

We are living in an age that is witnessing the birth of a new science. As surely as chemistry emerged from alchemy during the Renaissance, as surely as psychology emerged from philosophy during the Age of Reason, a true science of consciousness is emerging in our time from the convergence of psychology, physiology, biochemistry, ethology, psychopharmacology, systems analysis, media analysis, and a host of other compartments of knowledge whose final contributions to the whole have yet to be determined.

Much as alchemy laid claim to being the complete science of matter before being superseded and transcended by chemistry and atomic physics, psychology (in diverse and sometimes conflicting schools), biochemistry, biophysics, and even physiology all have some tenuous claim to being definitive sciences of consciousness.

The psychologies of mental states—whether Freudian, Jungian, neo-Freudian, or eclectic—study the mind of man and thus have rival claims to being the science of mind. But is a "science of mind" a true science of consciousness? Behavioral psychology denies the relevance of "consciousness" or "mind" and declares that to understand human repertoires of behavior is to understand man, the thinking animal. Can a science that declares "consciousness" and "mind" irrelevant be a true science of consciousness? Biochemistry, biophysics, and physiology are attempting to describe totally the physical nature of brain, nervous system and endocrine system and how they interact on a cellular and ultimately molecular level. But would a complete picture of brain, nervous, and endocrine biophysics and biochemistry be a true science of consciousness?

We have an impressive (if as yet incomplete) science of the mind as we subjectively experience it in classical psychology, we have a pretty fair science of human behavior as we observe it externally in behavioral psychology, and we have an ever-more-cogent body of knowledge about the physical equipment in which consciousness is somehow generated. We have a science of the mind and we have a science of the brain, but as yet we have no science of the mind-brain interface, of consciousness itself.

Not quite yet.

Consider some of the unanswered questions about consciousness, beginning with the biggest one of all: just what *is* it? The biochemists and physiologists can give us fairly detailed descriptions of the biological equipment that generates what we subjectively experience as our own consciousness, but they have yet to explain *how* our biological equipment generates consciousness, or just what consciousness *is* in a physical sense. The psychologists have constructed elaborate and useful maps of our psychic territories, but the maps are still full of blank spaces and offer no key to the nature of the interface between thought and matter.

We do not really know how the brain stores memory or generates thought in an absolute physical sense. We do not know many of the physical correlatives of mental disorders, or of other "non-ordinary" but verified mental states such as creativity, hypnotic trance, mystic ecstasy, dreaming, hypnagogia (sleep), or positive hysteria. We can point to physiological and biochemical changes in the body *associated* with some of these mental states, but we cannot delineate *how* these states are generated on a physical level.

We do not even have firm knowledge of the total range of capabilities of human consciousness on a physical or even mental level. Psychosomatic illness is pretty much a demonstrable fact, but the actual linkage between altered mental- state and altered somatic state is largely unknown. Less clearly documented than psychosomatic illness but just as real is *its* reverse: so-called spontaneous remission of so-called incurable diseases, whether through hypnosis, "faith healing," or the patient's influence over his own somatic state by metaphorically transmogrified act of will. An enormous amount of data has been-accumulated on telepathy, precognition, psychokinesis, and other so-called extrasensory mental phenomena. While more of it than not seems quite dubious, there does seem to be a preponderant weight of evidence to suggest that at least some human beings have some capability in some of these areas. Thoroughly documented studies in India have proven that yogis can consciously control what were previously considered strictly autonomic functions such as heartbeat and respiration rates. *How* their altered mental states produce altered somatic states is as yet unknown. It seems clear that the powers

inherent in human consciousness even in its present evolutionary state have not yet been fully described.

The very core of all human experience, knowledge, intuition, and logic—the phenomenon of consciousness itself—is the largest gap in our scientific picture of the universe. We have more rigorous knowledge about galaxies a billion light-years away or subatomic particles than we do about that which discovers, remembers, and extrapolates from such knowledge—our own essential selves. At the center of our scientific *weltanschauung* is an enormous void.

