holograms at multiple frequencies.

The activity in the cerebral cortex shifts quickly, and the periodicity of the thalamic pacemakers changes more slowly; an extremely complex electrohomomorphic field will be generated by their interaction. It will extend throughout the brain, and into the space outside the brain. The partial transmission of this field through the skull will be aided by the fact that it is being pulsed or modulated at the extremely low frequencies typical of the EEG – the rate at which the thalamocortical axons actually fire. Several different types of fields, each operating at many frequencies, may well be involved. Vibration in some of the additional dimensions suggested by superstring theories and by Bohm may also be important. The characteristics of the particular type of radiation will partially determine the range and resolution of the potential information transfer; this has yet to be understood.

These fields appear to have some characteristics which have been postulated for mind, the transmission of extrasensory perception and healing, chi, and other body energies. Recent research by Dr. Edgar Wilson, in which he brainmapped a number of individuals with unusual ability to heal, channel, receive psychically, or report out of body and transcendent experience, has revealed some interesting common features which would be expected to produce stronger field transmission according to this model. Wilson's brainmaps reveal that these experiences typically begin with an activation of theta and delta

frequencies at Cz, corresponding to the crown chakra in the esoteric literature. This rapidly become diffuse throughout the head, and then develop overtones at higher and higher frequencies, which are particularly intense in the temporal areas, T3 and T4. These overtones extend to F6 and F7 in healers. They can generate very high energy, coherent bursts in the gamma frequency range, roughly defined as above 30 cycles per second. The highest frequencies that have been observed were limited by the 128 cycle cutoff of the Lexicor system, just as prior EEG studies had been limited by the fact that the Grass polygraph spit ink above 32 cycles. Using a magnetometer suspended a foot above the subject's head, Dr. Wilson was able to observe electromagnetic field changes corresponding to the gamma bursts in a limited number of subjects. I have been able to record some similar findings in a subject with multiple talents, who produced distinctly different patterns in different states. The differences between these brainmap patterns satisfied me that this was not merely due to EMG artifacts from the temporomandibular joint.

According to this model, the higher the wave energy and the more synchronous the phase of the waves from various cortical locations are, the stronger the output from the brain laser and the resulting hologram should be. Higher frequency cortical output should also increase the efficiency of the brain laser because the energy of the rhythmic discharges of the thalamocortical tracts, which is reflected by the EEG recordings, drives the brain laser by vibrating the parts of the glycoproteins. The higher the frequency of the thalamocortical rhythms, the more frequently that these glycoproteins are re-energized and the more constantly they will vibrate (see Figure 4). The more energetic and consistent that this vibration is, the greater that the resonance between the vibrating parts of neighboring glycoproteins will be, and the stronger the brain laser's coherent output. All of these factors, acting together, should increase the strength of the electrohomomorphic field emitted during transcendental, healing, psychic and channeling experiences. They may also be relevant to understanding the role of strong, synchronous brain rhythms in projecting the intentions and images generated as part of the alpha-theta brainwave training process.

This new mechanism may also generate coherent subtle energy waves and holograms. Scalar electromagnetic "waves" may be particularly important as potential information transfer agents due to their unique properties. They do not diminish with distance, and they are not as easily shielded as are conventional electromagnetic waves. As shown in FIGURE 6, these waves should be formed by any anti-symmetric – directly out of phase – modes of vibration of charged particles. These modes are well

known and accepted in the field of spectrochemistry, and should occur at many sites within membrane glycoproteins. These vibrations should also entrain each other into coherence in the same way that the symmetric modes shown in FIGURE 4 do. These anti-symmetric modes of vibration are the molecular counterparts of the two opposing electrical coils that Bearden (1988) showed were capable of producing scalars. It is also possible that this alternating squeezing and separation may actually impress a similar pattern on the electron clouds surrounding atoms and molecules in the range of the hologram that they form; this alternating pattern could continue indefinitely, since there is no friction to slow it down. This would effectively retain the subtle information in the electron clouds. The classical electromagnetic waves produced by the brain "laser" may also be enfolded and contained within these scalar waves, as Bearden (1988) postulates. This should give these waves, and their resulting holograms, some distinctive properties, which deserve detailed investigation. Bohm (1980, pg. 178) emphasizes that all such quantum fields have unusual properties, such as discontinuity and action at a distance.

The proposed mechanism for the reception of electroholographic fields by the brain must assume, based on Bohm, Sheldrake, or the electron cloud squeezing argument, that such fields exist and can persist through time. If so, then all that is required to read a hologram in space is a coherent (reference) beam, of the same type, frequency, and proper orientation. The portions of the energy beams produced

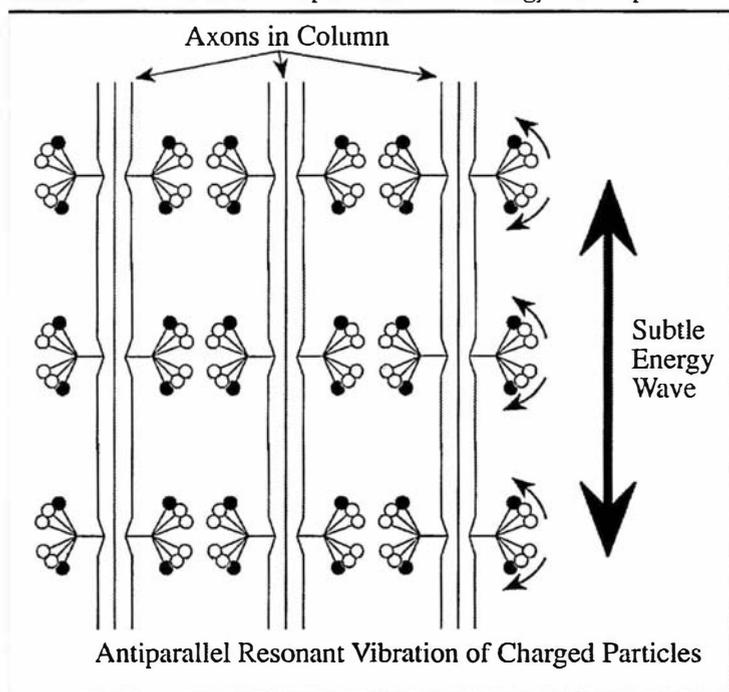
by the macrocolumns that are not reflected from cortical structures will serve as reference beams. The hologram will be received by the brain as a reconstruction of the same electrochemical pattern that was in FIGURE 6: the cortex at the time it was originally projected. This reconstructed image will influence the probabilities of occurrence of the ongoing pattern of electrochemical cortical activity, making them more similar to the original pattern that gave rise to the image. These altered probabilities of neurochemical activity could then influence brain function by affecting the release of vesicles containing neurotransmitters into the synapse (Eccles, 1990), by changing slow potentials, or by altering the function of the neuronal membrane, as well as via several other methods.

