

A HOLOGRAPHIC CONCEPT OF REALITY

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Abstract: *The organization of any biological system is established by a complex electrodynamic field which is, in part, determined by its atomic physiochemical components and which, in part, determines the behavior and orientation of these components. The holographic model of reality emerging from this principle may provide a scientific explanation of psychoenergetic phenomena.*

The pattern or organization of any biological system is established by a complex electrodynamic field, which is in part determined by its atomic physiochemical components and which in part determines the behavior and orientation of those components. This field is electrical in the physical sense, and by its properties it relates the entities of the biological system in a characteristic pattern and is itself in part a result of the existence of those entities. It determines and is determined by the components. More than establishing pattern it must maintain pattern in the midst of physiochemical flux; therefore it must regulate and control living things. It must be the mechanism, the outcome of whose activity is wholeness, organization and continuity. The electrodynamic field then, is comparable to the entelechy of Driesch, the embryonic field of Spehmann, and the biological field of Weiss.

Burr and Northrop, 1935

Since the dawn of time there have been two conflicting explanations for the nature and structure of the world in which we live. Those can be most simply stated as the field and the particle. These two conflicting ideas appear in

Greek thought, Democritus stressing the field and Heraclitus the particle. Today, fields are stressed in relativity physics, while particles are emphasized in quantum mechanics.

Throughout history, many attempts have been made to synthesize the field and the particle theory. In current physics, those attempts fall under the name of geometrodynamics (Wheeler, 1959). It is our intent in this paper to show how a cross synthesis of particle theory and field theory will shed new light on living processes.

Field theory can be interwoven with particle theory in an attempt to better understand biological processes. This effect will enable us to approach an understanding of life because we can conceptualize all structures and functions, all levels from the electronic to the super molecular, as one single unit (Szent-Gyorgyi, 1960: 135).

MECHANISMS

A. Quantum Mechanisms

Particles found in biological processes include photons, electrons, protons, elementary ions, inorganic radicals, organic radicals, molecules, and molecular aggregates. Photons act upon electrons by raising their energy state. This process is called excitation. Excited electrons can drop back to more stable energy levels and emit photons. Electron excitation can lead to the formation of an electronic bond between molecules. This is the traditional bond of classical chemistry. The breaking of such bonds can, by reverse process, lead to the excitation of electrons.

In living systems the excitation of electrons by photons and the subsequent conversion of that excitation into the bond energy is called photosynthesis and is the basic builder of biological structures. The reversal of this

process is called bioluminescence. This phenomenon is the transfer of energy from a bond to an excited electron, resulting in the emission of a photon. It has been suggested by Szent-Gyorgyi (1957: 8) that the energetics of living creatures can be understood in terms of photosynthesis and its reversal, bioluminescence.

All cellular processes are driven by energy derived from the breaking of chemical bonds and the excitation of electrons. Depending upon the particular environment and circumstances, the excitation of the electron can be converted in one of three ways: (1) conversion into heat and dissipation (2) translation of molecules or ions through the cell, or (3) transformation of the molecules' shapes which profoundly influences their biological reactivity.

The formation of a certain type of chemical bond known as the resonance bond (which is most easily seen in the case of the Benzene molecule) leads to a peculiar situation in which certain electrons are freed from a local or particular location in the molecule. These are then free to travel around the entire molecule. This means that the electrons occupy an energy shell of the whole molecule as opposed to any particular atom in the molecule. The existence of molecular systems with mobile electrons has been found to be of profound significance in the phenomena of life.

Hydrogen, carbon, nitrogen, and oxygen, which compose 99 percent of all living systems, are among the atoms in the periodic table which form the multiple bonds most easily leading to mobile electrons. Sulphur and phosphorus, which are extremely important for life

processes, also form such multiple bonds quite easily.

All the essential biochemical substances, which perform the fundamental functions of living matter, are composed completely or partially of such mobile electrons. Molecules which contain these electrons are known as conjugated systems (Pullman and Pullman, 1963, chapter 18). The essential fluidity of life may correspond with the fluidity of the electronic cloud in conjugated molecules. Such systems may best be considered as both the cradle and the main backbone of life.