Which is not to say that the phenomenon of consciousness will forever remain an unknowable mystery, the preserve of theologians, mystics; and Platonic idealists. For now, in the second half of the Twentieth Century, half a dozen or more established sciences and at least as many aborted or nascent proto-sciences are converging on the mind-matter interface. Some, like psychopharmacology, endocrinology, and brain physiology, are moving inward from the systemic and cellular level toward the molecular and atomic level, where matter and energy are revealed as aspects of each other, ultimately, perhaps, as pattern itself. Others, like media analysis, Noetics, and perceptual psychology, are moving outward from the study of interior mental states to the physical matrices and determinants of what conventional psychology calls the mind. The interface toward which they are converging is the line between internal and external reality, between thought and mass-energy phenomena, between mind and matter. Ultimately, and perhaps sooner than we think, the two trends will meet and meld along that interface between the psychic and the somatic, which is consciousness itself. At that point, the divide between the inner reality of the psyche and the outer reality of mass-energy phenomena will evaporate, giving birth to the new science of consciousness, which might be called *psychesomics*, the science of the somatic and physical nature of mind.

What will the new science of consciousness be like? Predicting what an as-yet-unborn science will discover is a doubly dubious occupation, but it is not all that difficult to predict the sort of questions *psychesomics* will seek to answer. First and foremost, of course, any science of consciousness must ask what consciousness *is*, in empirical phenomenological terms.

If we define the "mind" as the sum total of all the mental states we experience—that is, the subject matter of classical psychology—then we can define "consciousness" as that objective verifiable phenomenon which gives rise to what we experience as internal mental states. As such, consciousness must be simultaneously a phenomenon of energy and/or matter and of the subjective reality inside our heads.

*Psychesomics* must therefore seek to discover and elucidate the physical mechanisms of memory and thought. A science of consciousness must develop a coherent theory linking our subjective mental experience with the objective universe of matter and energy, encompassing all that is known about both spheres without contradiction. It must then test all aspects of such a theory experimentally. If the experimental evidence contradicts the theory, a new theory must be constructed and the process continued until there is a theory of consciousness comparable in rigor and predictive usefulness to the periodic table of the elements, quantum mechanics, or the biochemist's model of the DNA molecule.

From where we stand today, this may seem a tall order, and in some respects it is. Biologists have only a series of tentative theories of how the brain stores memory and generates thought.

Some contend that memory is stored in the RNA molecules of the brain. Brain tissue is known to be unusually rich in RNA, and since the RNA structure is complex enough to transmit genetic coding, it certainly—at least theoretically—has sufficient information-storage potential. Experiments with planeria worms and with rats tend to show that at least some sort of memories can be transferred by injecting brain RNA from one animal into another.

Other biologist: think that memory is coded into the actual pathways between the neurons of the brain. Each neuron (and the brain contains billions of such nerve cells) is connected by synapses to thousands of others, so that the total number of possible neural pathways far exceeds the information-storage capacity theoretically needed to store a lifetime's memories and to serve as the matrix for moment-to-moment thought. The theory here is that memory consists of well-worn paths from neuron to neuron; that nerve impulses, having traveled on a particular neural pathway, have a greater tendency to continue to flow down that pathway than to flow down a fresh path, due, perhaps, to reduced electrical

resistance. Memory-traces, then, would be coded into these patterns of reduced electrical resistance in the brain's neural network.

Yet another theory likens the brain to a holographic plate and memory to a hologram. A hologram stores visual information as interference patterns, so that information on the total picture is distributed throughout the holographic plate, unlike a conventional photograph where each point on the photographed object has a one-for-one correspondence to a locus on the film. If you cut a piece out of a conventional frame of film, there is a gap in the picture, but any part of a holographic plate will reproduce the holographic image, though the less complete the plate is, the fuzzier the image will be. Proponents of a holographic theory of memory would contend that memory is stored holographically in the brain, either, in the neural pathways, the RNA molecules, or electrodynamically as the discharge patterns of brain cells. This would certainly account for the "fuzziness" of some memory, the ability to retrieve apparently lost memories under unusual circumstances (particularly electrical stimulation) and for the ability of people who have lost areas of their brains to sometimes regain lost functions by retraining other areas of the brain to assume them.