The major problem with this approach is that it would seem to require that the head be in the same spatial orientation during transmission and reception, if reception of electroholographic fields generated by matter outside the head, and transmitted by ordinary physical means, is to be considered.

Several factors may increase the probability of accurate memory retrieval via this mechanism. If the individual is in the same state of consciousness as he was during the projection of the field during memory storage, the beams from the various axonal columns should be roughly similar. If the context during memory retrieval (reception) is similar to that at storage (projection), then an experience should be easier to retrieve. Other factors that increase the amplitude and/or synchrony of wave fronts should also aid retrieval, all else being equal. Additional consequences of the properties of holograms applied to this particular system should also aid retrieval (Pribram, 1971).

This theory enlarges on Pribram's seminal work on holographic memory storage. He proposed that there were quasi-holographic memory structures in the cortical surface layers, which were produced by transforming input into slow electrical potentials according to holographic principles. He did not hypothesize the formation of actual electromagnetic holograms projecting beyond the cerebral cortex. Both proposals are actually simultaneously possible: The brain may form multiple physical holograms of quasi-holographic transformations of the input to the cortex. If, as Bohm (1980, pg. 204) suggests, the actual content, structure, function, and activity of thought is in the implicate order, then perhaps this mechanism, or one very much like it, can begin to explain how this implicate order is transformed into the explicate order of everyday experience. In view of the two holographic and quasi-holographic transformations I have just delineated, it may actually be more accurate to suggest that there are at least two implicate orders, one of which can be termed a super-implicate order.

FIGURE 6



MEGABRAIN REPORT

ELECTROHOMORPHIC FIELDS *CONTINUED*

Other neuroanatomical structures may also contain synchronously-excited parallel axons that can project and receive electrohomomorphic fields. Within the brain, there are other bundles of parallel axons, some driven by pacemakers. The septal hippocampal system is one example. Nerve fibers that respond to pressure, temperature, muscle stretch, and position in the periphery—for example, the hands and feet and the spinal cord—are regularly and repeatedly excited, as are the pacemaker fibers in the heart. These parallel fiber bundles may emit coherent radiation. The relationships of these structures to the chakras and their reputed energies appears to be worthy of further exploration, as are the possible implications for healing and energy medicine.

This type of projection and reception mechanism may also help to explain spiritual experiences, the phenomenology of extrasensory perception, and the relationship between the mind and the brain. There are many opportunities for both experimental testing and mathematical modeling of this proposed mechanism. I invite each of you to join me in this quest for understanding of our deepest spiritual nature.

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NEW SOUND AND LIGHT TECHNIQUES *CONTINUED FROM PAGE 13*

The Meta-4 is an offbrand walkman unit with an extra box attached. You plug your headphones into the walkman and your goggles, mounted with red LEDs, into the extra box. Side A of each tape is your audio program, which you hear normally. Side B is a series of signals that are played through your goggles as light flashes. Thus each tape (like a VHS videotape) plays in one direction only, and then must be rewound. Each "program" is recorded onto a separate tape, and your tape library equals the available programs you can use.

The manufacturer supplies a growing library of program tapes (numbering 31 as of 11/15/93) in three categories, pure hypnosis programs, pure light/sound programs, and combined programs.

Conventional L/S machines are like computers, while a L/S player can be compared to a VCR.

Many unique advantages to this approach, but one significant limitation: If you use a patch cord and pre-recorded music, L/S machines can combine their effects with the best recorded music in the world, and the Meta-4 can't do that; the pre-recorded tapes are the only sounds you are going to hear through it.

My preliminary opinion is cautiously positive: the idea is brilliant and the execution is not bad, although not the ultimate. I don't think the programs make use of all the possibilities of the LSP as creatively and satisfyingly as they could. The music is not highly varied and intrinsically compelling, and the hypnosis style, although quite good, is authoritarian and overt. I'd enjoy some subtler suggestions combined with different music.

The units themselves are nicely labeled and quite professionally packaged (especially considering that they're almost certainly made by splicing a small box onto the back of the walkman) and for the most part they function properly with minimal problems (see below). Goggles are okay, with 2 LEDs per eye, and adequately bright.

In use, we've observed quite good sound and light quality, but on other occasions some rather annoying mechanical high frequency static. That's a major drag, but it should be viewed taking into account that this problem doesn't seem to occur with all units, or at least not all the time, and it is definitely an inexpensive (\$129.95) entry-level machine. When working at its best, it does deliver a more full-dimensioned experience available than any of the conventional L/S machines, because the audio programs have voice and music in addition to pulsed sound, clicks, or binaural tones, with fully-synchronized light flashes. ▲◆■

The Right Time

by Michael Hutchison

Not knowing that one has a time structure is like not knowing that one has a heart of lungs. In every aspect of our physiology and lives, it becomes clear that we are made of the order we call time.

Because the clocks and calendars of social activity are designed for economic efficiency or convenience, an individual may have to learn to detect his own cycles, and become aware of scheduling to protect his health.

Dr. Gay Gaer Luce
Report of U.S. Department of Health, Education,
and Welfare

"The night time is the right time."
The Strangeloves

"I like it much better in the morning."
Genya Raven,
1970's rock singer

RIDING THE BIG WAVE

Back in the early 1980s, when I began exploring the effects of the flotation tank, I was intrigued to find that my experiences in the tank were quite different at different times of day. For some reason there was an enormous difference in "feel" between an early morning float and one in the late afternoon, and between an early evening or a late night float.

I talked with other floaters about this and found that they too had noticed how the time of day influenced the quality of their float. One lawyer loved to hop in the tank for a 6 a.m. float on days when he had court appearances – he would emerge an hour later feeling charged with an electrical power and energy. But he noticed that when he floated in the evenings he emerged feeling relaxed, drowsy and ready to go to sleep.

An architect with multiple sclerosis would usually go in for a float around noon, and said that he would quickly sink into a state of profound rest, with no

Like a diver slowly rising toward the surface, I would slowly regain consciousness, my mind would become more alert, my thoughts more intentional.

thoughts – he felt his body was healing and restoring itself, and called it his "healing time." But he noticed that when he went in after work in the late afternoon his experience was quite different – as he floated his mind was busily visualizing and working on his current architectural projects.