Conjugate bonded molecules may interact in a variety of ways. Among these types of interaction can be found the interpenetration of electron orbitals which permits an electromagnetic coupling. This coupling can permit activated electron energy to pass from one molecule to another in the same way a radio can transmit a message to a radio receiver. There is also the possibility of the transfer of an entire electron which is known as charge transfer.

It is possible for a molecular complex to contain several radicals at different positions on the main molecule, each of which are conjugated. If these are in close enough proximity, or can be brought into proximity by changes in the structural configuration of the molecule, a charge can pass between these two groups. This is the case of the transfer of electron charges on or around a single molecular complex. It has been suggested by Szent-Gyorgyi (1968) that the sugars and phosphates that make up the side of the alpha helix of DNA can permit the passage of electrons, functioning as a conductor.

The biological conduction systems operate primarily on an amorphous semiconductor mode as opposed to resembling metallic conductors (such as the new devices being developed for computer memories). These do not have sharply defined energy bands in which electrons may flow, as opposed to other bands in which they are bound rigidly. There is a spread or bell-curve in which the points or tails are bound more closely to a particular molecule. The hump indicates a conducting band that permits electrons to flow across the surface of a particular molecule or between molecules (McGinness, 1972).

This means, in essence, that protein molecules which are composed of amino acid sequences, may act as organic circuits. The amino acids each have a donor group and an acceptor group on opposing ends. This means that a string or series of amino acids could pass a charge along as if it were being passed along a series of spines sticking up from the main body of the molecule.

Different pathways could be defined across the surface of a protein molecule by the amino acid radicals projecting out from the surface of the protein. The shape of the protein molecules is a function of the charges and the conjugate systems on the radicals that make up the protein. When a protein is manufactured and peels off the ribosome, it immediately assumes a three-dimensional spatial pattern that is directly related to the charges on its surface and the ways in which they interact.

The biological activity or specificity of action of various molecules is intimately related to their structure or their exact three-dimensional spatial configuration. Electronic energy and electrons can move through a protein molecule between

its different parts and can pass among different molecules. We now come to understand a possible mechanism for biological regulation involving flows of electrons and transfer of electronic energy between molecules. These can change their shape and thereby change their specific action and activity. The fusion of electron clouds can exist within a conjugated system and among conjugated systems. This can account for cohesion or the adherence of such molecules to each other. Such fusion is a very important determinate of the structure of larger aggregates of molecules and portions of living cells, such as membranes.

B. Fields

A liquid crystal in a cell through its own structure becomes a proto-organ for mechanical and electrical activity, and when associated in specialized cells in higher animals gives rise to true organs such as muscles and nerves. The oriented molecules in liquid crystals furnish an ideal medium for catalytic action, particularly of the complex type needed to account for growth and reproduction. A liquid crystal has the possibility of its own structure through singular lines, rods and cones, etc. Such structures belong to the liquid crystal as a unit and not to its molecules which may be replaced by others without destroying them, and they persist in spite of the complete fluidity of the substance (Needham, 1936).

Bernal's statement (1933) would seem to support Burr and Northrop's macro-atomic theory (1935), which postulates that there are two aspects to reality, the field and the particle. They associate the field with what they term the macroscopic aspect and the electron with the particle. They associate the field with what they

term the macroscopic aspect and the electron with the particle. The particle is associated with movement. The structure of biological material seems to be associated with the field aspect. The electric field causes polarization of the macromolecules in the solution due to the fact that molecules possess a dipole moment, and changes the position of protons in the molecule. Such action can affect the relative stability of different possible configurations of the macromolecules. The field affects the degree of structure present in the solution.

A constant magnetic field can, in principle, affect the various processes in biological objects. Three possible mechanisms for this biomagnetic affect are (1) the orientation of diamagnetic or paramagnetic molecules by the magnetic field (2) distortions of the angles in the molecules and (3) orientation of the spins of molecules in a magnetic field (Fowler and Bernal, 1933; Fredericksz and Zolina, 1933; Van Iterson, 1933; Osborne, Ambrose and Stuart, 1970). Presman (1970) has postulated that such electromagnetic fields normally serve as conveyors of information, from the environment to the organism, within the organism, and among organisms. He suggests that organisms employ these fields in conjunction with the well known sensory, nervous, and endocrine systems, in effecting coordination and integration.