Both the RNA storage theory and the neural pathway storage theory might explain memory, but how do they account for present-time thought? This sort of chemical or physiological encoding and decoding simply could not take place fast enough to actually *be* continuous moment-to-moment thought. Moreover, though either RNA or neural pathway encoding might explain the brain's memory-storage capacity, neither even begins to explain what it is that *does* the encoding and decoding or what it is that experiences the end-result as "thought." These are theories of *memory*, not of consciousness, because they do not even begin to bridge the gap between the matter-energy phenomena of the brain and the mental-state phenomena of the mind. They may have a part to play in the formulation of a working theory of consciousness, but neither is a theory of consciousness itself.

The holographic theory, while still only a theory of memory-storage in its present form, may ultimately prove critical in the development of a valid theory of consciousness. While it does not really attempt to bridge the mind-matter interface, it does point the way toward a possible basis for grounding the mental-state phenomena of the mind in the matter-energy phenomena of the brain in a way that contradicts neither our subjective experience of the mind nor our present objective knowledge of the brain. Ironically it may prove to be a better explanation of thought than of memory.

These theories of the physical basis of thought and memory, however, are only half of the current input into the emerging science of psychesomics. On the other side of the brain-mind interface, minds are studying their own internal states, trying to relate them more and more to external parameters, trying, as many psychologists have always tried, to objectify a science of mind.

The Freudians, neo-Freudians, and Jungians have concentrated on how external events and inner mental events and structures interrelate and feed back on a content basis, leaving it to the perceptual psychologists to explore how the senses actually transfer information from the external universe into their sphere of study, the interior world of the mind. For their part, the perceptual psychologists have concentrated on how the sense organs and their associated apparatus create sensory images in the brain. Neither have really paid much attention to the relationship between the total sensory image conveyed to us by our sensory apparatus and our inner mental states.

Now, however, Marshall McLuhan's central insight that "the medium is the message" is being extended into a substream of psychesomics, media analysis, whose area of study is exactly that interface between our sensory image of the outer world and our inner mental state: the sensorium.

The sensorium—the total constellation of sensory images transmitted to the brain by our sensory apparatus—is our experience of outer reality. Whatever relationships our mental states and structures, brain chemistry and physics, and endocrine system have with external reality are really relationships between these inner factors and our *sensory images* of outer reality. Indeed, it would not be going too far to say that what we experience as "the mind" is the interaction between the sensorium and the biochemical and bioelectrical mechanisms of brain, nervous system, and endocrine system.

Here we begin to approach a major element of a theory of consciousness from the inside out. McLuhan, in his book "Understanding Media," and elsewhere, has given many examples of how

alteration of the sensorium has altered inner mental states, or, if you will, has altered consciousness. The invention of movable type and the consequent wide distribution of printed matter and literacy altered human consciousness by putting additional emphasis on the visual component of the sensorium and by encouraging a more sequential, linear mode of thinking. Film montage, by presenting the sensorium with multiple intercut realities, drastically altered our consciousness of time, space, and sequence. Television extended our realtime senses of vision and hearing to the far corners of the world and ultimately beyond, to space and the Moon, altering, among many other things, our psychic relationship with the planet Earth, leading directly to the new ecological consciousness. Rock music, with its partial emphasis on the tactile component of sound, has to some extent reoriented our sensoriums toward greater emphasis on hearing and the tactile senses, with a resulting alteration of consciousness that has produced an entire "counterculture."

By studying how alterations of the sensorium have altered our interior mental states, McLuhanistic media analysis has shown us that, in a very real sense, the interface of the senses with our internal biochemical and bioelectrical equipment is the locus of consciousness, indeed may be consciousness itself.

And another nascent substream of psychesomics, psychopharmacology, is trying to come up with the other half of the equation by attempting to systematize and deepen our knowledge of how alterations in our internal chemical states alter our internal mental states. If consciousness is indeed the interface between the sensorium and the biochemistry of brain, nervous system, and endocrine system, then, at least in theory, fully developed sciences of the sensorium and of psychopharmacology should imply a science of consciousness itself.

