together with some elaboration and implications will be made in this section. 262

The new concept of field is that the unitary field is a structured entity providing within itself the potentialities for structure, process, organization, and one-way development. The structures of the unitary field manifest a spontaneous tendency toward change in shape, size and position. This spontaneous tendency toward structural symmetry is the source of the unitary field process which is manifested in two aspects, one of which is the tendency toward a decrease in structural asymmetry (or an increase in symmetry) in isolable processes. The other aspect may appear to be counter to the first but a closer inspection of it shows it to be a tendency toward symmetry also. This is a tendency toward uniformity of structural asymmetry in the field as a whole; this process is called normalization and the level of structural asymmetry which is restored is called the "norm." The former aspect of the field process manifests itself in the formation of local structural symmetry while the second aspect leads toward uniformity of a structural asymmetry in the field as a whole such as in radiation and diffusion. Though the first tendency produces regions of differentiated order and the second tendency disperses them, both assert a single universal formative tendency—from asymmetry to symmetry. Though asymmetry tends to disappear in isolable processes, uniformity of asymmetry tends to appear in larger systems of which the isolable process might be a part. This is more obvious when one remembers that no system is ever completely isolable nor does any part of a system remain isolable for long. Thus, in a changing system of systems such as our universe, any system, in so far as it is isolable, will tend to approach its characteristic structural symmetry and thus increase its differentiation from the more disordered environment. When that system is no longer isolable it will tend to decrease its asymmetry in relation to its neighbors and so conform to their state of relative disorder. This balance of changing systems is the reason we can have a tendency toward symmetry and yet a universe in process. It should be remembered that there is never just one of two aspects operating, but always the two in some degree of cooperation. One or the other may be dominant, however, at any particular moment.

The tendency toward symmetry is the cause and the unitary structured field the source of the appearance of all three-dimensional structural organizations in the universe. In the realm of living organisms, the two aspects of the symmetry tendency of the structured field are in close cooperation via the synchronized operation of anabolistic and catabolistic 263
sub-systems or processes. In some processes or sub-systems the one aspect of the unitary process is dominant—these processes manifest the features of anabolism or synthesis. In other processes or sub-systems the other aspect is dominant—these processes manifest the features of catabolism involving the provision of free energy which is postulated to be structural asymmetry. However, the two types of sub-systems are in close cooperation with the balance being in favor of the asymmetry induction (catabolistic) processes and the result being a depolarization-repolarization property with the formation of highly differentiated structural aggregates. The catabolistic sub-systems—one of which is the oxidation-reduction cycle—are actually the normalizing process of the structured field in operation. That is, the

catabolistic process is the normalizing process, in a highly differentiated form, restoring the norm or asymmetry level (free energy) in some anabolistic sub-system after structural symmetry (via synthesis) is formed by the process. The one-way direction of development (toward decreasing asymmetry) is also a natural consequence of the two aspects of the symmetry tendency of the unitary field process since anything which impedes or distorts the unitary process is in time selectively eliminated thus, in effect, retaining those internal or external structural organizations and relationships which promote the intrinsic tendency of the unitary process. This mode of operation in structural organization is at the core of the evolutionary process and is the basis of the process of adaptation. It appears on all levels of living organisms from the genetic level to the level of the human learning process.

Both aspects of the field process, it should be remembered, are part of the continuous intrinsic tendency of the unitary structured field toward symmetry. Moreover, the three-dimensional free energy structures and the organizations of these structures that appear as a result of isolable processes are inherent in the potentialities of the field structures and processes or combination of such. That is, the unitary field itself is conceived as a structured field, and the macro structures of our experience are highly concentrated and differentiated organization of this unitary structured field.[10] Thus, the living organism does not have to form these

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[[10] It might seem, at first, that by taking the unitary field and field process as the basis of all things we are guilty of the most rank and extreme reductionism and, hence, have lost the reality of the cell, the atom, the molecule, the human personality, the social group, etc. (Reductionism means the reducing of these complex organizations to more primary and less complex organizations.) In fact this is really the opposite of the truth. We can understand and appreciate these more than would otherwise have been possible. The unitary field may be the "ultimate reality" but the cell, the human personality, the social group are highly differentiated

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three-dimensional structures since they are intrinsically present as the basis 264
of "matter" itself.

The quality of a particular three-dimensional quantum structure depends upon which point in the asymmetry to symmetry continuum it happens to be at the moment. A particular quantum structure of a given type may pass through a wide gradient of asymmetry to symmetry changes and manifest a corresponding wide variety of qualitative properties. Hence, a coupled combination of similar quantum structures (and, of course, a heterogeneous combination of such field structures) can yield a qualitative mosaic of different structural properties depending upon the point and order the various structures and organizations of these structures occupy in the asymmetry to symmetry continuum.

The properties of the field structures and the field process of the structured fields provide for a tremendously vast potentiality of qualitative differences as, for example, the four billion living species estimated by Simpson to have appeared on this planet. A more familiar example is the vast range of individual differences in men, women and children. These

individual differences are mainly due to difference in learning on the

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(individualized) organizations of the unitary field. Uniqueness or individuality is thus bound to differentiated and organized systems; the destruction or prevention of this differentiation and organization puts an end to uniqueness and individuality. In other words, the distinctive reality of the human personality is the empirical referent of the human personality for it partakes of this differentiated and highly organized "ultimate reality." To attempt to reduce the human personality to the properties of the structured field is to neglect the formative and creative nature of the unitary process. . .]

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various neural levels. Learning is based on memory formation and, as will 265
be postulated, the structured field and the field process underlie both memory formation and learning and are, hence, responsible for these qualitative differences in human beings. . .

The tendency toward structural symmetry of which salient aspects are a tendency toward organization, order, growth, and differentiation, is not teleology or orthogenesis in the sense of an underlying process working toward a developmental goal or purpose devoid of environmental influences. On the contrary, the structural order and organization that are produced in the living system must continually adjust and adapt to conform to the various aspects of the environment system of which they are an integral part. It is the normalizing process which is responsible for the characteristic of the one-way direction of development of living systems for it selectively eliminates (by failing to provide asymmetry or free energy) structural organizations that distort the symmetry tendency of evolving systems. This symmetry tendency is a persistent tendency toward growth, differentiation, and development on the part of the structural organizations of the living organism in a manner to conform with the environment.

