

PSYCHOPHYSICS

NATURE-CULTURE & MIND-BODY RELATIONSHIPS

Abstract

The mind-body dichotomy is at least as old as the *nomos-physis* controversy in ancient Greece. Since then, thinkers have queried on the proper relation between the physical and mental or spiritual realms, in order to attain human excellence.

We hereby enjoin this quest by introducing the new Sociophysics paradigm to update this age-old quandary into the Twenty-first Century. The theory of Sociophysics attempts to apply the latest insights of the Natural into the Social Sciences.

In this particular study, we concentrate on psychology as the paradigmatic area where nature and culture, as well as mind and body intersect and interact. By a dialectic process juxtaposing the apparent contradiction of mind and body, psychophysics thus synthesizes them into a coherent Sociophysics system.

The thesis developed here is that classical ideas and ideals incorporate the appropriate wisdom of the ages, combined with the accumulated knowledge of the present, to analyze and clarify this historical quandary. On that basis, the particular application of this general thesis focuses on the importance of excellence and perfection in the ideal community where the citizen can participate in politics to the fullest.

The methodology will be theoretical, utilizing a systematic analysis of a three-dimensional conceptual framework, involving physiology, sociology and psychology. Each chapter will investigate the interfaces among these three aspects, thus placing the psycho-physical content in its socio-cultural context. Finally, the dialectic conclusion will draw the appropriate synoptic perspective.

Paris Arnopoulos,
Montreal, Canada,
Spring 2004

PSYCHOPHYSICS

NATURE-CULTURE MIND-BODY RELATIONSHIPS

INTRODUCTION

The **mind-body** dichotomy is at least as old as the *nomos-physis* controversy in ancient Greece. The debate whether man is primarily the result of nature or culture still goes on, with the best compromise situated somewhere between. Since the Greeks, later thinkers have continued studying the relation between the physical and mental or spiritual realms, especially as they apply to mankind.

There is by now compelling evidence connecting the neural and immune systems, both of which are influenced by environmental factors. Psychosomatic and sociobiologic correlations are accepted as important conditions of overall sickness and health. **Homeostasis**, the electrochemical process affecting emotions as well as organs, is recognized as the response of an internal psychophysical balance. Without falling into the sin of biological or physiological reductionism of complex phenomena, it is now safe to say that the interdisciplinary studies of sociobiology and psychosociology, macrobiotics and bioenergetics, as sociophysics and psychophysics, have a lot to contribute to a better understanding of human beliefs and behaviors.

We hereby enjoin this quest by introducing the new **Sociophysics** paradigm to update this age-old quandary into the Twenty-first Century. The theory of Sociophysics attempts to apply the latest insights of the Natural into the Social Sciences. In this particular study, we concentrate on psychology as the paradigmatic area where nature and culture, as well as mind and body intersect and interact, thereby coining it **Psychophysics**. By a dialectic process juxtaposing the apparent contradiction of mind and body, psychophysics synthesizes man's internal and external realms into a cogent and coherent system.

We proceed by discussing first the theoretical foundations of Psychophysics and then its connection to the Sociophysics paradigm. With this conceptual content and context of our subject, we then rise the *scala natura* of our reality from the simple being to complex life, from which emerge the organic-physical human brain and its ultimate byproduct of the logic-spiritual mind. These three chapters should give an overall first approximation picture of this extremely complicated mind-body relationship in its natural-cultural setting.

Historical Antecedents

The philosophy of science and society that so far has been dominated by two opposing schools of thought. Ever since the Greek Sophists, the so-called *nomos-physis* controversy pitted naturalists versus culturalists in what was eventually to become the **nature-nurture** debate.

The Greeks believed in the dialectic fusion of Apollonian reason and Dionysian emotion. The synthesis of male thesis and female antithesis results in the proper measure of Olympian wisdom. Similarly, the fusion of the male body *Eros* and the female soul *Psyche* produced *Hedone* or joy of pleasure. This corresponds to the fusion of matter (*yle*) and mind (*nous*).