As I began experimenting with longer floats – staying in the tank for eight or ten hours at a stretch – I found that there was a wave-like quality to the float. At first I might sink rapidly down into a deeply relaxed state in which I had no awareness of time, no thoughts – a deep theta state. But after a

period of time, like a diver slowly rising toward the surface, I would slowly regain consciousness, my mind would become more alert, my thoughts more intentional. Gradually my body would become more active – I would feel the need to stretch, move, tense and release my muscles. And then, after rising to the surface, my consciousness would again turn downward, and I would sink into the depths, returning to the dreamlike imagery of theta, or the bliss of total emptiness. I began to think of it as "riding the big wave."

As I paid attention, I found that these waves of rising and falling awareness were rhythmical – I seemed to pass through one complete cycle of rising and falling about every 90 to 120 minutes. Upon further exploration I found that different parts of the wave seemed most conducive to certain types of consciousness or certain types of work. For example, the tank was often a great place to get writing done – at times I could spin out page after page of wonderful prose, and store the words clearly in my mind, ready for access when I sat down at my typewriter. But I quickly found that the writing only happened when I was at a certain point on the wave. As I sank deeper, a different type of creative thinking would take place – I might see or "feel" the entire structure of a book at a single flash, experience spontaneous images, bizarre thoughts, unpredictable flashes of insight. And then I sank even deeper, into a place beneath consciousness – a state that was not sleep, but was without content.

But when I emerged from that deep wordless and thoughtless place, I rose back up through the mysterious, unpredictable twilight theta space again, where I would often find my brain filled with sudden new ideas, mental fireworks, chains of thoughts veering off in unexpected directions – it was as if the time in deep unconsciousness had charged my brain with new energy. And as I rose higher up on the wave I would once again be at that point where I found the words running through my mind, and, if I wanted to, I could write whole chapters, articles, stories. And then I would rise even higher on the wave and become too conscious to write – it would be time to stretch, scratch an itch, think about what I would cook for dinner that night, remind myself to take my shirts to the cleaners, make active plans. And as the mundane thoughts passed, I would once again begin to slip downward, sinking deeper, riding the wave.

As I became more aware of the wave-like nature of consciousness, I also discovered that there were certain points on the wave ideally suited for certain types of activities or non-activities. For example, I discovered that if I offered myself suggestions while moving downward into the theta range, and just

I would often find my brain filled with sudden new ideas, mental fireworks, chains of thoughts veering off in unexpected directions.

MEGABRAIN REPORT

ULTRADIAN RHYTHMS AND MIND MACHINES *CONTINUED*

before slipping into that level of deep theta where I was no longer actively conscious, then the suggestions seemed to become implanted and take root while I was in the deepest part of the wave, before I rose again into consciousness; and having taken root, would have powerful effects in my life. On the other hand, it seemed to me that if I offered myself suggestions while I was moving upward on the wave, or was reaching the peak of the wave, the suggestions had little effect – it was as if my mind was too busy, or too conscious and analytical to take note of (or to permit me to believe) the suggestions.

I made similar discoveries about learning – information that I heard over underwater speakers in the tank while sinking downward on the wave, and before passing into the unconscious deepest part of the wave, seemed to be learned most effectively. On the other hand, I felt like I was much more capable of making effective plans, organizing my activities, while riding upward on the wave.

OBSERVATIONS OF THE CHRONOBIOLOGISTS

What I was exploring, though I didn't know it at the time, was the realm of chronobiology (the interplay between biology and time). Scientists had long observed that humans were influenced by a variety of biological rhythms. These include the long rhythms of the human genetic lifespan, the yearly rhythm of the passing seasons, the monthly menstrual rhythms, the sleeping and waking rhythm of night and day, and the waves or cycles that rise and fall several times each day, including sexual arousal and hunger.

These latter rhythms are called ultradian (pronounced ul-TRAY dian) rhythms (from the Greek ultra-dies, "beyond" daily, i.e. many times a day).

And during the last few years chronobiologists and others have made some astonishing discoveries about ultradians and their influence on our bodies and minds.

One key finding that has emerged in recent years is that humans have been genetically programmed to operate on a 90- to 120- minute ultradian rest-activity cycle, known as the Basic Rest-Activity Cycle (BRAC). This cycle seems to regulate a wide array of mind and body activities.

HEMISPHERIC DOMINANCE. Neuroscientist David Shannahoff-Khalsa of Salk Institute for Biological Sciences did EEG studies of both right and left brain activity simultaneously and found that hemispheric dominance shifted back and forth in a wavelike rhythm. The average time for the cycle from right to left back to right, he found, was about 120 minutes.

BODY SIDE DOMINANCE. Not only the brain hemispheres, but the actual sides of the body switch

dominance every 90 to 120 minutes, according to Shannahoff-Khalsa and associates. By sampling neurotransmitter levels in blood taken from both arms every 7.5 minutes, the researchers found that catecholamines—dopamine, norepinephrine, epinephrine [adrenaline] – became more concentrated on one side or the other in a regular cycle that accompanies the basic rest-activity cycle.

VERBAL AND SPATIAL SKILLS. Since certain types of mental activity are linked with specific hemispheres, Shannahoff-Khalsa's identification of a rhythmic shift of hemispheric dominance suggested that human mental activity might go through similar ultradian rhythms. Other scientists tested subjects at regular intervals on verbal (left-hemisphere) and spatial (right hemisphere) tasks. They found that when verbal ability was high, spatial ability was low, and vice versa, and this alternating pattern continued throughout the day and night in cycles of about 90 to 100 minutes.

COORDINATION AND MEMORY. Scientists studying subjects playing video games measured various skills, and found that hand-eye coordination, learning, and short-term memory all showed a pattern of peaks and valleys. The peaks in performance occurred about every 90 minutes.

PHYSICAL ACTIVITY. Scientists observed subjects who were left alone in a neutral environment – a quiet, sparsely furnished room – and found that they showed a clear basic rest-activity cycle of around 110 minutes.

MENTAL ALERTNESS. When subjects were tested on complex tasks that demanded intense concentration and alertness, their performance rose and fell in an unmistakable 90 to 120 minute cycle.

CREATIVITY. Performance on a number of tests that measure creativity shows that levels of creativity rise and fall in the ultradian rhythm of around 90 minutes.

SUGGESTIBILITY AND RECEPTIVITY. Hypnotherapist Milton Erickson found that people went through natural short (15 to 20 minute) periods of relaxation and heightened receptivity that he called "common everyday trances," and that these natural trances occur on a basic 90-120 minute cycle.

OPTIMISM AND PESSIMISM. During high energy phases, according to psychologist Robert Thayer, people can be over-optimistic and tend to over-estimate their resources, and the time and energy required for a project. Similarly, during low energy phases, they can be over-pessimistic, tending to underestimate their own resources.