Thus, it is the normalizing process which is highly sensitive to environmental variables and so "directs" the development of biological organization of all levels of the organizational hierarchy within the organism to accord with environmental conditions.[11] The "physical" environmental

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[11 Bertalanffy, one of the originators of the unitary viewpoint, in his book *Problems of Life*, asks the following questions: "Is evolution a process accidental in itself and directed only through outside factors, namely, is it a product of random (chance) mutations and equally accidental environmental conditions resulting in the struggle for existence and election, plus the accidental effect of isolation and subject speciation? Or is evolution co-determined by laws lying in the organisms themselves? He chooses the latter alternative. From the unitary view expressed by Whyte and used in this development, the normalizing process operates in the organism-in-environment system and in such a way that it tends to bring organism and environment into conformance. The normalizing process adjusts the organism to its environment and does not operate on chance—far from it—even though chance is an important factor in evolution. The normalizing process operates on the unitary principle so that all systems must conform to the symmetry tendency of the structured field especially when they are highly differentiated such as living organisms.]

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variables that affect the normalizing process as it operates in living 266
organisms can be deduced from thermodynamic formulae that relate "free energy" to certain environmental conditions. Free energy (controlled by the asymmetry rate of the normalizing respiratory process), moreover, can be utilized or dissipated by functional activity of organisms. Utilization of free energy leads to development whereas the dissipation of free energy deflects

the normalizing process from its symmetry tendency producing symptoms of low energy level, temporal disorganization, and, if prolonged, collapse and death of the organism. . .

[Note: Portions of text eliminated as collateral to the science begin on page 266 in the middle of the first paragraph and continue through page 268 and the remainder of its footnote contained on page 269.]

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D. WHYTE'S CONCEPTS OF FIELD TENDENCY

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According to Whyte the field process which he calls the Unitary Principle is as follows: "Asymmetry tends to disappear, and this tendency is realized in isolable process."

The concept of local symmetry formation is as follows: "Symmetry is invariance of finite parts of a structure with respect to rotations and translations, i.e., by the regular repetition of equivalent spatial elements." The description of the field process and symmetry formation in isolable processes is stated as follows: ". . .an observable deviation from some type of three-dimensional symmetry latent in a system" tends to disappear with the appearance of invariance of finite parts of that structure with respect to rotations and translations, i.e., by the repetition of equivalent spatial elements." [Note: Punctuation is from the original text.]

Whyte points out that the structured field as a whole also has a characteristic symmetry tendency which is toward an extended uniformity or asymmetry in the field as a whole.

> The unitary principle asserts a single formative tendency, but two major contrasted tendencies are evident in natural processes, toward local order and toward uniformity of general 'disorder' . . . But it must be noted that what is misleadingly called 'the state of maximum disorder' is in fact the state of maximum equipartition, or maximum uniformity of a certain kind. The unitary principle applied to such a universe implies a tendency toward local symmetry and a tendency toward extended uniformity of asymmetry.

The level of the "uniformity of asymmetry" of the structured field as a whole Whyte speaks of as the "norm" and the field tendency toward this norm is called the "normalizing process." So the symmetry tendency of the field as a whole is the tendency to re-establish this level of uniformity of asymmetry or norm. The description of the normalizing field process or tendency by Whyte is as follows:

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> All field processes consist of the normalizing of fields; all such processes lead either to static or cyclic structures facilitating their repetition; the normalizing process therefore leads to structures facilitating normalization. . .

In other words, the normalizing process leads to the development of static or cyclic structures that facilitate the attaining of the level of uniformity of asymmetry or norm which is the symmetry tendency of the structured field as a whole.

Both of these aspects of the unitary field process appear in living organisms. In Whyte's words somewhat paraphrased: The system organism-environment is marked by an oscillatory equilibrium between two sets of processes: (1) the local symmetry forming processes of the organism's

hierarchical systems and (2) those processes of the wider system of which the organism is a part. The result of this oscillatory equilibrium is development of the organism's hierarchical processes and a gradual increase of mutual conformity between organism and environment. The life-maintaining tendency is the normalizing process which maintains the organism (via its high rate of asymmetry in the form of repolarization pulses) and heightens its conformity to the environment. But the life-maintaining normalizing process is in conflict with the inner tendencies of the organism (toward local symmetry formation) which, if isolated from the former, will in a few moments develop some parts of the organism's system into static patterns of the moment.

E. Reinterpretation of Whyte's Concept of Field Tendency and its Formative Nature

The asymmetry norm of the structured field as a whole appears in living organisms as a high rate of repolarization pulses.[13] This high rate of

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[13 This repolarization rate of the normalizing process at its present level in the human organism apparently took many long eons first to appear on the micro-biological level and then many more to appear on the neuro-physiological level. Oparin's classical work, *Origin of Life,* a part of which traces the evolutionary development of enzymic systems that led to the "gradual rise in metabolistic rate," is interpreted as the delineation of the long evolutionary process which lay behind the progressive appearance of the asymmetry field norm in the form of the respiratory rate on the biochemical-micro-biological level. How else—other than with a hard-to-understand tendency toward equilibrium—is one to explain the gradual rise in metabolistic rate for a billion and more years and then a cessation with further evolution going

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repolarization is postulated to be the high rate of vibration (10^{13} or 10^{14} times during every second) and supply of three-dimensional asymmetrical free energy field structures or the induction of structural symmetry into a system. This *high rate* of vibration and supply of three-dimensional asymmetrical structures is the asymmetry *norm* of the structured field as a whole appearing in living organisms and the *process* supplying this high rate of asymmetrical structures is actually the *symmetry tendency* of the field as a whole (re-establishment of the uniformity of structural asymmetry) which appears as the highly differentiated sub-systems of catabolism in the organism. The source of what we call energy, it should be noted, is the restoration of the level of asymmetry in the field as a whole—in the upswing or repolarization phase of the depolarization-repolarization cycle (which process induces structural asymmetry in some anabolistic sub-system). Thus, energy or potential energy in any form is structural asymmetry. The down-swing (the release of "potential energy" and the appearance of "free

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into increasing the efficiency of secondary sub-systems? The asymmetry level of our galaxy or local galactic system seems to have been gradually approached in living organisms and this asymmetry level is reflected in the catabolistic rate of modern organisms. This phase of biochemical evolution—the progressive increase in efficiency of catabolistic free energy-yielding processes—is spoken of, from a thermodynamic viewpoint, as the evolution toward equilibrium. However, from the unitary viewpoint this evolution toward equilibrium was actually the progressive appearance of the asymmetry norm on the biochemical level.