Furthermore, the tripartite combination of body (*soma*), mind (*psyche*) and soul (*pneuma*) may result in the proper balance or harmony of opposites. The harmony between feeling (*aisthese*), instinct (*enstinkton*) and reason (*logike*) is the way to self-knowledge (*autognosis*), as well as self-control (*autoperiorismos*). Thus we have tight interrelations of the physiological, biological, psychological and sociological aspects not only of humanity but of nature at large.

Everything is alive and conscious, even if beings and things are so in different ways. This pan-animism is reflected in Plato's *Timeos* where life and logic are ascribed to all of nature. Following him, Aristotle and Galen, identified three faculties of the soul: reason, passion and appetite, situated in the brain, heart, and liver respectively. On that basis, Aristotle recognized a direct connection between mind and body by affirming that the soul sympathizes with the traumas of the body, as the body suffers with the aches of the soul.

On the contrary, Democritus in his atomic theory, emphasized physics as the basis of reality, according to which the mind was an epiphenomenon of the body. His follower, Epicurus tried to soften the blow of materialism by proposing that the mind arose from the random motion of atoms. Epictetus, later on however, put it more brutally when he said that man was little more than a small spirit carried around in a big corpse.

Since then, the body-mind dichotomy gave rise to Hume's is-ought antinomy. Since the body is grounded to the physical reality, while the mind or spirit soars above it, what is actually need not reflect what ought to be ideally. It is the mind that creates its ideals, which are not necessarily related to the reals, as the age-long controversy had it.

The rise of Natural Law philosophy tried to equate body and mind as two aspects of the same truth, and as such morality could be well grounded in reality. Reason, the ultimate product of human mind would be the means of deriving the right rules of conduct from the prevailing laws of nature. Naturalism thus puts rationalism within its context of realism and requires that ethics be grounded on physics.

Similarly, the body-mind dichotomy reflected the materialism-idealism controversy for the ultimate reality and its accompanying morality. Whether the rules of ethics can or must be found in physics, the search for these physical laws and moral rules went on for centuries until Hume with his famous guillotine put an end to it by proving that “ought” does not necessarily follow “is”. This meant that realism cannot logically support idealism, and ethics cannot rely on physics for its foundation. Be that as it may, although the logical necessity was found wanting, the body-mind relationship could not be permanently or totally denied.

Naturalism resurfaced in the Twentieth Century, as a byproduct of scientific progress with logical positivism of the Vienna Circle. Its adherents, Carnap, Menger and Neurath, combined Humean ontology, Kantian ethics, Russellian logic and of course Comtian sociology to revive rationalism and realism. Based on the empirical reductionism of Hume and the scientific unitarianism of Carnap, Wittgenstein effected a grand synthesis of transcendental realism emphasizing the essential unity of all science.

By mid-century, this attempt emerged as the dominant theory of Austro-German and Anglo-Saxon philosophy of science. More holistically, **Gaia** Theory and deep ecology now assert that the Earth is a living organism with a mind of its own. Finally, more scientifically, Quantum Theory assumes and investigates consciousness in everything.

This scientific naturalism gives precedence to pure science because it is more exact and better known than the human or social sciences. Its explanations usually tend to rely on physical prototypes translated into human or social symbolism. Whether reductionist (ontological) or scientist (epistemological), the two areas are thought to be identical. Therefore, what is apodeictically (synthetic, *a priori*) demonstrable is also analogically (analytic, *a posteriori*) comprehensible. Thus, there exist many explanatory models of abstract social concepts in terms of concrete natural systems: i.e. the Hobbesian Leviathan as an organic body-politic writ large, or simply: human society as an ant colony or bee hive.

The nomos-physis controversy may be modernized into the nature-nurture antithesis. In both, the question is whether human behavior stems primarily from natural genes or cultural memes. Is man a product of physiology and biology or sociology and pedagogy. The former favors and is preferred by natural conservatives, whereas the latter animates social engineers.

A human is an animal with a genetic brain infected by a mimetic mind, i.e. a cultivated primate. As his physical being is predetermined by innate genes, his social behavior is predisposed by environmental memes. Thus the symbiosis of cultural development and natural evolution produced a unique and distinct *homo sapiens*, above and beyond all other species.