REST AND HEALING. The peaks in physical activity and energy every 90 to 120 minutes are mirrored by troughs or valleys, with the deepest part of the trough being a period of about 15 to 20 minutes. A mounting body of evidence suggests that the body requires this short rest or recovery period, and uses it for essential

Humans have been genetically programmed to operate on a 90- to 120- minute ultradian rest-activity cycle.

healing, repair and growth, and to replenish its stores of neurochemicals. At the same time the mind shifts away from external matters into a “common everyday trance,” a period of inward focus during which some sort of mental rest and reorganization takes place. Interestingly, this is a period of increased theta brainwave activity. Research indicates that this all-important period of rest, healing, inner focus and mental receptivity takes place in the approximately 20 minute transition period – the trough – between the low end of one 90- to 120- minute cycle and the beginning of the next. Psychobiologist and hypnotherapist Ernest Lawrence Rossi, a leading authority on ultradian rhythms, calls this approximately 20 minute transition period or trough the *Ultradian Healing Response*.

In sum, the 90- to 120-minute basic rest-activity cycle seems to regulate an overwhelming number of our body-mind systems. According to Dr. Rossi, “research indicates that all our major mind-body systems of self-regulation – the autonomic nervous system (activity and rest), the endocrine system (hormones and messenger molecules), and the immune system (disease fighting) – have important 90- to 120-minute basic rest-activity cycles.”

WHY YOU’D BETTER LEARN TO RIDE THIS CYCLE

This basic cycle, according to BRAC discoverer Nathaniel Kleitman, is a fundamental and essential characteristic of the life process itself – it “involves gastric hunger contractions and sexual excitement, processes concerned with self-preservation and preservation of the species.”

“When such fundamental human processes and learning and performance, digestion and bodily repair, and sex and personality all respond to the call of the 90- to 120-minute rhythms,” observes Rossi, “when even our muscles, glands, circulatory system, and organs resonate to it, and our very brain and psychological state keep time to it – these rhythms, or whatever causes them, must reflect pervasive patterns of communication between our mind and body.”

ULTRADIAN STRESS. The basic rest-activity cycle seems to be programmed into our genes. In fact there is new evidence that the BRAC regulates the most basic life process, the growth and division of cells. As Rossi points out, the entire process of cell division and growth lasts about 90 to 120 minutes, with a 20 minute period required for the build-up of a biochemical that plays a key role in the process of cell division. For millions of years our ancestors lived in close harmony with the natural rhythms of life, rising with the sun, sleeping at night, and responding to the signals of the BRAC by resting and napping periodically during the day.

Modern civilization, with its artificial lights, work schedules, and unremitting stress, tends to disrupt

the 90- to 120-minute BRAC. For many of us life is a process of repeatedly overriding or ignoring the signals from our bodies and minds that it’s time to take a break. Many of us have completely lost touch with our basic need for periods of rest and rebalancing. The result of this chronic disruption and desynchronization of our most fundamental rhythm is that modern plague called stress.

We all know the symptoms, starting with mental and physical fatigue, manifesting itself as mood swings, forgetfulness, loss of concentration, irritability, and burn-out. When ignored, these symptoms of stress can lead to more serious stress-related disorders, including high blood pressure, heart disease, stroke, suppressed immune function, depression, anxiety, insomnia, and, in all probability, various types of cancer.

What the evidence shows, then, is that our mind and body operate on a basic wave-like 90- to 120-minute cycle. This ultradian wave is a key factor in our mental performance – our ability to learn, think, create, remember – and in our physical performance – our energy, reaction speed, strength, endurance and much more.

Other capacities, such as our abilities to control stress, our sexual energies, our immune function, our abilities to heal ourselves, our sensitivity to emotions, and much more, are directly linked to this basic cycle. The message is clear: *if we are at all interested in maximizing mental and physical performance, then we must become aware of and learn to make intelligent use of our ultradian rhythms.*

By becoming aware of our ultradian rhythms, we can both capitalize on our strengths – “peak the peaks” – make most effective use of our down times – “trough the troughs.” We can also, when necessary, learn to forcibly alter our ultradian rhythms. In Rossi’s words:

By learning to heed the signs that we are entering the active phase of the ultradian performance rhythm, we can enhance our overall performance by focusing on demanding tasks while our energy and alertness are on the upswing. And by learning to heed the signs that we are entering the 20-minute rest-and-rejuvenation portion of the rhythm, we can properly restore ourselves so that we are at our performance peak when our energy and alertness rise again.

What you have to pay attention to is yourself.

MAPPING YOUR RHYTHMS WITH MIND MACHINES

The essential first step toward making effective use of your ultradian rhythms is very simple: pay attention. What you have to pay attention to is yourself. Unfortunately our culture does not encourage us to pay attention to ourselves, to heed the signals of our mind-body rhythms. We are, in fact, actively encouraged to ignore and override our natural rhythms.

MEGABRAIN REPORT

ULTRADIAN RHYTHMS AND MIND MACHINES *CONTINUED*

Virtually every aspect of contemporary life – the drive to produce more and more at work, the proliferation of dazzling entertainments to distract our attention – calls us away from ourselves, encourages us to ignore our natural ultradian rhythms, our life wave.

Fortunately, we now have available to us a variety of tools that are ideally suited for helping us pay attention to those signals: mind machines.

Mind machines, in a sense, act as blinders and earplugs – cutting off the external signals so that we can pay closer attention to our internal signals.

The following techniques for becoming aware of and making optimal use of your 90- to 120-minute ultradian life wave can be accomplished without mind machines, of course, by simply paying attention to yourself. But while the act of paying attention is fairly simple in itself, it is not easy to accomplish. We have to make an effort. Amidst the cacaphony of modern life, it's often hard for us to hear the messages being sent to us by

our mind and body. Mind technology, however, is highly effective at blocking out the environmental distractions and disruptions. Mind machines, in a sense, act as blinders and earplugs – cutting off the external signals so that we can pay closer attention to our internal signals. By helping us direct our attention inward, Mind tools can act as sensory amplifiers, helping us become aware of and keenly sensitive to the rise and fall of our natural life wave.

STEP ONE: PAY ATTENTION TO THE SIGNALS

The initial step is to find a comfortable place to sit down or stretch out – ideally, someplace quiet where you'll be free of jangling phones and other distractions. Employ your mind tool, and let go of concerns about external matters. If your device or tapes permit you a selection of frequencies, choose alpha. Now, as your turn your attention inward, pay attention to your internal mind-body signals and messages.