Blum, in his scholarly work *Time's Arrow and Evolution*, postulates that the salient event in the origin of the first protein molecules, and hence in the transition from the non-

living to the living state, lay in the prior origin of the adenylic acid system which includes the high free energy phosphate bond transferring and coupling molecule, ATP, which plays so central and ubiquitous a role in almost all catabolistic and many anabolistic processes. It was postulated above that the reason the ATP molecule (or the adenylic acid system) apparently played so illustrious a role in the transition from non-living to living systems is that it furnished the necessary molecular properties which facilitated the appearance of a structuring process (actually the two aspects of the unitary field process in close cooperation or synchronization) which processes, in turn, formed the static and cyclic structural organization for the asymmetry norm to appear progressively in a micro-biochemical context. That is, although the molecule itself, as is all other "matter," is composed of three-dimensional free energy field structures in concentration, its properties permitted the two aspects of the unitary process intrinsic in the molecular system of ATP itself as well as in all molecular systems to manifest themselves in close cooperation with one another. This led to the appearance of a structuring process which in turn led to the development of the early so-called catabolistic processes. (Dodson) Moreover, it is further postulated that the structuring process retained its directive influence over all subsequent evolution of living organizations. Thus, it is conceived that a structuring process and quantum structural organization are at the core, underlie and direct all anabolistic processes and genetic and neural functioning in all living organisms at the present time. Moreover, the apparently simple appearance of the DNA molecules must be deceiving; underlying them must be tremendous activity and organization of quantum field structures which form the basis for genetic and ordinary human memories.]

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energy" and "entropy") or the depolarization phase of the cycle is the three- 272
dimensional structures (or organization of these) tending toward their characteristic symmetry. Thus, the appearance or release of energy in any form is the property associated with a structure going from asymmetry to symmetry. The term energy is, hence, superfluous. "Potential energy" is structural asymmetry and "kinetic energy" is the system in process, i.e., the activity or motion of the structures going from structural asymmetry to structural symmetry.

A system which undergoes local structural formation is counteracted by the structural field as a whole (the repolarization effected by the differentiated sub-systems of the organism) which attempts to restore this structure to the level of field asymmetry. The normalizing process is only partially successful and some structural symmetry remains, for the unitary principle never reverses itself; that is, the tendency is never from symmetry to asymmetry (when the whole system is taken into account). The upward swing of the structured field is the source of induction of energy or structural asymmetry into the system. A system that has a surplus of structural asymmetry is said to have "potential energy." When this structural asymmetry is allowed to follow its intrinsic tendency toward symmetry, "kinetic energy" is said to be released.

F. The Human Organism from the Unitary Viewpoint

The human may be considered to be made up of a hierarchy of interdependent and interrelated sub-systems each of which, though less autonomous than the entire aggregate which is the organism, is nevertheless distinguishable in its operation. (A system itself may be any recognizable delimited aggregate of dynamic structures–such as an organ—that are interconnected and interdependent and that operate together to produce some characteristic total effect.) Each differentiated sub-system in an organism operates in such a manner as to eliminate deviations of a specific type from the norm.

The environment (e.g., the economic environment) is made up of structural sub-systems and events which are also interrelated and interdependent. The organism and environment, however, are also interrelated and interdependent and the existence or actions of each system affect one another in lawful ways. It is because of this mutual interrelationship that unitary theory considers the organism and environment to be part of a larger system which is the organism-in-environment. The causal chain or relationship between the environment and the organism is effected via the stimulus-receiving exteroceptive- 273
interoceptive perceptual processes of the organism. The causal chain or relationship between the organism and the environment is effected via the cognitive (symbolic-conceptual) motivational-effector channels of the organism. (The perceptual and cognitive processes are also causally interrelated and this causal interrelationship is the main means whereby the organism and environment approach conformance. In other words, these two sub-systems are the main phases of the continuous tendency of the unitary process operating in the organism-in-environment system to bring the organism and environment into mutual conformance. When this relationship is continuously effected, this is the empirical meaning of freedom for the human organism; for in such a state the organism controls his environment and can manipulate it to suit his ends.) To put the matter more simply, there are structural processes within the organism which the environment completes and develops. And there are structural organizations in the environment which the human completes and develops. The healthy tendency of this mutual interrelationship between organism and environment is a tendency toward decreasing asymmetry. That is, the environment promotes structural growth, differentiation, and organization in the sub-systems of the human which promote the human's development. And the human in turn should promote events and structural organizations that facilitate the growth and differentiation of various aspects of his environment...

[Note: The 2nd paragraph of page 273, through where it ends on page 274 has been eliminated as non-scientific dissertation.]

G. A New Wave as to the Natre of the Neural Parameter 274 -----The Quantum Structure

It has been stated that recent critics of nerve impulse theory have suggested configurational changes in axoplasmic nucleoprotein molecular configurations of neural membranes as the underlying parameter. This writer postulates an even finer view of the neural parameter.[14] It was postulated in the footnote above that the properties of the ATP molecule facilitated the

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[14 "The Unitary principle is structural; it applies to the ultimate structures . . . The principle applies in all fields but it only applies directly to ultimate structure." (Whyte)

Afferent nerve impulse fibers differ not only in rate, frequency, amplitude of impulses and number involved in an instance of stimulation. Many theorists have long felt that these and other differences such as the well-known functional localization in the brain are too few to account for the many aspects of psychological processes (which unmistakably display the characteristics and properties of structure). Moreover, research in nerve and muscle thermodynamics indicates that the nerve impulse may not be a basic parameter for it appears to be playing mainly a biochemical role. This new information has led some theorists to look to changes in neural molecular nucleoprotein configuration to account for the structural properties

of psychological processes and to serve as the basic neural parameter. Similarly the genetic unit has been progressively traced from the cell, to the chromosome, to the gene, to the protein, to the nucleoprotein, and now to nucleic acid (DNA). It is now believed that the order of bases (of which there are four) on the nucleic acid backbone confers genetic specificity.