Most recently, the age-long controversy may be resolved by genetic engineering in conjunction with social engineering producing a dialectic synthesis of these two positions, as designer genes combine with controlled memes to create biocyberman. This ultimate artificial development thus supplements natural evolution by combining nature and culture in the future of humanity.

Theoretical Foundations

Attempts to understand reality are metaphors from the known to the unknown: trying to explain the mysterious in terms of the commonplace. We adopt this process of advancing knowledge by forming various hypotheses that relate more to less familiar concepts. When these ideal constructs pass certain rigorous tests, they become scientific theories, incorporating the fundamental principles that make human experiences meaningful.

Theory gives meaning to experience by identifying phenomena and relating them to noumena. By this dialectic confrontation between the outer and inner worlds, theory serves as the synthetic intermediary that explains the former to the latter. Thus, whether implicit or explicit, a theoretical conjunction is necessary for human understanding.

For this reason, it is the task of theory to construct symbolic models of reality by distilling its essential components and rejecting irrelevant ones. On that basis, it is the task of science to corroborate the speculations of theory by rigorous empirical testing, thus proving some possibilities to be probabilities, if not certainties.

If science is a systematic activity of decoding empirical regularities and recoding them in explanatory generalities; then in order to be scientific one should combine rationality with reality or forms with facts. These requirements serve to ensure that theories are true and tested as well as logical and elegant. As reason validates the internal consistency of human intelligence, truth verifies its external correspondence with reality, whereas beauty evaluates its proper proportion.

Following these guidelines, we attempt to formulate a set of propositions whose empirical confirmation can then elevate them to the status of theory. Such process of theory-building begins with the dichotomy between external reality and internal mentality as its prime axiom, connecting percepts and concepts by interweaving mental images into formal systems. The propensity of the human mind to compare experiences by making distinctions and recognizing similarities is the basis of the Cartesian polarity between ourselves as *ens cogitans* and the world around us as *res extensa*.

This anthropocentric position recognizes the inter-subjectivity of human knowledge as both necessary and desirable in understanding and shaping our reality. From this perspective, human beings are creatures of their natural and social environments, as well as molders of both domains. A science of and by human beings should then look for the sources of human thought and behavior, not only in natural and social laws separately but in a combination of both, as intended here. Thus the relation between Sociophysics and Psychophysics depends on the mental aura of each brain overlapping with those of others to communicate socially as an emotional resonance.

Whether one begins with the Cartesian "*cogito ergo sum*" or some other dictum, existential reality is largely defined by the experiences and expressions of its participant-observers. Human sensibility arises from two related sources: one consisting of the phenomenal or sentient world and the other of the noumenal or mental realm. The first is considered the actual world of physics that is somehow related to the second virtual world of psychics. Our awareness is directed both outwards and inwards, so identifying and defining itself.

For that reason, following Hume, logical positivism divides human consciousness into formal and factual components, thus distinguishing between the inner realm of human

logic and the outer realm of empirical existence. That dualism, recognized for a long time as the matter-mind dichotomy, is reflected in various other opposites such as thought-action, concrete-abstract, substance-essence, subject-object. This practical reflectionism accepts the existential mirror-duality between interior and exterior domains by assuming the world as if it existed independently but accessibly to human reason.

The Triadic Paradigm

Traditional mind-body dichotomy has now become more sophisticated by placing the brain between these two polar opposites. The old division cannot stand alone because it ignores an intermediate reality. The mind is situated between brain and brawn, or neurophysiology and sociobiology. It thus mediates between nature and culture by relating psychophysical health and socioeconomic status. As has been often documented, dominant animals and people live longer, healthier lives.

In order not to forget the importance of the middle ground connecting the two diametrical extremes, it is better to utilize a **trichotomy** that recognizes a bridge between all polarities. This connection has been provided by a third concept that interfaces with both opposites and integrates them within a single framework.

In Kantian terms, this is the formal reality, mediating between the two unknown and unknowable worlds: the inner world of mortal man and the outer world of divine God. In Popperian terms, it is the empirical world connecting the mental and the physical; all of which may be transcended by the pure realm of Platonic formality or Weberian rationality. Similarly, in Hegelian or Marxist theory, transcendence is replaced by a dialectic, whose opposition between thesis and antithesis is resolved by its synthesis.