Here are some of the signals and messages you might notice:

- fatigue
- feelings of impatience, irritation, anger
- a desire to stretch, yawn, sigh deeply
- drowsiness
- daydreaming or experiencing pleasant memories
- feeling contemplative, introspective
- having fantasies, sexual arousal, idle thoughts

All of these are signals that you are on the down side or in the trough of your life wave, and that your mind-body would profit from a short period of rest and recovery. You can use your mind tool to help you relax, let go, and let your mind-body make the most of this healing period.

Here are some other signals you might notice:

- you feel energized, rested and strong

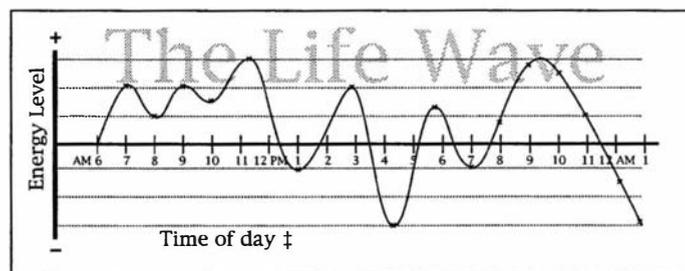
- your mind is focused, alert
- you're eager to get to work, to accomplish specific tasks
- you are coming up with solutions to problems, and having creative ideas
- you are eager to play or engage in physical exercise.

These, of course, are signals that you are on the up side, or at the peak of your life wave, and that it's time to get things done. You may want to use your mind tool(s) in an active mode, to focus and amplify your energies, to solve specific problems or projects, to engage in activities and creative pursuits.

MAPPING YOUR LIFEWAVE

In the initial stages of mapping your life wave, this act of using mind technology to pay attention to your mind-body signals is something that should be repeated several times a day. Ideally, you can make notes in a daily or hourly calendar. A few words describing the signals you receive each session are sufficient – for example, “wiped out,” “memories of 6th grade,” “back pain,” “psyched up for the board meeting,” “bliss,” “high energy,” and so on.

Over a period of days or weeks, you will begin to see patterns emerging. Perhaps you'll notice that you have a lot of your best creative insights at night or in



A SAMPLE OF ONE PERSON'S LIFE WAVE CHART.

the morning; that you feel most tired in the late afternoon, or just before lunch; that your back pain peaks at certain periods and goes away at others.

Soon, you should be able to point to your peaks and your troughs each day, and by connecting the dots you will be able to draw a line, tracing the rise and fall of your life wave throughout the course of your day. A sample of such a Life Wave Map is included above. Our ultradian rhythms are flexible, of course, and can vary in response to external conditions, so your life wave map can never be exact, predicting your peaks exactly to the minute. However, your map will increase your awareness of your own rhythms, your ups and downs, your peak

performance periods and the best times to take a relaxing break.

DOWN IN THE VALLEY: THE HEALING RESPONSE

Once you have mind technology to tune into your ultradian life wave, you can begin using your mind tools in ways that are specifically designed to take advantage of specific mind-body states, or points on your daily cycle. The single most important application for most of us is to get the most out of our body's natural rest and regeneration period, that 20 minute bottom-of-the-trough that Ernest Rossi calls the Ultradian Healing Response. By using mind technology to enhance and deepen the body's natural tendency toward relaxation and rest we can "trough the troughs," or get the most and the highest quality rest and regeneration that is possible.

One reason this 20-minute period can be so important is that it is characterized by what Milton Erickson called the "common everyday trance." As Ernest Rossi describes it, during this common trance, "we become more introspective. Our dreams, fantasies, and reveries – the raw material of growth in everyday life as well as in psychotherapy – become unusually vivid, as the window between our conscious and unconscious opens a bit." At these times, says Rossi, we gain access to our inner selves and our inner

One reason this 20 minute period can be so important is that it is characterized by what Milton Erickson called the "common everyday trance."

mind. "Because the inner mind is the source of our deepest knowing," he writes, "people may be at their creative best during these meditative moments, experience insights, fantasy and intuitive leaps."

These moments, Erickson found, were the key to inner transformation and healing. In Rossi's words, "the secret of transformation from illness to health and higher levels of well-being" lies in "recognizing and facilitating a person's own mind-body resources during these brief natural windows of inner focus as they [arise] periodically throughout the day."

NATURAL THETA STATE

The descriptions of the "common everyday trance" are virtually identical to what scientists have described as the theta state. And in fact EEG evidence has now revealed that during this natural rest period, brainwave activity tends to slow down from the beta-dominant patterns that govern our normal waking states of consciousness into relaxed state in which brainwave activity is predominantly in the alpha and theta frequencies. In other words, by becoming aware of our natural life wave, and "troughing the trough," we can enter a natural theta state, with all the well-documented benefits of theta.

Theta is characterized by vivid imagery, sudden bursts of insight, and intense memories. Researchers such as Elmer and Alyce Green at the Menninger Foundation have found going into theta regularly somehow enhances immune functioning, heightens creativity, and can facilitate profound "integrative experiences" and life transforming moments.

Erickson the hypnotherapist seized on these moments of common everyday trance to implant life-changing suggestions in the minds of his clients – the secret to his so-called "miracle cures". More recently, researchers have found that the theta state is characterized by hypersuggestibility and hyperreceptivity. It is, they have discovered, a state in which suggestions for behavioral change can have dramatic and longlasting effects. Again, by using mind tools to accentuate, augment and deepen the body's natural theta state, we can learn to quickly and reliably put ourselves into hyper-receptive states. At these times, by combining mind tools with suggestions to ourselves – verbally or in the form of images or feelings – we can intensify our Common Everyday Trance to implant powerful messages for personal growth, healing and transformation.

By being aware that we have a natural tendency to be more pessimistic and to underestimate our own powers while in our trough, we can reassure ourselves and take a more realistic view of ourselves and our situation. Awareness of our position on the life wave helps us avoid being discouraged or disheartened, since we can remind ourselves that our current life rhythm causes us to see things a bit pessimistically.

By becoming aware of our natural life wave, and "troughing the trough," we can enter a natural theta state.

PEAKING THE PEAKS

Once you've become aware of the rise and fall of your ultradian life wave, you'll be ready to "seize the hour" and make the most effective use of those times when you are at your peak. These are the times to undertake your most challenging tasks, to use your energies and enthusiasm to communicate your ideas and visions clearly and compellingly to others. These are the times to schedule your important meetings, to set personal records, to exercise, to be with friends, to make love. But it's also useful to be aware that at these times we can be unrealistically optimistic, and overestimate our own powers. By being aware of this tendency as it arises at our life-wave peak, we can remain optimistic, but temper our natural confidence with realism.

The most common use of mind tools is during the natural healing periods, the troughs. By using mind tools to get the most out of these periods of profound rest and regeneration, you will have more energy, more power, more intelligence and more creativity

MEGABRAIN REPORT

ULTRADIAN RHYTHMS AND MIND MACHINES *CONTINUED*

for these peak moments: by troughing the troughs, you peak your peaks.