Thus, theorists cognizant of the above research are looking to changes in, or structural properties of, nucleoprotein molecules and patterns to account for both psychological and genetic characteristics and to serve as the basic unit in both fields. This writer predicts that neither the basic genetic unit not the basic psychological parameter will be found in the structural characteristics or isomeric patterns of changes in the nucleoproteins. The Heitler-London mutual bonds of atoms which keep a molecule in shape and lattice (van der Waal forces) bondings are too strong, and are not plastic enough to account for the structural properties of genetic and psychological processes. The implication is that the atomic-molecular nucleoprotein

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appearance of a structuring process (actually the two aspects of the unitary field process in close synchrony) which led to the development of underlying quantum structural organization. This structuring process in turn developed all molecular protein and nucleoprotein structural and functional organizations. The structuring process not only led to the development of an underlying biological order that mediates all genetic activities but was also responsible for the subsequent appearance of a similar mediating biological order and structuring process (in a neuro-physiological system) that mediates all neural processes. In other words, the postulate is that all genetic and neuro-physiological (psychological) structural processes are mediated by an underlying quantum structuring process and quantum structural organizations. 275

To the query posted by Fessard in the most recent symposium on Brain Mechanisms: "But is there any parameter of a physico-chemical process, or a more or less complicated function of a number of parameters that we could pretend correspond to levels and organizations of conscious experiences?", the answer postulated is that the process is quantum structuring process and the parameters are the properties of quantum field structures and their hierarchical organization, on each level of which new properties appear because of the underlying differentiation, organization, and creative nature of the field process. The events underlying neuro-physiological functioning are postulated to be quantum (field) structure complexing, structuring of these structures into quantum structural aggregates, and the formation of extended patterns of quantum field structures (memories). All psychological processes and human behavior

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organizations are not directly involved in psychological or genetic processes. It is postulated that quantum field structures themselves underlie the nucleoprotein framework and are the basic units of genetic and psychological processes. It is predicted that the laws of genetic and psychological processes, when fully known, will be fundamentally similar and described in full and directly by unitary principles. Thus, the postulate is that a quantum structuring process, and quantum structural aggregates, are the basic parameters of psychological and genetic processes. (The structural aggregates or chains of structural aggregates, it is postulated, on the genetic level are responsible for the appearance of a precept, concept, or personality attribute. These structural aggregates are highly dynamic and flexible entities.) A structuring process and underlying quantum structural organizations of decoupable, highly flexible and plastic (and three-dimensional to start) quantum structures, which can be aggregated into an almost infinite variety of structural organizations by the structuring process is postulated to be at the core of psychological and genetic processes and to use the molecular-atomic superstructure as a source of stability and avenues of communication. The electrical activity of the nervous system results from changes in the super-structure molecular system and is not directly involved with psychological and genetic processes.]

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are postulated to be the resultant of underlying activities within these quantum structural aggregates and the quantum structuring process. 276

The DNA molecular organizations are conceived to furnish facilitatory properties for the quantum structural organizations and the structuring process. [Symmetry is the source of stability and asymmetry the source of instability in nature. Molecules (of DNA) are actually miniature systems of configurational structural symmetry to which the quantum field structures become attached in the interior of the nuclear particles of these molecules.] Moreover, it is postulated that incoming quantum structures add more than a "pulse of orientation" to quantum structural field patterns (memory) already present—the suggestion is that stimuli are actually successive trains of inter-related quantum structures and that they actually serve to extend quantum memory organizations to form new ontogenetic extensions of such structures. The process of human memory formation is a process of progressive differentiation and growth of quantum structural organization.

An interesting implication of this view which regards the psychological process as the resultant of an underlying quantum structuring process is that cosmologists studying the structure and organization of the universe may well find the psychological processes, especially the perception, to be a major source of information. This is because in the psychological phenomena certain properties of the structured fields and field process appear highly differentiated and in spatially distinct processes, where as the structural field process elsewhere lies subtly concealed in more complex patterns of relationships which involve events that transpired in long eons of time unavailable to direct scrutiny. Thus, structural phenomena in genetics and psychology may throw as much light on the problems in cosmology as the discipline of physics, for the underlying formative process reaches its most differentiated and clearest expression in the quantum structuring process operating in living organisms and their structural products. At any rate in the science of tomorrow, the basic nature of which Whyte suggests in the following quote: "The science of inequality, succession, and asymmetry—which still has to be created—is more comprehensive than the science of equality, reversibility, and symmetry. . .", the life sciences may well contribute heavily to the elucidation of cosmological problems that are currently obscured by dualistic conceptuology and an over-emphasis on quantitative technique.[15]

[15 In his criticism of quantitative technique, this writer does not mean to minimize its contribution and importance in all branches of science. For example, Goldschmidt estimates that 85 percent of the problems of genetics involve statistical methodology. The problems in

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From the view that a unitary field with free energy properties is the basic substratum of the universe, from the point of view that a quantum structuring process and quantum structural organizations underlie psychological processes, and from the view that "organism in environment" is one system, it is postulated that unitary theory with its empirical 277

referents is adequate to describe the nature of the stimulus, receptor action and the psychological processes that take place in the human organism.

H. Nature of the Stimulus Process and its Role in the Cyclic Organism-in-Environment System

The environmental (distal) stimulus is viewed as a varying pattern of electromagnetic, mechanical, thermal, or chemical energy. This pattern is

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psychology involving quantitative technique are of lesser magnitude because of the organization of the human but perhaps of even more importance because of the variety of random influences that affect the independent variable in experimentation. But the remaining 15 per cent is of salient importance and, in Goldschmidt's words, those who ignore or minimize that 15 per cent, ignore the living organism itself.