Based on a Platonic triangular format and combining Spinozian monism and Cartesian dualism, this paradigm elaborates a fundamental trichotomy that both diverges from and converges into a single cosmic unity. In between these ultimate fusions, human consciousness perceives, conceives and compares the similarities and differences that characterize everything. Thus, reality appears to be made up of various distinct elements, which can nevertheless be classified and interwoven into a great multidimensional tapestry.

Recalling Davidson's term, we perform a **triangulation** of the human perspective by distinguishing three kinds of structural relations, depending on the systems involved. On the one hand, each person is related within itself. These internal connections constitute the inner realm of the personality and create a mental **egosphere**. On the other hand, human beings also relate to the external world that exists apart and independently of them. These relations connect people to their natural environment and create an **ecosphere** that includes them. Between those two types of relations are those existing among people. These interpersonal relations form a **sociosphere** mediating the other two spheres.

The three distinct worlds can best be illustrated as three concentric circles. The innermost represents the internal world of each human being, surrounded by the social system in the middle and the natural environment outside. Reflecting the Aristotelian dictum *anthropos zoon politikon*, we depict the sociophysical position of human nature in an overarching scheme of things. For purposes of this study, we marginalize whatever lies beyond person or nature, leaving these externalities to the *terra incognita* of either the subconscious or the supernatural.

This conceptualization centers the psychological, surrounded by the social and natural sciences, indicating that the content of man can only be understood within the context of culture and nature. For that reason, the construction of this anthropocentric

model begins by postulating the existential polarity between the real and ideal worlds as mediated by humanity. The three terms of the Aristotelian dictum *physis, anthropos, polis*, may thus be depicted as an interrelated and interacting triangular system. That trilateral format serves as the general metaphor of this paradigm because it illustrates the conception of a basic existential duality, tempered and alleviated by an intermediate condition that contains and transcends it.

As a causal chain, we could say that the evolution of man's biological brain into a hundred billion interconnected and interacting neurons made possible the emergence of social consciousness and political culture. Within this uniquely human creation of culture as context, man developed a rational mind as content of his brain. The feedback from this mind was able to contemplate and manipulate society, thus making history and presently promises to do the same with his brain as he plays with artificial life and intelligence.

Reality Realms

After the primary and secondary levels, we have now reached the tertiary level of being. This top level of our hierarchy is superimposed upon and includes the other two. The atoms of the first level make up the molecules of the second, which in turn compose the cells of the third. A particle at the lowest level becomes an element at the middle and a component at the highest one. Man is a particular assemblage of about one hundred trillion different cells of various forms and functions.

In making this vertical distinction of existential layers we expostulate an order of priority in things; thereby attributing to them "inferior" and "superior" status. Ever since Aristotle's *scala natura* became responsible for both the quantitative and qualitative similarities and differences in everything. With increasing quantities of matter and energy, systems become more complex to the point where they undergo qualitative changes. The three levels dealt with here reflect such qualitative jumps from the microscopic to the macroscopic.

Primitive and pagan people attribute some kind of life to all creation. The presocratics concurred with this belief, as Thales' hylozoism and Pythagoras' pan-animism attest. From this traditional viewpoint, all beings are alive in different ways and various degrees, the more formidable the complexity of its components, the more alive is the system.

It seems that complexity peaks at midrange or human level; both micro and macro systems are quite simple by comparison. **Organic** systems arise at the micro-meso intersect when according to Wolf's Vortex hypothesis, an electrical spark breeds life to photon-electron interactions. This cosmic process reflects the primordial tendency of all matter to revert to its original identity with pure light.

Beyond this hypothesis, **Emergence** Theory attributes life to the incremental or incidental accumulation of complexity. Organic systems require a greater quantity of components and better quality of relationships than inorganic ones. Adding the quality of life to inorganic materials means endowing them with a higher degree of order that makes for idiosyncrasy, intelligence and autonomy. Although some order exists in all material structures, living systems rise to the level of organization. This gives them greater variability of behavior in relating and interacting with the environment. Living entities have a wider range of discretion in both their structures and functions than either physical or chemical ones. This higher capability means that they can solve problems, determine values and set priorities as **teleonomic** actors.