But there are a variety of ways you can actively use mind tools during your peaks to increase the power and effectiveness of these heightened moments. Some of these involve activating “anchors” or using “cues” or personal signals to trigger heightened states that you have prepared yourself for in earlier sessions. Other ways include using devices or tapes that stimulate you in the energizing beta frequencies.

AROUSAL AND FLOW

It has been repeatedly verified that peak performance depends on optimal levels of arousal. Too much arousal is experienced as anxiety, and can cause performance anxiety, stage fright or choking, and performance deteriorates. Too little arousal means you’re simply not alert enough – too laid back or too bored – to deliver a peak performance.

One of the most valuable functions of mind technology is as tools for controlling arousal. A variety of mind tools permit the user to either turn arousal levels up or down (by increasing or decreasing the frequency of the light flashes or the binaural beats, for example). So once you’ve mapped out your life wave, and are aware of your peak periods, you can make appropriate use of mind tools. If you have to give a speech or make a presentation and your arousal levels are too high or too low, you can alter your levels of arousal until you feel you’re at a level that is just right.

ULTRADIAN BREATHWORKS

As we noted earlier, one key ultradian cycle is the wavelike shift in hemispheric dominance. Over a period that averages 120 minutes, but that can vary from 25 to 200 minutes, dominance shifts back and forth between hemispheres. Research by neuroscientist David Shannahoff-Khalsa of Salk Institute for Biological Sciences and others suggests that this dominance is mirrored by shifts in the flow of breath through the right and left nostril. In general, because the brain is “cross-wired” with the body (i.e. right hemisphere linked to the left half of the body, left hemisphere linked to right body) when the right nostril is more

open – i.e. breath flows more easily through it – the left brain hemisphere is dominant, and vice versa.

This discovery, as Shannahoff-Khalsa observed, “suggests we can exert more control over our day-to-day mental functioning. For example, certain cognitive functions, such as language skills, mathematics and other rational processes that are thought to be

primarily localized in the left hemisphere” might be boosted by “forcibly altering” our cerebral dominance. And in the same way we might “accentuate the creativity that is thought to be characteristic of right-hemisphere dominance,” through similar forcible altering.

Chinese scholar and student of Taoism Daniel P. Reid points out that “Taoists have been aware of this for millennia.” Reid notes that Taoist teachings have traditionally emphasized that “When air flows in through the right nostril, the body is geared for action. When air flows in through the left side, the body is prepared for physically passive mental functions. In Taoist parlance, the left nostril is identified with Yin, the right with Yang.” In the Taoist tradition, Yin represents darkness, passivity, receptivity, woman, water, earth, softness, contraction, coldness, and is clearly congruent with our modern concept of the qualities of the right hemisphere. In the Taoist tradition Yang represents light, activity, resistance, hardness, expansion, outward movement, man, fire, heaven, and is also certainly in line with our modern view of the left hemisphere’s logical, linear, verbal, happy, extraverted qualities.

Like neuroscientist Shannahoff-Khalsa, Taoist masters advise maintaining an equilibrium of Yin and Yang energies throughout the body by forcefully altering and balancing the flow of air through the nostrils. One technique for doing this is an ancient yogi pranayama practice: breathing solely through the right nostril to activate the left hemisphere (the yogis called this the “sun breath”) or through the left nostril to activate the right hemisphere (“moon breath”). This can also be done by lying down on the side that is clear and breathing deeply through the nose – that is, lying on your right side will tend to open up your left nostril.

It is possible to use certain mind technologies to learn to selectively activate areas of the brain or specific hemispheres. Biofeedback specialists have found that, when they are given EEG feedback from specific areas of the brain, most people can learn to activate certain areas. Some biofeedback EEGs can be used as training tools for learning to activate specific hemispheres or areas of the brain.

By using brain tools to heighten our sensitivity to our rhythmic shifts of hemispheric dominance, just as we used them to increase our awareness of our ultradian life wave, we can learn to make optimal use of the particular powers of each brain hemisphere.

THE INTERPLAY BETWEEN HEMISPHERES AND THE REST - ACTIVITY CYCLE

Since the rhythm of the shift of hemispheric dominance may be shorter or longer than the rhythm of our 90- to 120-minute ultradian life wave, we will find ourselves becoming aware of a variety of potential

By using brain tools to heighten our sensitivity to our rhythmic shifts of hemispheric dominance, we can learn to make optimal use of the particular powers of each brain hemisphere.

mind-body states as the two separate cycles move into different relationships between themselves. For example, many people find that reaching the peak in our basic rest-activity life wave, with its accompanying high physical energy, while the right hemisphere is dominant in the brain, seems to produce emotionally charged, highly creative and productive states. Peaking out in the rest-activity cycle while in a left-dominant state, on the other hand, can produce a more euphoric, extroverted state of absolute self-confidence and self-assurance.

TUNING THE DEMONS OF THE DOUBLE WHAMMY. For those who are not aware of the effects of their ultradian life wave and the characteristics of right hemisphere dominance, being in a right-hemisphere dominant state while going through the trough, or the bottom of the wave, can produce a sort of “double whammy” that is experienced as depression, fatigue or unpredictable mood-swings. On the other hand, once we’ve become aware of the potentials of this combination, we can use it, and “tune” it with a mind tool to project ourselves into deeply introspective states in which we find unexpected flashes of insight, or gain access to highly emotional images and memories.

Theoretically, learning how to consciously control hemispheric dominance can be a powerful tool for boosting our ability to deal most effectively with the task at hand. If you’re going into a conference, taking a written test, or faced with some other task that requires left hemisphere capabilities, and you find that you are in a right hemisphere dominant phase, for example, you might want to shift quickly into left hemisphere dominance.

THE SYNERGY OF BALANCE

However, perhaps the most powerful application of mind technology to hemispheric dominance is to create a state of hemispheric *balance*. It’s been discovered that during each cycle of shifting hemispheric dominance there is a period of time during which

dominance is equally balanced between both hemispheres. And, researchers have suggested, it is during this period of time that the brain is at its most fertile and creative. Two brains are better than one. The two hemispheres are complementary, and when working together produce synergy, defined by Buckminster Fuller as “behavior of whole systems unpre-

dicted by the separately observed behaviors of any of the system’s separate parts.” Whether we are in a peak period of our ultradian life wave or going through a trough period of deep rest and recuperation, we are at our best when the two hemispheres are functioning together, synergistically.

Two brains are better than one. The two hemispheres are complementary, and when working together produce synergy.