For centuries, scientists have conceived that, instead of the criterion of denotability emphasized by modern semantics, the essence of scientific method lay in measurement and quantification. Quantitative laws are called the architects or causes of structure and structural events in nature. For example, Weyl, an accomplished mathematician, says the following in his recent book, *Symmetry*, ". . .the mathematical laws governing nature are the origin of symmetry in nature." However, this ascribing of causal properties to the human's conceptual abstractions and their projection into the empirical referents is the essence of the meaning of reification. We forget that measurements and the concepts derived from them are only abstractions and do not have agency or causal properties which lie only in the empirical referents themselves. "One of the principal reasons why one clings to the belief that quantitative laws produce the structure is that one tends to regard them as agencies. One forgets that the concepts of force and momentum, of elasticity, strain, cohesion, and the like, are only formal expressions that combine the descriptive measurements of such variables as mass, velocity, and acceleration. One is inclined to think of a 'force' not merely as a mathematical equation, derived from mass and kinetic measurements, but as something that is 'forceful', that has a 'potency' for separating things or bringing them together, that is, in short, a 'dynamic cause' of aggregation." (Allport)

Abstracting and investing these synthesized abstractions with causal properties not only confuses the concept with its empirical referent but it misses the essence of structure. Quantitative measurements are essentially an array of quantities of some variable attribute that is abstracted from some structural organization or structural event. Quantitative aspects such as measurements and laws of correlation, it is asserted, are handmaidens of structure and not the reverse. That is, the structure gives significance to the measurement, dimension, or law, for the quantitative aspects only represent the degree in which the quantum structured fields and organizations of these structured fields manifest their tendencies toward structural symmetry. The reification of the notion of mathematical law has had grave consequences for science in particular and Western civilization in general which will be pointed out below. (Allport, Whyte)]

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transformed in the receptor into quantum structural (field) patterns of 278
varying degrees of symmetry and asymmetry. The transformed stimulus pattern is conceived to be composed of coupled three-dimensional quantum (field) structures each of which carries a part of the structural configuration of the environmental stimulus pattern. In some modalities there may be an actual input of environmental structures into the receptor. (For example, it may well be that the magnetic quantum field structures of the incoming electromagnetic photon may be involved in the subsequent visual perceptual process.) In other modalities (such as tactual) the source of the transformed stimulus structure may lie in the receptor itself. That is, a pattern of physical contact is transformed into patterned quantum field

structures via modification of a free energy field (or quantum field?) pattern existing within the receptor itself.

The normalizing process operating at the receptor periphery keeps the receptors at a high asymmetry level by the induction of structural asymmetry (free energy). This process of repolarization of asymmetry (free energy). This process of repolarization of asymmetry induction induces a particular asymmetrical structural pattern in the receptor using the receptor's structural asymmetry (free energy) as the source of structure, and the specialized pattern intrinsic to the receptor to effect the patterned repolarization. This high level of patterned structural asymmetry induced in the receptor represents the symmetry tendency of the normalizing process manifesting itself at the periphery and is responsible for the phenomenon of the absolute threshold. By the process of receptor depolarization[16] which is postulated to involve the transformation process, environmental stimuli distort the symmetry tendency of the normalizing process appearing at the periphery. Thus, at the receptor periphery two factors are introduced: a moment to moment varying structural configuration (that is interceptible and differentiable by the specialized memories within the organism) and momentary varying degrees of normalizing distortion. The

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[[16] A process of depolarization and repolarization of the molecular super-structure is simultaneously initiated. This provides the means for the quantum field structures to traverse the neural pathways. This is a nuclear action which involves a transport of fundamental particles, quantum field structures, from the atomic nuclei particles of one molecular structure to another by causing a grouping and regrouping of atoms which releases electrical energy in the process. This electrical energy or nerve impulse is the resultant of ionic changes taking place in the chemical reactions of the cellular steady states which maintain the ATP-ADP-PC system that directly sustains the depolarization-repolarization cycle. In the depolarization phase, ATP is split to ADP and the structural asymmetry or free energy released is used to perform the function—transport of the fundamental particles—and in the repolarization phase, ADP is resynthesized to ATP by the PC metabolism and the molecular structure is again in an active state—ready for the next stimulus.]

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incoming structural configuration is differentiated by memory structures 279
and then symmetrized in processes which temporarily become isolable in the reticular centers, the symmetrization process being a structuring process in which structural aggregates are formed; these then become the basic source of the configurational properties of our psychological phenomena. The normalizing distortions, being simultaneously introduced at the receptor, appear as the dimensional aspects (intensity attributes) of our psychological phenomena.

Since memory structures are added to the incoming stimulus, the entire sequence of operations—from the initiation of the environmental stimulation to the moment of structuring in the reticular centers before the asymmetry level is restored—must be thought of as the process of stimulation or as the decrease of asymmetry in an isolable process. The entire sequence of operations from the restoration of the asymmetry level in the structural aggregate to its effect on the total environment via the excretory, locomotory, and manipulatory activities of the organism must the thought of as the reaction of the organism or the restoration of the asymmetry level by the normalizing process. The two phases or the complete operation is cyclic and one-way: the environment induces a

configurational normalizing distortion in the organism which we call a stimulus. This stimulus eventually forms a unit of structural order in the human's reticular structuring system which unit of order is being called a quantum structural aggregate. This unit of order is then used by the normalizing process in an immediate or delayed effect to exert an ordering influence on the environment. Thus, the normalizing distortion introduced from the distal environment is offset by the ordering activity of the normalizing process operating within the organism on the distal environment. This cyclic sequence of operations is what is meant by organism-in-environment. The stimulus and the reactions of the organism are both links in this cyclic sequence of operations. The overall resultant of the sequence of operations initiated by the incoming stimuli is the progressive elimination of the normalizing distortion introduced into the organism by the environment (thereby bringing the organism and environment into mutual conformance) and the increase of differentiated organization of the memory areas. These memories, now a part of a vast neural structural organization, provide the potentialities for the central semi-autonomous process (a term first used by Hebb) to be described below.