We can now begin to see what a theory of consciousness would have to be like. It would have to draw upon what we know of brain and nervous system physiology, biophysics, and chemistry, endocrinology, psychopharmacology, the sensorium, and internal mental states. Using systems analysis, information theory, logic, and a good helping of pure intuition, it would have to meld what we know about these areas into a seamless whole which accounts for what we experience as "the mind" in objective mass-energy phenomena terms.

When will it be possible to construct such a hypothesis and thereby create a true science of psychesomics? The answer, I believe, is now. To propose a theory of consciousness is not to claim that the theory is necessarily proven. To say that the existence of a theory of consciousness creates a science of consciousness is not to imply that the full subject matter of that science has necessarily been thoroughly explored. Chemistry was a science before the periodic table was fully elucidated, physics was a science before fine atomic structure was pinned down, and today astronomy is a science even though it presents several contradictory theories of the nature of the universe. A science of consciousness comes into being when one or more theories of consciousness are proposed which can be either confirmed or proven invalid by classical scientific method. A science comes into being when it has a subject matter to be explored experimentally and observationally and when it has at least some theoretical parameters for that exploration, not when it has *completed* its work.

With that large disclaimer, I would like to present a hypothetical theory of consciousness, not so much to contend that it is necessarily valid, as to demonstrate by example that it is possible to construct tentative theories of consciousness from data presently available; that in this sense, at least, a science of psychesomics exists right now.

Let's start by organizing the obvious in a systematic manner, by putting together a systems model of consciousness in terms of what we know about inputs, outputs, and subsystems. (See diagram.)

Consider the brain itself as one subsystem of consciousness, the central subsystem through which must pass the inputs and outputs of all the other subsystems. Three subsystems located within the human organism input into the brain: the biochemistry of the body (factors like endocrine balance, blood-sugar level, et cetera), the internal sensory system (somatic senses, such as hunger, muscular tension, sexual

arousal, fatigue), and the external sensory system (vision, hearing, smell, taste, touch, thermal sensitivity, and perhaps other more subtle senses of which we are not yet consciously aware). The body biochemistry system has a feedback relationship with the brain; the sensory systems are one-way conduits for input data, and are in turn functioning in a complex biochemical matrix. Already, we see that on a sheer animal level a brain in a living body with sense-receptors is a system of considerable complexity and many intertwined feedback loops. Your dog is certainly capable of non-predictable behavior, he does too have a "personality"!

But in addition to our biological subsystems and sub-sub-systems whirling ever-changing patterns of electrical impulses through the neuron tissue of our brains, we have piled on our own complications and recombinations. We have created *language*. (Or language has created us?) Language is information put into the brain or output from it which is coded in a way that enables it to remain relatively unaffected by the vagaries of our biochemical matrix. Language is perceived as pure symbol, not sensory experience: words, music, mathematics. As such, it is yet another separate subsystem in a feedback relationship with the human brain.

The body biochemistry and sensory subsystems interface on the sensorium, or to put it another way, by interfacing, they form the sensorium. Thus the sensorium is the total matrix of the reality we perceive, "the little man behind our eyeballs." Only he isn't behind our eyeballs all the time. At times, the major focus of our consciousness resides in a portion of the sensorium other than vision, such as when we're making love, or listening intently to music.

But even the sensorium is not a system which contains consciousness. For language, man's perception and creation of trans-sensory symbols, inputs into the total consciousness system independent of the sensorium, though using its input channels.

The total human consciousness system may be defined as the system containing all the previously mentioned subsystems, sub-sub-systems, and feedback loops. Quite a bowl of spaghetti, isn't it? And its total configuration is never constant from moment to moment. If you took timewise slices, no instantaneous constellation of patterns would ever repeat. So much for determinism.