In his studies of the brain wave patterns of hundreds of peak performance individuals, biofeedback researcher C. Maxwell Cade found that “all the unusual abilities that some people are able to manifest ... are associated with changes in the EEG pattern toward a more bilaterally symmetrical and integrated form.”

As noted above, it’s also clear that the sides of the body itself shift dominance regularly. It makes sense to believe that just as brain symmetry and integration of both hemispheres seem to be linked to peak brain performance, so the integration of the right and left sides of the body are keys to peak physical performance. Says David Shannahoff Khalsa, who discovered the switch in dominance of body sides, it may be crucial to identify and make use of the “crossover point.” “My chief interest,” he says, “is in finding measureable changes that correlate with yogic medicine. The yogi, of course, tries to maintain a ‘life force’ understood to be the optimal balance of the two sides.”

It’s evident that a highly integrated brain, a brain in which both hemispheres are functioning in symmetry, synchrony, harmony and unity is a key to peak states and peak human performance. The same may be true of physical balance between the two sides of the body. But throughout history, humans have found that it’s not easy to intentionally bring both hemispheres to bear simultaneously (or to reach that ideal point of physical balance when both sides of the body are working together with optimal coordination). Much of our lives we spend swinging back and forth between left dominant states and right dominant states. This is where mind tools represent a real breakthrough: they can effectively produce more symmetrical, balanced brainwave dominance. It’s probable that they can also help the body become more integrated and balanced between right and left. And, the evidence suggests, by doing so they can assist in producing the optimal states associated with whole-brain, whole-body integration.

PICKING THE RIGHT TIME

One example of how being aware of your personal ultradian rhythm can enhance your mind machine use is in the area of accelerated learning. In the last few issues of Megabrain Report (such as in “Beyond Entertainment: How to Use Mind Machines for Peak Performance,” MBR #4) I presented a number of strategies for using mind tools for accelerated learning, including suggestions for In-Session Learning (presenting the material to be learned while actually in-session with your mind technology), Post-Session Learning, and Pre-Session Learning.

Below are some suggestions for how you can enhance your learning powers by timing your sessions in accordance with your life wave.

MEGABRAIN REPORT

ULTRADIAN RHYTHMS AND MIND MACHINES *CONTINUED*

IN-SESSION LEARNING

If you have charted out your life wave, or are generally aware of your ultradian rhythm cycle, you will be able to pick out the best times for accelerated learning sessions with your mind tool. For learning information that requires your active participation or attention, the best times are the 20-45 minutes after you have hit the peak of your wave. This period, while you're on the downslope of your ultradian rest-activity cycle, but before you hit your drowsy 20 minute trough, is a time you can relax easily, yet remain attentive enough to absorb the information well. The drowsy dreamlike trough period that follows then permits the information you have absorbed to consolidate and "set" in long term memory. Another good spot for active learning is the 30 minutes or so after you emerge from your ultradian trough.

For learning that has to do with changing attitudes and beliefs, and other types of learning that you want to bypass your conscious mind and get directly into your unconscious, the 20 minute ultradian trough, with its natural increase in theta activity, and trance-associated increase in suggestibility is the ideal time.

Many people find that they learn more rapidly and effectively when they receive the material in different states, ranging from relaxed alertness to drowsy twilight states. The best technique is to begin presenting the material to be learned while on the downslope of your ultradian cycle, continue presenting the material throughout the 20 minute trough period, and continue on into the upswing.

POST-SESSION LEARNING

Since you want to emerge from your session rested, alert and lucid, you may benefit by timing your session to coincide with the trough period of your ultradian rest-activity cycle. This will permit you to emerge as your life wave is swinging upward toward its peak. The average person whose waking day ranges from about 7 a.m. to 11 p.m., might time this pre-learning session to take place during the midmorning slump/coffee break (usually around 10:30 a.m.), the after lunch daze (about 1:30 p.m.), the mid-afternoon siesta (about 3:30 p.m.), or the after-work recovery period (about 5:30 to 7 p.m.).

PRE-SESSION LEARNING

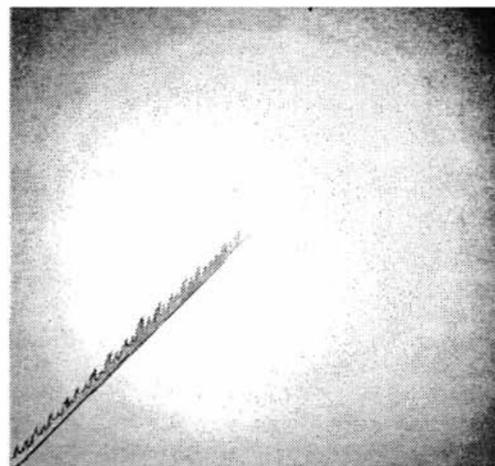
An ideal period for studying or presenting the material to be learned is when you are at your peak or moving past your peak. After a learning period ranging from a few minutes to 45 minutes, you will feel when your energies and attention is flagging. That's the time to begin your mind technology session, which should last through your ultradian

trough period. Ideally your session should last for an hour, during which time the material can be assimilated without facing competing stimuli, thus permitting the "reminiscence effect." This relaxed session will permit you to emerge feeling refreshed and alert, with the material now a permanent part of your memory. Upon emerging, you may find it helpful to take a brief period to review the materials you learned prior to the session.

SUGGESTED READING.

A primary source for much of the information in this article has been *The Twenty-Minute Break* by Ernest Lawrence Rossi and David Mimmons (Los Angeles: Tarcher, 1991). It is highly recommended for those who seek more information about ultradian rhythms and how to use them to enhance their lives. ▲●■

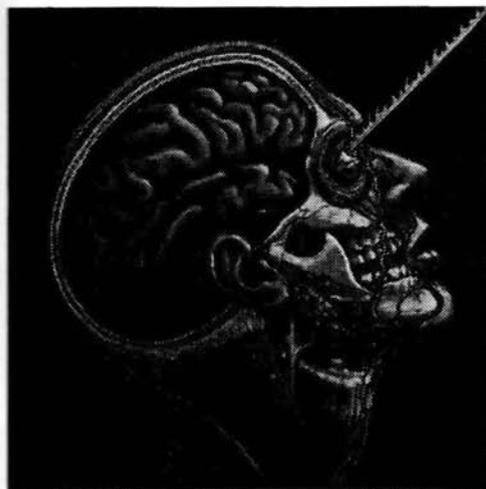
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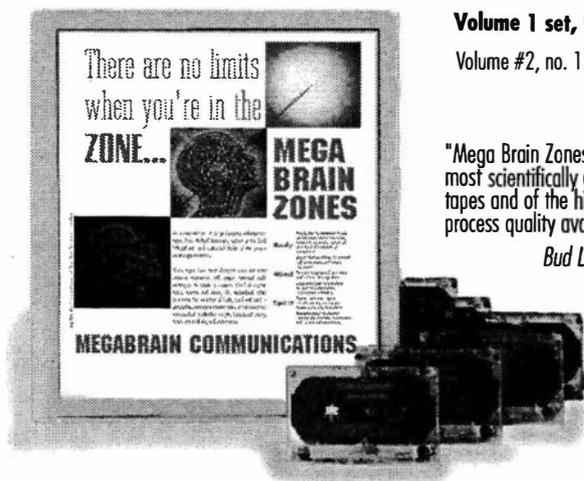
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Electric Pioneer: The Bioelectric Interviews, Part Two: Eminent CES researcher Ray Smith reveals his successes in using CES for reversal of so-called "permanent brain damage," treatment of alcoholism, drug addiction, anxiety and phobia, and much more.