INFLUENCES

Becker (1972) has stated that it is already established that electromagnetic forces can be used to change three fundamental life processes in mammals. These processes are (1) the stimulation of bonegrowth (2) the stimulation of partial multi-tissue regenerative growth and (3)

the influence on the basic level of nerve activity and function. All these affects appear to be mediated through perturbations in naturally pre-existing bioelectronic systems. The organism's bioelectronic system also seems to be related to levels of consciousness and to biological cycles (Ravitz, 1970).

Experimental evidence indicates that part of the environment of living organisms consists of a complex four-dimensional, space-time, field pattern, that the organism responds to and requires for a healthy existence (Brown, 1971). Research carried out with organisms in fields lower than the normal magnetic field strength of the earth inevitably results in deterioration and death of the organisms involved (Purrett, 1971).

Recent research indicates that an organism utilizes its sensitivity to cope with the complex electromagnetic and gravitational fields in its environment. This process serves to calibrate its internal biological rhythms with external factors such as (1) the rotation of the earth (2) variations in the earth's magnetic field (3) the transit of the moon around the earth and (4) the influences of the sun (e.g., short term field variations, yearly seasonal changes, sun spot cycles occurring every 11 years). Changes in these various external systems influence the organism profoundly (Burr, 1972; Garrison, 1971). Correlations have been drawn between collapse and reversal of the earth's magnetic field and extinction of various species (Purrett, 1971).

The complex field pattern also carries other information to living creatures. Fluctuations of the field patterns reflect the presence, location and other characteristics of different physical and biological phenomena in the environment (e.g., other creatures, physical objects).

Alterations in electromagnetic parameters in the environment can be related to such physical phenomena as conductivity, permeability, and space and surface charges. Organisms themselves contribute to the environment by virtue of the end products of their various physiological processes. These may alter the environmental electrical and magnetic properties.

Weather systems also have electrical and magnetic correlates (Brown, 1971). One can see a very positive contact or connection between electromagnetic phenomena associated with weather and the behavior and health of organisms. A more advanced theory would connect weather changes and changes in the physical environment to behavior and biological products attributable to organisms. More precisely stated not only does weather in a variety of ways profoundly influence living creatures, but also it is possible that living creatures can influence weather.

CO-RELATIONS

Moving from a consideration of various mechanisms and influences of electromagnetic field phenomena upon living creatures, a more intimate role for electromagnetic fields in life phenomena will be examined. The first phenomenon that shall be considered is the relationship between electrostatics and development.

It is a current hypothesis that the electrical fields associated with a cell are intimately related to processes that have to do with structure and motion in the cell. The first such influence or effect would be that of providing a directive force in the laying down of substances in the

growth of the creature. In dealing with extracellular electric fields, such fields most probably correlate the growth activities among cells, and thus determine the origin and orientation of symmetrical axes for the cell groups and the entire organism (Lund, 1945, chapter 6).

The next area for consideration has to do with regeneration of damaged tissue. Recent research has shown that electrical current in living tissue can serve to precipitate regeneration and growth of new tissue (Becker, 1972). This mechanism apparently operates by causing the cells at the site of the injury that are still alive, to dedifferentiate back into cells resembling embryonic cells and thereby to divide and grow. This new growth is guided to repair the damage and ceases when the damage has been repaired and the creature is again intact.

From the very beginning, the electromagnetic field provides a sustaining and directing matrix for the cells and the biological substances in the creature. There is evidence that all creatures possessing a central nervous system have a direct current system that displays a field pattern expressing the anatomical arrangement of the central nervous system itself. It has been suggested that this DC system serves as a primitive data transmitting and control system which regulated the ability of the central nervous system to process data by a more sophisticated and neural transmission (Becker, 1963).

Consciousness may be seen as a frame of electrical charges in motion such as electrons bombarding a television screen; personality is a time series of these scintillating frames of consciousness. Personality becomes a reverberating input-output pattern of self creation seeking information or patterns of

energy from the environment as well as from its own memories. The personality never recreates itself but creates only a close approximation which is accepted due to the principle of constancy as being the same.

The phenomena of unique individuality and personal continuity depend on memory. Consciousness involves the most recent memory and thereby the most subject to erasure and loosening. Personality transformation becomes energy pattern modification of not only scintillating consciousness but also of recent circulating memories and older stored memories.