But the complications don't end when we have encompassed the boundaries of the human consciousness system, for since, the invention of culture and artifact, the human consciousness system has entered into a complex series of feedback relationships with the external environment. We can alter our body biochemistry subsystem with drugs, systems of exercise and breathing, electrical stimulation, surgery, meditation, air pollution, diets, and so forth. Our cultural patterns—laws, esthetics, religions, music, color preferences, art, beliefs, et cetera—create internal events in the human consciousness system and are in turn creations of human consciousness. Brain electrical fields may interact harmonically under some conditions with other brain fields or environmental electrical fields—yet another possible feedback relationship between the human consciousness system and the external environment. We seem to invent more such feedback relationships every day: art forms, drugs, cultural patterns, new sciences, electronic extensions of our senses.

Where does what we experience as "the mind" actually reside in this almost infinitely complicated human consciousness system? By now, the answer seems obvious. The mind, our moment-to-moment mental states colored with memory and expectation, is not localized or focused in *any* of the subsystems of human consciousness. It is an overall phenomenon of the human consciousness system itself. The total system of systems is the total matrix of the mind, and consciousness is distributed throughout the human consciousness system. It is a second-order pattern phenomenon, a "pattern of patterns."

Or, to come at it from the other direction ...

We have three basic theories of how memory is stored in the brain. Either it is chemically encoded in brain RNA or some other molecule or molecules, or it is patterns of relative electrical resistance imprinted on neural pathways, or it is some kind of pattern in the electrical impulses perpetually cross-zipping from neuron to neuron.

Or, of course, the total phenomena of memory could involve two or three of these encoding systems. Perhaps memories are stored on the physiological, molecular, and electronic levels in some unknown combination. But at any rate, these three methods or combinations thereof seem to be the only ways in

which the brain can store memories.

Let's look at just what inputs for storage. The major portion of input to the consciousness system comes through the sensory systems as a nerve impulse, as charges of electricity. Even the pure symbols of language are still transmitted as bioelectricity. The rest of the input comes from the body biochemistry system on a molecular level. Since our memory input comes from a bioelectric and biochemical bouillabaisse, it is quite likely that some memory may be coded into RNA or other molecules.

But when we move from memory-storage to moment-to-moment thought, to mental event, to the realtime phenomena of the mind, only an electronic system seems fast enough to account for what we observe happening inside our minds and in the world around us. We can assimilate a wavefront of visual signal every 1/24 of a second. We can encode or decode language as fast as two thousand words a minute. Pilots and racing drivers have reaction times measured in tenths of a second or less, not for mere reflex arcs, but with their brains circuited into the reaction process.

Thought seems to move at speeds far more characteristic of electronic phenomena than of chemical or physiological phenomena. So we will propose what seems a pretty likely (though as yet unverified) hypothesis: that consciousness must be at least partially an electronic-level phenomenon.

So let's take another look at the holographic theory of memory-storage and extend it to the instantaneous constellation of mental states of the realtime mind. We know that the millions of neurons in the brain are in a perpetual state of electronic flux, firing nerve impulses back and forth in ever-changing patterns along billions of possible neural pathways. We know that sensory data is pouring into this system as wavefront after wavefront of bioelectric nerve impulse. We know that the body biochemistry system is constantly altering the chemical matrix of these electronic events, perhaps somehow even kicking RNA memory up into the electronic level from time to time. (Dreams? Hallucinations? *Déjà vu*? Schizophrenia? What else?)

Interestingly enough, all subsystems of the human consciousness system input into this total electronic flux in one way or another. Apply the holographic theory of memory to one moment of this flux isolating the timewise slice as a constellation of memory bits. If the holographic theory is correct, this timewise slice of consciousness is diffusely stored throughout the total instantaneous electrical pattern. As are other constellations of memory bits from the timestream of the mind.

Now start time moving again. More wavefronts of electronic data enter the system from the senses, from internal mental events, encoding new memories into it electroholographically. But since all memory bits are stored holographically, former patterns do not have to be displaced or destroyed to make room for the new until the total system is saturated. The electronic memory bits move around areas of brain tissue, stored as something analogous to standing wave patterns. All the "standing wave patterns" of electronic impulses in the brain at any given moment *are* consciousness at that given time, forming a trans-temporal continuum, a kind of four-dimensional hologram.

This four-dimensional hologram has definite mass-energy existence as electronic impulses in the brain; it is not a mental state construct.