Upon their exit from the receptor organization, the transformed stimulus patterns are conceived to be decoupled by quantum organizations that underlie the molecular structures of the exteroceptive and interoceptive 280
projection systems.[17] The decoupled structures then proceed to the geniculate structures or their functional equivalent where, it is conceived, spatial and temporal dispersal takes place. (The decoupling idea and subsequent spatial and temporal dispersion of the individual structures of the transformed stimulus pattern is based on an interpretation of the work of Marshall and Talbot on the visual system. They also point out that there is a 1:100 cell ratio between the retina and its cortical projection in area 17. Since Hecht, Shlaer and Pirenne have made it reasonably clear that the absorption by a rod or cone of one photon of light is sufficient to excite it, it seems reasonable to conclude that it is this one photon or its transformed equivalent that must be spatially and temporally dispersed and each structure multiplied many times before it reaches area 17.) Thus, by the operation of the projection system structures, each discrete quantum structure of the transformed stimulus acquires at the same instant the same velocity and the same direction of movement along neuro-anatomically prescribed paths. The dispersal of the incoming structural stimuli causes them to pass through memory areas where they (the incoming structures) are structurally differentiated (made more complex) by memories in the organism. Their reappearance in the form of equivalent quantum structural aggregates is due to the spatial (cortical) convergence properties of the descending reticular projections and due to the nature of the structuring process present in the reticular formations.

I. Memory Areas Viewed as Quantum Structure Complexing Areas

Before the dispersed quantum structures reach the structuring centers on each level, they pass through areas of previously formed quantum

organizations composed of extended quantum structural patterns with linking side chains—both phylogenetic and ontogenetic records or memories.[18] Each such memory or quantum structural pattern, as will be

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[17 All receptor systems, those for vision, hearing, olfaction, gustation, and the cutaneous senses (tactile, temperature, pain) may be classed according to the scheme introduced by Sherrington as exteroceptors. All sense organs belonging to this class are stimulated from without the body and provide "knowledge" of events external to it. Many internal bodily changes have their effect on receptor organs and result in sensation. These organs are the interoceptors and have as their receptive field the gastro-intestinal tract. These are also the internal proprioceptive and tonic systems. These have their receptors in muscle, tendons, and joints and mediate motor and postural functions and activity.

18 What is phylogenetically already present (that which appears when maturation is complete) in the various memory areas in the brain such as qualities, reflexes, instincts and

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pointed out below, contains one central pattern with other side chains, the 281
central pattern being the particular type of quantum structure that the memory area is differentiated to sub-serve and the other side chains being the quantum structures or memories of all other external and internal modalities, including the tonic and proprioceptive, that were temporarily contiguous with the central memory at the time it was recorded. Building up the central pattern is the means for abstraction; side chains are the means for (sensory, perceptual, and cognitive) generalization of events and objects such that appears in the perceptual constancies and in the cognitive process of thinking and abstract reasoning.

Within a particular memory area, the quantum structured organizations which are the memories must be arranged in a hierarchy. That is, the structural and spatial relationships of the past quantum structures in each memory pattern determine in what order the incoming structures will link and hence how they will decouple past memory chains. This relations is called dominance and a system of such relations is called hierarchy. Perhaps the dominance relation is established by the formation of most recent memories at the forepoint of the extended chain-pattern. These structures or memories at the forepoint of the chain would be traversed and decoupled first by incoming stimuli. The less recent chains or memories would be decoupled in progressive temporal order. This hierarchy of memories, which determines which past memory will be decoupled by an incoming environmental stimulus, is also controlled by the central semi-autonomous process which will be discussed below. This central process induces structural asymmetry of a configurational nature (called "set" or "attention") so that the asymmetry level (energy level) of certain specific memories is raised to just below or—in the case of habitual motor behavior—above threshold. This induction of configurational asymmetry into our perceptual memory areas is what set us to perceive or behave selectively in our environment.

It is conceived that the incoming dispersed trains of quantum structures (the stimulus) pass through *all* previous quantum patterns or memories of a particular level. As the successive trains of quantum structures sweep through the memory areas, they decouple configurationally similar extended

chains of quantum structures—usually those high in the hierarchy.[19] Thus

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some motor coordination, is actually a highly complex combination of quantum field patterns representing a long history of one-way development of the living organism. What are called memories, learning, past experiences, etc., are the result of the continuation of this historical process in our lifetimes and what we call personality, attitudes, concepts, etc., are the resultant products of this growth and differentiation during our lifetimes.]

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many relatively similar partial chains of quantum structures are brought to structuring centers (central reticular centers) by the sweeping decoupling action of the quantum structures; however, only a few of these many possible partial chains can enter the centers and hence, be structured (integrated) and spatially ordered (temporally associated) at any one moment.[20]

After restructuring and spatial ordering has occurred in the central reticular centers, the resulting structural aggregates undergo feedback to the quantum chains in the complexing (memory) areas through which the stimulus structures have just passed. To and fro sub-threshold movement of the quantum structural aggregates occurs between central structuring centers and complexing (memory) centers and continues for some time after cessation of the stimulus.[21] This feedback serves to incorporate the new stimuli and associated ongoing bodily processes in the memory areas and is effected via the intrinsic tendency on the part of the structured quantum memory patterns toward self-extension which property Whyte calls facilitation.[22]

> Facilitation is the tendency of structures to extend their form by repetition of this process by which they were formed. . . Thus all structures facilitate the processes which develop them, though this tendency will not always be realized. . . The records of memory and the verbal symbols of conceptual thought. . .behave as structures in facilitating the repetition of the mental processes by which they were formed.
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> The fact of facilitation underlies all order in nature and all organization in organic nature. If systems did not facilitate their own development there would be chaos. . . Without the fact of facilitation there would be no reason for anything to happen here rather than there.

[[19] It is conceived that the incoming stimulus structures actually remove the quantum structures or memories from their molecular repository structures. This decoupling action is the basis for the "transactional" nature of all psychological processes. What is coming in couples with, or is complexed or differentiated by, similar patterns already present so that what appears in psychological phenomena is a combination of the present and past and never the current stimulus alone. Moreover, it is conceived that the decoupled quantum structures must be immediately resynthesized the replacement being accomplished by the complementary quantum pattern which is postulated to exist for each and every single memory.

[20] That this competitive aspect takes place in psychological phenomena has been demonstrated by numerous tachistoscopic experiments.