Thus consciousness can be conceptualized as an electronic phenomena occurring in the brain that involves both dynamic charges in motion and also stored structure (Tien, 1969). Referring to the mechanisms mentioned earlier, a very close connection between electronic activity and structure can be seen. A good deal of work on human psychological processes indicate that human beings are extremely sensitive to the various electromagnetic events in their environment.

Daily variations are related to the rotation of the earth. Correlation has been found between deviant human behavior and alterations in consciousness to cycles of the moon. Work has been done on the correlation of deviant behavior in schizophrenia and sun spot activity (Becker, 1963). All these various factors indicate that human consciousness is modulated by electromagnetic events in the environment.

CONCLUSIONS

Mechanisms of molecular influence, influences of field phenomena on whole organisms, and various factors relating to human consciousness shed interesting light on ancient metaphysical systems having to do with psychophysiological regeneration. We suggest that the conscious experience of various profound electromagnetic events in our terrestrial environment can have a salutary affect on the health of the organism. When human beings consciously experiences a sunrise or sunset, a new moon or full moon, the equinoxes and solstices, as well as the points of maximal and minimal sun spot activity, a calibrating effect results which involves their various biological rhythmic systems.

It has been shown that stress can uncouple synchronized and harmonious biological rhythms resulting in pathological conditions for the organisms (Burr and Northrop, 1935). We are proposing that these biological systems can be resynchronized and recalibrated through conscious effort. The proposed mechanism for this influence has to do with the indicated coupling of these various external events to biological processes.

The amplifying effect of consciousness has also been seen to be relatable to the various electromagnetic occurrences in the brain. At a deeper level of analysis, it can be suggested that the field phenomena which we have been studying and working with are in fact more real, if that term can be used, than the particulate matter and various objects of which we have been speaking (Wheeler, 1959).

Briefly stated, the fields and particles may be themselves composed of empty curved space, trapping lines of electromagnetic force. This is the holographic concept of reality. The structural configurations themselves or the

geometry of the fields and the particles are more fundamental than either the fields or the particles themselves.

We suggest that an epistemology based upon the concept of a human being as a material object composed of particulate substances in various configurations and patterns would be erroneous. Human beings are better seen as on-going, dynamic, shifting, changing, field entities (or field patterns) that serve as a matrix for the flow-through of biological substances and various simple chemicals.

This proposal has profound significance for human behavior, extending from the actions of the individual and personal ethics all the way to the actions of sociological aggregate systems such as nations and multi-national groups. We feel that many of the problems of society that are current today can be traced to our ignorance of, or refusal to embrace, this larger holographic electrodynamic reality in which we live.

Furthermore, this knowledge is not new. It is the main core of the message of the social reformers throughout history. It is also discussed, in other terms, by many individuals who characteristically experience psychoenergetic phenomena (e.g., psychokinesis, clairvoyance, telepathy, precognition).

SUMMARY

As postulated by Northrop and Burr (1935), the pattern or organization of any biological system is established by a complex electrodynamic field which is in part determined by its atomic physiochemical components and

which in part determines the behavior and orientation of those components.

Presman (1970) has postulated that such electromagnetic fields normally serve as conveyors of information from the environment to the organism, within the organism, and among organisms. He has postulated that in the course of evolution, organisms have come to use these fields in conjunction with the well-known sensory, nervous, and endocrine systems in effecting coordination and integration.

Szent-Gyorgyi (1957, 1960) has theorized that cells and other biological components might have various electronic solid-state physical properties such as semi-conductors. He suggests that the use of quantum electrodynamics is necessary in order to understand biological processes which regulate the vital activity of organisms.

Becker (1963) has maintained that it is already established that electromagnetic forces can be used to change three fundamental life processes in mammals. Those processes are the stimulation of bone growth, the stimulation of partial multi-tissue regenerative growth, and the influence on the basic level of nerve activity and function. All of these effects appear to be mediated through perturbations in naturally pre-existing electronic control systems. The neural electronic system also seems to be related to levels of consciousness and biological cycles, and we have developed the thesis that this system furnishes the linkage mechanism between electromagnetic forces in the environment and biological cyclic behavior.