But it does contain all the elements of the "human consciousness system." It does perform all the functions of "the mind." Might it therefore not *be* the human consciousness system in both mass-energy and mental state terms? If this total electroholographic pattern has one-for-one correspondence with a functional and systems definition of human consciousness, would that not make it consciousness itself?

Whether ultimate investigation will confirm, modify, or invalidate this theory of consciousness, it *is* a theory of consciousness which unites mental state and mass-energy levels, proving, if nothing else, that such theories of consciousness can now be formulated. Proving that a science of psychesomics is a present possibility.

Once it has a theory to consider—in this case the electroholographic theory of consciousness—scientific inquiry must begin to ask two major questions. How can this theory be tested observationally and experimentally? If proven valid or partially valid, what good is it? In fact, it might be argued that theories, plus the work of answering these two questions about them, are what any science is all about.

What sort of experimental mad observational areas of exploration would tend to prove, disprove, or

modify such an electroholographic theory of consciousness? If the human consciousness system can be defined as the sum total of all subsystems of human consciousness, then a total physiological, biochemical, bioelectric picture of all the subsystems will be a complete picture of the total system in mass-energy terms as well. That is, once we have complete descriptions of the workings of our sensory systems, our body chemistry system, our nervous system, and our brain on physiological, cellular, molecular, and electronic levels, we will have a physical description of consciousness. We will not have a theory of consciousness, we will have hard scientific *knowledge* of what consciousness is and how it operates.

Therefore, all the current work in areas of brain chemistry, psychopharmacology, brain and nerve physiology, genetics (insofar as genetics is a study of RNA and DNA on a molecular level), biofeedback, electronic stimulation of the brain, chemical memory transfer, and all other studies of human consciousness subsystems is directly applicable toward proving, disproving, or modifying theories of human consciousness with hard scientific fact. This is another sense in which a science of psychesomics already exists today.

For the purposes of the specific electroholographic theory of consciousness, the key question, of course, is where and how are memories and thought generated and held in the matrix of the brain? Can the four-dimensional hologram of "standing wave patterns" of electronic nerve impulses be detected, recorded, and ultimately decoded? In theory, at least, if such a phenomenon exists, the answer must be yes. The growing sophistication of electroencephalography through the burgeoning interest in biofeedback techniques is moving us in this direction. Ultimately, psychopharmacology must seek to connect the molecular chemistry of the brain with the electronic nerve impulse level if it is to reach the point where it can really prescribe drugs designed to create any given mental state. Within ten years, we should *know* where and how memories and thoughts are contained in a physical matrix. Within ten years, we should have at least a rough *description* of consciousness as a mass-energy phenomenon, not just one or more unproven theories.

What good would such a science of psychesomics be? What insights would we gain from it? How could it improve or alter our lives? Let's look at a few random areas psychesomics might impinge upon as an applied science.

When we do have a complete and proven theory of memory and thought, I would suspect that it would prove to be somewhat more complicated than the electroholographic theory of consciousness, which leaves some significant questions unanswered. For instance, there is much evidence that at least some memory is stored in brain RNA. Perhaps consciousness consists of a series of electroholograms, each one associated with a general area of the brain. We know that many cerebral functions are to some extent localized. Electronic data from the sensory channels enter the appropriate electrohologram (through a switching pattern? or by direct nerve-circuit connection?) along with other electronic patterns created by internal cerebral event. Through attenuation of signal, trivial data and noise are extinguished (possibly through dreaming?) and the more significant patterns are retained as short- and medium-term memory in the electroholograms.

But since the accumulation of memory patterns in the electroholograms would eventually saturate the electronic matrix, patterns that persist long enough, or that group into similar meta-patterns, or both, may somehow become imprinted on RNA molecules and thus pass from the electroholographic thought and storage system into more permanent and static molecular memory banks.

If this is so, there may be a mass-energy correspondence to Freud's notions of conscious and unconscious minds. The unconscious may consist of the RNA memories, the conscious may be the electroholographic complex. Even the Jungian notion of the "Collective Unconscious" might fit in. The Collective Unconscious might turn out to be species RNA coding inherited from the genes that determine brain chemistry.