The **conscious** brain developed the self-conscious mind or sense-of-self to deal with complex social situations requiring imagination and creativity. In such situations, emotional reactions (i.e. the collection of physiological and behavioral responses to external threats or opportunities) are not enough for social as distinguished from physical survival. It should be noted that **feelings** (sadness, anger, fear, disgust, surprise, anticipation, acceptance, happiness) are the subjective-impressive-private mental experiences of objective-expressive-public **emotions**.

Psychophysics considers the **mind** to be the flow of information among body parts, especially brain cells. Some of these flows are conscious, other autonomic. As

such, there is a definite and direct connection between body and mind. The concept of body-mind derives from the oriental belief of holistic fusion of these two. Neural, hormonal, immune and metabolic systems are all intimately connected. Biochemical and electromagnetic flows link them together as an interdependent-interacting whole.

Accordingly, overall **health** is the proper balance among all these flows of matter, energy and information, involving body cells, brain electrons, and mental currents. That is why, physical and mental exercise improves health by increasing blood flow to brain and body, as well as building muscles and burning calories. Similarly, mental and spiritual activity, including prayer, may protect the body from various diseases or help it recover from them. It has been scientifically shown for example that church attendance reduces mortality and promotes longevity. Brain scans indicate that meditation improves immune response by changing brain activity. It is recognized that meditation lowers heart rate and blood pressure, both of which reduce the body's stress condition.

Releasing endorphins improves mood and emotions, giving a feeling of euphoria. These information substances link mind and body by messenger molecules that communicate data and feelings. **Biochemicals** are thus the physiological substrates of emotions, experienced as feelings, sensations, thoughts, and drives. The limbic system is the seat of emotions, the ghost in the machine, so to speak. **Emotions** are cellular signals translating information into action or mind into matter and back again by biofeedback. This info-realm is the emotional-spiritual part of wisdom based on the frontal cortex or forebrain that evolved most recently and develops last, so children have very little of it.

Life & Mind

The creation of life is the highest stage of physiochemical dynamics, where system and environment reach their maximal interaction, at the same time as they maintain their distinct identities. Living systems, of course, come in many forms of different quantities and varying qualities: from molecules and cells to organs and organisms, from simple protozoa to complex humans. The classical dichotomy of living forms into the plant and animal kingdoms is really a continuum that classifies entities on the basis of their complexity.

As a criterion, complexity integrates many structural and functional characteristics, the simplest of which is sensation. As one rises the hierarchy of life and crosses from plants to animals; other characteristics, from motion to emotion, are added as the distinguishing attributes of life. Finally, at the pinnacle of complexity, stands "man": the paragon of animals; culminating all the other traits with the unique capability of introspection or contemplation.

The recognition of such graduated scale is reflected in Menger's and Whitehead's **Organismic** philosophy which considers the difference between physiology, biology and sociology to be mainly a matter of size and degree. Whatever their degree of complexity, all organisms share certain structures and functions. They all have the cell as a basic structural component and living as a fundamental functional process, involving flows of matter; energy and information. Humanity has now progressed to the point where it can create artificial intelligence, which comes close to having many of the characteristics of natural life. Even if so far biological systems can usually outperform mechanical ones, the difference between natural and artificial systems keeps narrowing.

In any case, these factors and flows, alone or in combination, determine the structures and functions of life everywhere. So much so that health itself may be defined as the state of normal fitness in which an organism can operate and propagate optimally. Conversely, sickness is any sub-optimal existence due to the wrong quantity or quality of matter, energy or information.

These structures and their functions have been classified into three hierarchical levels. At the most basic level there is **production** or conversion of matter and energy to satisfy subsistence needs. Next, there comes **reproduction** or transmission of information to propagate the species. Finally, at the highest level arise **organization** or management and control to secure the proper function of the whole system. These **organic** (metabolic), **informatic** (genetic), and **cybernetic** (homeostatic) abilities exist in living systems, albeit in different proportions. As Thomas Aquinas put it: nature imprinted life with the instincts of preservation, procreation and propagation.