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Megabrain Forum--Comparing the Effects of Meditation, Biofeedback and Mind Machines: discussions by experts Dr. Thomas Budzynski, Dr. George Fritz and others.

Roll Your Own--Schematic for a Rife-type Frequency Generator: Electromagnetic innovator Bob Beck describes how you can build the controversial "frequency therapy" instrument banned by the FDA, for under \$275.

Light--Medicine of the Future: a look at the new book by light researcher Jacob Liberman.

The Mind-Body Database Project: An overview of a "cooperative information-gathering project" and international online database focused on consciousness technology.

The New Science of Brain Growth and IQ Improvement: new research and books exploring the impact of stimulation on brain growth (by leading authority Marian Diamond) and on intelligence and giftedness.

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In Search of the Wild Scalar--The Bioelectric Interviews, Part Three: Foremost scalar theoretician Col. Tom Bearden reveals links between new scalar breakthroughs and teleportation, mind control, scalar weaponry; physicists Elizabeth Rauscher and Bill Van Bise challenge Bearden; neurochemist Glen Rein explains his investigations of the effects of scalar fields on biological systems.

Brain Tech Treatments of Learning Disorders: New breakthroughs in using photic stimulation, light/sound machines, and CES for the treatment of learning disabilities.

New Biocircuits Research Provides Evidence of "Subtle Energies": Dr. Julian Isaacs describes his startling evidence about the effects of Biocircuits, the first fully controlled double blind study of a subtle energy device ever performed.

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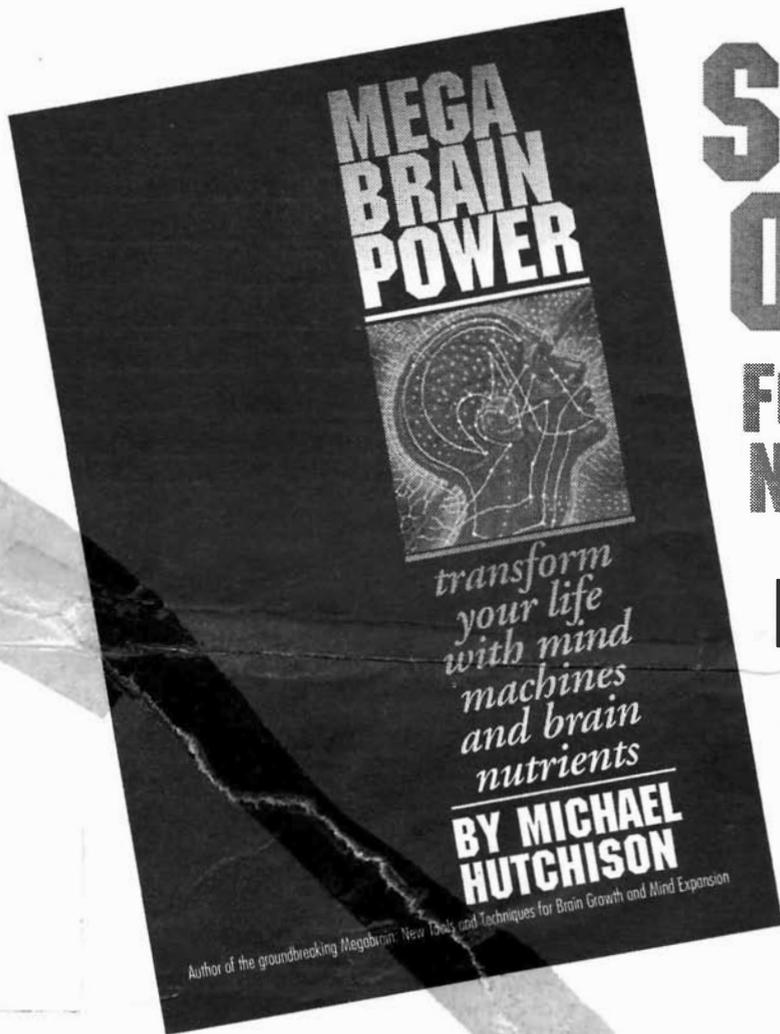
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22 December 1993

Dear friends and subscribers,

With this letter, you will have issue number 6, (Vol 2 No. 2). The EEG (issue number 7) will be out the end of February.

Our enormous mailing in September-October, announcing the formation of Megabrain Communications and promoting the new tape series, generated a tremendous response for tapes and subscriptions. It also triggered an enormous volume of calls from people wanting more information and to find out the status of their subscription. Half of the people calling never left mailing addresses, resulting in a 4-6 week pile-up of phone messages. Frankly, we did not anticipate this.

Starting the first week of January, we will have a small office staff to answer calls quickly and to reply to requests for information. There will even be a live person answering our 415-332-8323 number during regular business hours and voice mail at other times. Take heart, we're gettin' there !

With this issue, the mailing label shows your subscription status in terms of how many more issues you should expect the date of expiration.

The latest news is that Michael Hutchison's new book, MEGA BRAIN POWER - Transform Your Life with Mind Machines and Brain Nutrients, is being released MARCH 1st by Hyperion Books, a division of Walt Disney. For a preview of its table of contents, look inside this issue of Megabrain Report.

In appreciation for early renewals, we are offering autographed copies of Michael's book at a fantastic price ! These will be shipped via 2nd day US mail as soon as we receive them from the publisher, which should be before March 1st.

The special EEG issue has taken longer than expected, given its length and the number of contributions from different researchers. It will be ready by the end of February.

We are also planning a 6-part television documentary designed to take viewers from the current state of consciousness technology to what is likely to lie in the near future. Stay tuned!

Best wishes to you in this new year - one we expect will be full of significant developments for human evolution.

Alex Kochkin

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