There is plenty of evidence to show that other species have such species RNA memory coding—the so-called instinctive behavior patterns of nesting and migrating birds, social insects, trapdoor spiders, wolf packs, and thousands of other species may very well be just that.

Most psychoses, then, may turn out to be imbalance or dysfunction between the electroholographic

mind and the RNA memory banks. It is known that drugs such as LSD can bring on schizoid and paranoid mental states. Such drugs might do one or both of two things. They might interfere with the electroholographic mind by tending to break up the patterns, or they might cause an undue amount of RNA-coded memories to be kicked up to the electroholographic level, interfering in its vital function as realtime data processor. People who are "washed over" by drugs may have had so much interference in their electroholographic minds that the patterns lost their temporal continuity and therefore their real-time stability. Schizophrenia could be a similar effect caused by a malfunction somewhere in the body biochemistry system. A fully developed science of psychesomics would be able to prescribe specific medicine for specific mental malfunctions. Or for that matter, specific drugs to induce any desired mental state.

A mature science of consciousness might come up with some answers about so-called extrasensory powers, which may turn out to be harmonic relationships between the electroholographic mind and other cerebroelectrical fields, or even other environmental electrical fields. If so, it should be possible to bring these electrofield interactions under more systematic conscious control and build extensions and amplifications of them in hardware, as we've done for our other senses.

Psychesomics may also help our evolutionary perspective. From a psychesomics viewpoint, we can define the evolution of consciousness as the evolution of total consciousness systems. The original organisms—the viruses-genes—are DNA molecules, so they obviously can have only one consciousness system, molecular coding. Their behavior, therefore, would be automatic and deterministic. Single cell organisms already have rudimentary sensory systems in addition to molecular programming, so they already have complex consciousness systems encompassing several interacting subsystems, and their actions are not quite predictable. By the time you get to complex multicellular animals with brains and spinal cords, complex endocrine systems, and sophisticated sensory equipment, you've got the ingredients for the electroholographic mind to make its appearance. At what phylogenic level this takes place is currently hard to pinpoint, probably somewhere between reptiles and mammals. Once the electroholographic mind makes its evolutionary appearance, the trend seems to be for proportionally ever more elaboration of the electroholographic consciousness until mice become men at the end of a smoothly continuous evolutionary development.

But since the tendency is for increasingly complex systems to generate ever more additional subsystems, the human consciousness system that evolved biologically has continued to evolve 'through the new subsystems it keeps creating for itself.

In these terms, it is an uncontrovertable fact that the evolution of human consciousness has continued past the phylogenic development of *Homo sapiens* as a species. One need only enumerate the subsystems of human consciousness that have evolved in cultural and historic times: language, the extended senses of the media, drugs, meditative techniques, biofeedback, logic, science.

On one hand, this implies that questions such as "Are dolphins sentient?" are meaningless. The real question should be: Can we describe the subsystems of dolphin consciousness and therefore the dolphin's total consciousness system? Consciousness is not even remotely unique to man. What is unique to man is *human* consciousness. "Sentience" is entirely an anthropocentric term.

On the other hand, a psychesomic perspective on evolution seems to imply that the direction of the evolution of consciousness is toward ever-increasing freedom from deterministic processes. The more subsystems a consciousness system contains, the more complex and genuinely unpredictable it becomes and the more new subsystems it generates—a geometrically progressive evolution toward total conscious control of ourselves and our destinies. A science of consciousness itself would be a major advance along this evolutionary vector.

And as a science of consciousness explores the very phenomena which created it, it will generate by its action new levels of consciousness for further exploration. As soon as the human consciousness system achieves a total knowledge of its subsystems, it will become a subsystem of a still larger system which includes the previous total human consciousness system plus a viewpoint outside it. Thus can a science of psychesomics consciously set out to evolve the human consciousness system which created it to ever more sophisticated and expanded levels of consciousness. Thus can we take the controls of our



further conscious evolution in our own hands and quite literally put ourselves in destiny's driver's seat.