Of course, the specialized functions are not absolutely segregated in each structure, but overlap and duplicate themselves in various instances. Information, for example, flows in all sectors: intra-personally by the genetic code; personally by the brain network; and inter-personally by social culture. In all cases, it communicates signals, triggering some specific actions by particular organs.

A new hypothesis is that self-consciousness, the highest manifestation of life, residing in every cell of the organism is a holistic product of human intercommunication. Self-consciousness persists, in spite of fifty billion cell turnover each day in a body of

trillion cells. The whole network system maintains experiences in its memory storage, although its individual members come and go constantly. In that case, the mind may live on even after the brain stops functioning.

From those qualities of organic systems, it may be concluded that there is a Law of Conservation of Life, similar to that of matter and energy. According to it, all organisms are interrelated and interdependent, thus forming a single system that shapes the environment in a way that optimizes life. By their metabolic, genetic and cybernetic structures and functions, living systems create the conditions best suited for their survival.

This principle agrees with the Minimum or Weakest Link Law, recognizing that the carrying capacity of an ecosystem is limited by the requirements of life in the shortest supply. Since organisms utilize matter, energy and form to maximize their chances of survival, they must do so efficiently and withstand environmental perturbations effectively. In this pursuit of life, the ecosystem seems to manage an admirable equilibrium among the production, distribution and consumption of its values.

Equilibrium, however, does not mean equality. The emergence of new qualities increases inequalities because the costs and benefits resulting from the added traits are not evenly distributed among everyone. The tendency of values to agglutinate around certain centers means that economic wealth, political power, and cultural talent will be unequally shared in any social system. As differentials increase, hierarchies are formed, thus enabling higher echelons to do things that the lower levels cannot. It is our thesis here that these inequalities, both in nature and culture, are necessary and desirable as long as they do not surpass critical limits beyond which they become pathological.

Furthermore, with the addition of mind, these inequalities have been exacerbated. Whereas life reforms, regenerates, interacts and grows; mind informs, thinks; recreates, and communicates. Combining both attributes, intelligent life has dominated the world. So much so that neo-Platonists insist that law of **form**, rather than matter or energy, is the ultimate reality of the Cosmos.

It may even be that life is the result of a game played by intelligent cellular automata. Such generic game of life has been proposed by Conway and can be played by anybody. All it takes is an initial unit and a transformation rule. As a result, the unit either multiplies in various patterns or extinguishes itself just like any life form. This process has been simulated by computers and shows that the correspondence between natural and artificial life behavior is very close indeed.

Social Applications

Social systems exist and operate under similar conditions. They too strive to preserve their identity in spite of external challenges. Many traditional societies managed to maintain a state of equilibrium for a long time. During that period, they kept their biomass (population) stationary, energy (resources) balanced, and information (knowledge) closed. By carefully monitoring the social and natural environment, their governments could adjust to perturbations through negative feedback and thus maintain the *status quo* as long as possible.

But not forever, since immortality is impossible. Eventually all things must come to an end, including species. Everything has a limit, even if that limit is practically indefinite. These limits ultimately depend on the triad:

-Material structure: resource scarcity; carrying capacity; population density.

-Energy process: food availability; fuel sufficiency; operational fatigue.

-Form flow: data banking; organization complexity; technical efficiency.

The vital margins of organic systems are much narrower than the structural limits of inorganic ones; so life span is much shorter than physical existence. By adding form and function to matter and energy, living systems became vulnerable as well as purposive, so they had to build various complex mechanisms to ensure their survival.

In the case of collective life these mechanisms correspond to economy, society, and polity. The structural model presented here discerns a three-dimensional typology based on the following criteria:

-STATION: vertical socio-economic class (low-middle-high);

-FACTION: horizontal ideo-political range (left-center-right);

-NATION: proximate ethno-cultural domain (inside-margin-outside).

Accordingly, fellowship, partisanship and kinship are the main distinctive features of social structures. Small, primitive, homogeneous communities notwithstanding, all societies eventually end up with some form of structure, dividing them along the CPE lines below. So, from the rigid casts of Hinduism to the flexible classes of Modernism, social systems distinguish three main hierarchies: Cultural (priestly-clerical-artistic); Political (military-legal-public); Economic (trade-labor-craft). These divisions are stylized in a well-known depiction of the social pyramid, thus emphasizing the vertical institutions of the typical human community.