[21] It is probably during this to and fro movement that proprioceptive components from phasic movements enter the memory structures of each specific modality. That is, quantum structures underlie proprioceptive activity as they do all other internal modalities. However, it is well known that the human continuously makes all sorts of complex adjustments to objects and their surroundings. These involve reflexive eye movements, tonic changes, etc.; specialized quantum structures from all of these sources must be constantly

flowing into memory chains before and accompanying the quantum structures from phasic movements.

[22] It is due to this intrinsic facilitating property on the part of quantum memory chains toward their own self-extension, over time, that is conceived to be responsible for prolonged duration of "excitation" even after very brief stimulation.]

To bring the complexing and memory forming process down to 283
empirical referents—the particles within the atomic nuclei of the DNA molecule are conceived to mediate patterns or complex chains of quantum field structures. Each group or pattern of quantum field structures serves some specific property such as a sensory quality, percept or concept. The differences in properties are due to structural configurational difference in these discrete underlying units each one of varying structural complexity; the discrete units are quantum field structures. (The individual quantum structure is also able to undergo changes due to the induction of three-dimensional asymmetrical free energy field structures.) Each nucleoprotein is conceived to have two central paired chains of these quantum memory structures—the one involved in the initial complexing of stimuli and the other in the feed-back memory forming process. (The dual-helical-cylindrical nature of the DNA structural unit discovered recently by Crick, Watson, Wilkins and others is the structural organization that provides, it is postulated, for these complementary quantum patterns. That is, it has been discovered that there are two DNA chains in the structural unit of DNA. This pair of DNA chains forms a helical-cylindrical chain wound around a common axis with the two chains linked by their bases.) Incoming stimuli decouple structures of one chain but the parts that are lost are almost immediately replaced by the homologous undecoupled chain. The process of structure restitution must be extremely rapid taking place in somewhere between 10^{-12} to 10^{-14} seconds. (In the process of attention, the induction of configurational asymmetry may separate the two homologous chains from each other permitting rapid decoupling and rapid transit of the incoming stimuli through these structures thus permitting them to reach the structuring centers first.) In the process of memory formation it is only the second chain and not the coupable chain that undergoes structural change at the moments of memory formation. Subsequently, however, the memory-forming chain effects changes in the decoupable one so that similar but complementary chains of quantum memory patterns appear in each of the two homologous components of the dual DNA unit. (The memory-forming feed-back chain may well be involved in the figural "after-effects" phenomena studies by Gibson, Vernon, Köhler and Wallach, Osgood and Heyer, and others.) The memory formation process per se seems to be very slow and may require hours or even days for complete fixation. Thus, the feedback process of memory formation leads to the increasing organized
complexity via the extension of quantum field patterns already present. (The 284
process of the extension and increasing organized complexity of the chains of quantum field patterns will be spoken of as the differentiation of the memory areas. The central pattern of memory field structures along with the subsidiary side chains will be spoken of as the memory organizations.) The feedback process of memory formation represents a phase of the normalizing process, in a highly differentiated form, causing the differentiated growth of "static and cyclic structures" that facilitate the

normalizing process. The patterns of quantum field structures or memories together with the structuring process control and direct all processes in the human. The increasing differentiated order and organization represents a growth of order and organization and increasing relationship (conformance) of the organism to its environment.

J. The Structuring and Spatially Ordering Process

A structuring and spatially ordering process is postulated and is conceived to be localized in the reticular complexes at the level of the thalamus and in the centrencephalic system in the brain stem.[23] The reticular formations are conceived to contain the facilitating molecular organizations of quantum structural organizations which mediate the intrinsic formative

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[[23] There are two major views as to the nature and localization of psychological processes in the neural structure. One view holds that psychological phenomena arise due to the total aspect of propagated nerve impulses through neural nets. Thus psychological processes are located in these neural nets, neural cell assemblies, etc. and are regarded as the statistical mass aspects of these concrete unit events (passage of nerve impulse). [Actually this is the extension and application to neuro-physiology of the pervasive belief in modern physics and chemistry that the laws of nature are statistical throughout. The notion of statistical law as it operates in the living organisms taken from Schrödinger is somewhat as follows: The working of the organism requires exact physical laws. But all atoms are observed to perform all the time in a completely disorderly heat motion which opposes orderly behavior. Only (it is said) in the cooperation of an enormously large number of atoms do statistical laws begin to operate and control the behavior of these assemblies of atoms, which are assemblies of nerve impulses in neuro-physiology. It is in this way—orderliness emerging as a statistical average from a great many small events—that events acquire orderly features from underlying disorder; or in this way we acquire orderly psychological phenomena from the massed numbers of nerve impulses. From unitary theory, the investing of nature with statistical law so that it appears in nature and controls events is the reification of the notion of statistical law. It is the empirical referent, the structured field operating on the unitary principle, that is responsible for the appearance of the phenomena which are called statistical laws in nature, which controls the assemblies of underlying events, and which is responsible for their orderly features.] The second view adopted with a special interpretation in the above development, is that psychological processes are due to the momentary distribution of patterns in "limited neural space." In other words, according to this view all psychological phenomena are due to the formation of structural organizations in highly localized neural spaces such as in the reticular formations.]

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tendency of incoming stimulus (quantum) structures toward the development 285
of structural symmetry. In this case the stimulus structures are the decoupled quantum structures of the transformed stimuli and the structural symmetry which appears is the reappearance of the structured stimuli after they have become complexed or differentiated by the memories within the organism. The basic idea is that the parts of the dispersed structures of the stimuli maintain their interdependent interrelationships (via the neuro-anatomical organization of the nervous system) as they traverse the nervous system. When the parts of the stimulus (highly flexible quantum structures) reach a common spatial point wherein the interrelationships of the parts of the stimulus are again spatially re-established, they recombine into quantum structural aggregates which are spatially equivalent to the macro stimulus. The reticular formations are postulated to be a structural system which provides the means whereby this dynamic patterning or structural

aggregating takes place. For this reason, the human nervous system is said to be a structuring or a structure forming system. In one set of processes (perceptual), the source of the elements of the structuring process (at this level of the hierarchy) is largely the decoupled quantum memory organizations of the organism and partly stimuli from its environment. The structuring process sub-serving the cognitive processes, since it is the highest level in the nervous system structural hierarchy, controls the perceptual process to a certain extent.