McGinness (1972) reported that melanins are excellent electron acceptors and have semi-

conductor properties which appear to be important in midbrain structures. Melanins are known to act as an ultraviolet sun screen, but research indicates that they also have a fundamental biological role. McGinness (1972) has proposed that melanins may de-excite certain biological molecules by converting electronic energy to heat. An analysis of data on melanins suggests that the electronic properties of melanins can best be explained in terms of a band model for semi-conduction in amorphous materials, which may also explain the behavior of proteins, and other biological macromolecules such as RNA and DNA. In amorphous materials, there is an essentially Gaussian density of electron energy states.

Muses (1970) has proposed the possibility of unit impulse functions evolving from the Gaussian. His work traces the relation of that mathematical concept to quantum biological indeterminacy in terms of a process of the modulation of random fluctuations by target-seeking perturbations which points the way to the understanding and computing of the parameters of volitional experience in quantum biological terms. He maintains that we are dealing with Gaussian wave packets, put to use in terms of a close-range reaction in turn resulting in the resonant microbiological specificity (arising from the relatively large number of specific molecular parameters) necessary to the essential life and evolutionary processes of chromosome synapses, replication, and mutagenesis.

Muses holds that inherently indeterminate processes may be biologically used in achieving determinate ones such as our repeatable and commonly accepted volitional experiences of effort and direction. The range of quantum indeterminate fluctuation of biological efficacy is

in the far ultraviolet, and it is in this spectral region that we should expect to look for any modulation effects on Gaussian wave packets by volitional energies manifesting as ultramicrobiological field perturbations.

Biologically, there is a threshold of non-randomicity below which peaks tend to emerge that are sharp enough to possess biodirectiveness in an enzyme-guiding sense. Random biological quantum energies which are physiologically unassigned are the clue to psychosomatic directing, which can be beneficial or deleterious to the organism. Muses (1970) describes the mechanism of this effect as a microbiolaser type process.

Heisenberg explored the possible relevance of the quantum indeterminacy of elementary particles for biological systems, especially human systems (discussed in Koestler, 1972). He stated that there are two places in the human system where the quantum indeterminacy of a single particle can have a profound influence. The first important effect is that of mutation in the genetic code. The second important influence is the alteration of the behavior of neurons during human thought processes.

Tien (1969) has conceptualized mind as mass in relative motion and brain as energy at relative electrical charges in motion, like electrons bombarding a television screen, and personality is seen as a time series of scintillating frames of consciousness. Personality becomes a reverberating input-output pattern of self-creation, seeking information or patterns of energy from the environment as well as from its own memories. The stability of any given personality of its identity, which is maintained by feedback upon the principle of most similarity.

The personality never recreates itself, but creates only a close approximation which is accepted due to the principle of constancy as being the same. The phenomena of unique individuality and personal continuity depend on memory, of which consciousness is the most recent and, thereby, the most subject to erasure and loosening. Personality transformation becomes energy pattern modification of not only scintillating consciousness but also of recent circulating memories and older stored memories of childhood.

According to the holographic model of reality, all the objects we can observe are three-dimensional images formed of standing and moving waves by electromagnetic and nuclear processes. All the objects of our world are three-dimensional images formed electromagnetically, i.e., holograms.

This concept and the models of human information processing based on the hologram, throw interesting light on the philosophical tradition which holds that the world of objects is an illusion. With the triumph of relativity and quantum physics, the interpenetration of the philosophical and the scientific is possible.

LeShan (1969) has observed, in discussing some individuals who purportedly experience psycho-energetic phenomena, that their view of the universe as a great thought of which they are a part is quite similar to many physicists' view that they see reality only in their own mental image.

We propose that the "reality hologram" which appears as a stable world of material objects is the elementary particle which has a long-term existence and fairly simple rules of interaction.

We also propose the existence of a "biohologram" which appears as mobile and evolving, through the DNA molecule. This "biohologram" projects a dynamic three-dimensional image that serves as a guiding matrix for the manipulation and organization of the "reality hologram."

Thus we have mobile self-organizing holograms moving through a relatively static simpler

hologram. The possibility exists that such "bioholograms" could achieve sufficient coherence to continue existence as a pattern of radiant energy apart from a material substate. We feel that such an occurrence could form the scientific basis of such psychoenergetic phenomena as psycho-kinesis, clairvoyance, telepathy, and precognition.

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