The existence of the entire system depends on the means of production and distribution of the economy, the degree of affection and association of the culture, as well as the strength of coercion and cooperation in the polity. The combination of all these factors, material, energetic and informational, builds up structures, creates systems and sparks life. For this reason, the investment of MEF into things increases their attachment or **value** to humans. Systems that contain this exclusive quality are difficult to make and scarce to find, therefore they are highly evaluated by human beings.

Conclusion

Matter, motion and form are here stipulated as the fundamental trinity of reality, measured by mass, energy and form (MEF). As such, they are identified as coexisting components of natural and social systems. The strong correspondence among all systemic levels: physical; chemical and biological help us establish the metaphor of general laws between body and mind.

It may be said that the existence of all systems depends on the conservative tendencies of MEF. This principle ensures the maintenance of every structure in space and time. Without it, societies would dissolve into their constituent individuals, just as organisms would evaporate into elementary particles. Paraphrasing Einstein's formula, we may say that as a general law, reality conserves this function:

$$E=f \{mf\}$$

In this scheme, if being is a function of space and time, then form in general and life in particular are functions of matter and energy. Of course, as one ascends to higher existential levels, the Principle of Emergence accumulates formal improvements as well as extraordinary complications. Simple fundamental laws which apply to everything, thereby, acquire particularly complex corollaries that have very restricted applications. Among them, the most important structural-functional attributes accruing to higher systems are of sympathetic nature, i.e.

- Symbiotic**: material interrelations and mutual exchanges;
- Synergic**: energy interactions and cooperative processes;
- Symbolic**: information intermediation and meaningful communication.

It is the harmonious cooperation among its different parts that assures coherence and integrity in a system. As a result, the notion of **health** applies to the proper structuring and competent functioning of an organism. Different types of system, of course, vary the ratio and degree of these three SSS empathy attributes.

The greater the complexity of the system, the lighter its reliance on material things and the heavier its emphasis on information. Thus, we can distinguish three types of social, as of physical or organic systems: primary (static), secondary (dynamic), tertiary (dialectic); depending on the relative importance they place on their attributes. This taxonomy then become the standard we have adopted here.

Underlying all these variations, has a remarkable coherence. It seems that simplicity, uniformity and consistency characterizes cosmic order. These qualities connect all areas and levels of existence into a single whole, held together by the same laws. As philosophers and scientists, from Parmenides to Gell-Mann, have recognized, the fundamentals of reality are always and everywhere the same.

BIBLIOGRAPHY

- Arnopoulos, P.J. **Sociophysics**. Nova Science, NY, 1994-2002
- Arbib, M.A. **The Metaphorical Brain**: NY, Wiley Interscience, 1972.
- Becker, R. & Selden, G. **The Body Electric**. Morrow, NY. 1985
- Bensch, B. **Biophilosophy**, Columbia UP. NY, 1971.
- Bernard, E. **Biological Prototypes & Synthetic Systems**. NY, Plenum, 1962
- Chopra, D. **Ageless Body, Timeless Mind**. Harmony, NY, 1993
- Cloak, F.T. **Naturalistic Explanations of Culture**. Hague, Mouton, 1972.
- Dychtwald, K. **Bodymind**. Putnam, NY, 1977
- Geyer, R. & van der Zouwen, J. (Eds). **Sociocybernetic Paradoxes**. Sage, 1986
- Goleman, D. **Emotional Intelligence**. Bantam Books, NY. 1995
- Harmon, W. **Global Mind Change**. Noetic Sciences, SF, 1988
- Johnson, D.H. **Body, Spirit & Democracy**. North Atlantic, Berkeley, 1993
- MacLean, P.D. **The Triune Brain in Evolution**. Plenum, NY, 1990
- Pert, C.B. **Molecules of Emotion**. Touchstone, NY, 1997
- Rubik, B. **Interrelationship Between Mind & Matter**. Temple UP, Philadelphia, 1989
- Sternberg, R.J. **The Triarchic Mind**. Viking, NY. 1988
- Wallace, R.K. **The Physiology of Consciousness**. Maharishi UP, Iowa, 1993