K. The Role of the Reticular Formations

One of the recent symposiums on brain function "Brain Mechanisms and Consciousness" was devoted entirely to discussing various aspects of the reticular formations. These neuro-physiological complexes have come under close neuro-psychological investigation only within the past decade. Consequently, the function of these complexes has been partially experimentally and clinically determined and partially inferentially deduced. The justification for the interpretations made below are implications of the above and other data and theory from such fields as micro-biology, ethology, psychology, etc.

The term "reticular formation" refers to neurological arrangements of closely interconnected neurons which appear, as far as current knowledge goes, mainly in concentrated areas in the brain-stem but which are also known to appear throughout the cortical areas. From the nature of their 286
external relations, it is deduced that the reticular formations perform three types of operations whereas other neural areas are almost invariably restricted to one operation. These operations, from the viewpoint of the neuro-physiologists participating in the above-mentioned symposium, are nerve impulse volley collection, integrating and re-dispatching.

The reticular formations have numerous collaterals over which they receive (collect) "messages" from various heterogeneous sources. "A remarkable fact, observable—at least in the reticular formations of the brain-stem—is that one neuron taken at random can receive messages from various origins. . .convergence of volleys from heterogeneous origins into the reticular complex." (Fessard)

After they receive these heterogeneous messages, the reticular formations work them over as integrators. That is, at this stage it is observed that there is input into the reticular formations without corresponding output. Or using Fessard's own words to describe the action in the reticular formations at this stage: "The volleys once in the reticular formations obey another rule, that of cooperation and mutual adjustment. . . the reticular formations working the volleys over as integrators." After the reticular formations integrate the heterogeneous volleys they spontaneously emit them as integrated volleys and transmit these to certain neural areas over "well defined afferent and efferent pathways." Thus, at this stage there is output without corresponding input, the reticular formations serving as autogenic

generators. The selective and restraining aspect of the many competing neural messages that are brought to these centers is regarded as a salient functional property of the reticular formations and is conceived as being due to the "limited neural space" occupied by the reticular complex.

L. Reinterpretation of the Role of the Reticular Formations

For each receiving cell in the receptive layer in the cortex there are two afferent fibers, one of which comes from the receptor (the specific projections) and the other from the reticular formations in the mid-brain (the non-specific projections). The specific projections are held to be the projection of the receptor inputs into the receptive cortical layer and the non-specific projections are held to be associative fibers which synchronize and coordinate the action of these cells. This writer postulates that the specific projection fibers play a dispersal role rather than, or in addition to, a projective role, which insures that each part of the stimulus traverses past quantum structural organizations (memories) in the cortex. Thus, 287
maximum dispersal of the stimulus structure is conceived to be reached when the parts of the stimulus reach the receptive levels in the cortex via the specific-projection fibers. The non-specific projections, it is postulated, then come into action playing a role as means of synchronization and convergence of the parts of the stimulus structures. (The non-specific fibers are conceived to induct chains of structural asymmetry into the cells. These chains all have the same synchronized rhythm and increasingly converge into one chain thus resulting in the parts of the stimulus also converging toward the reticular centers in the mid-brain.) As the parts of the stimulus converge toward the reticular centers the interaction between the parts may occur.

To repeat the postulated sequence of events thus far, it will be recalled that the transformed stimulus structures are decoupled and dispersed into trains of translationally moving discrete quantum structures. These trains of discrete quantum structures then decouple similar chains of quantum structures in the respective memory areas of each external and internal sensory modality. These complexed-discrete trains of quantum structures, traveling along parallel paths, are conceived now to converge upon quantum organizations within the reticular formations. The reticular formations are conceived to receive these complexed trains wherein they undergo spatial recombination, spatial ordering, and are subsequently re-dispatched to certain other neural areas. Thus, the "convergence of volleys from heterogeneous origins into the reticular complexes" is conceived as being the convergence of these complexed trains from the external and internal sensory modalities. The "cooperation and mutual adjustment of the heterogeneous volleys within the reticular formations" is conceived to be the intrinsic process of spatial recombination and ordering of complexed internal and external stimuli due to the formative nature of the unitary field process.

L. The Structuring Process (Integration)

The above has been somewhat over-simplified to give the entire picture. In more detail, it is postulated that each train of discrete quantum

structures from each specific modality upon reaching the reticular formations must first go to specific centers within the quantum organizations underlying the reticular formations. In the specific centers the converging quantum structures of the original transformed stimulus structures reach their final point of convergence and are brought into spatial relationships equivalent to the original stimulus. At the precise moment when the interrelationships between the parts of the stimulus are spatially re-established, a dynamic patterning or structuring process occurs. This basic synthesis results in the reappearance of the transformed stimulus, now as a quantum structural aggregate. (That is, the smaller structures are aggregated to form a single more inclusive structure, a larger structure composed of many substructures.) The spatial recombination or structuring process takes place in such a way that the spatial relationships within the original transformed stimuli are preserved. That is, each quantum structure of the dispersed original stimulus together with the decoupled links from the complexing (memory) areas, are recombined or structured into a condensed but similar spatial relationship to that in the original stimulus. The source of the aggregating process, it should be carefully noted, lies in the inner formative (symmetry) tendencies inherent in the quantum structures of the stimulus itself. The quantum organizations sub-served by the reticular formations merely facilitate the intrinsic formative tendencies of these incoming quantum structures. In the perceptual processes, the structures are largely furnished by the environment and to a lesser degree by the organism. In the cognitive processes, the structures to be dispersed, differentiated converged, and to approach their intrinsic symmetry tendencies, and to be structured in the process, are furnished by both the environment and the organism but largely by the organism itself.

The formative tendency is decrease of asymmetry in the stimulus structure—structural symmetry appears. Thus, the formative tendency, or the one phase of the unitary process, appears as a structuring or structure forming process in the specific reticular centers. In other words, we can conceive that a process of structural symmetrization (structuring) of highly flexible and dynamic quantum structures is taking place in the specific centers at a particular instant, and the resultant of the process is the formation of a quantum structural aggregate whose intrinsic processes yield what we experience as psychological phenomena. (The rate at which the structural aggregates are formed in the perceptual process may be directly related to the rate of stimulus presentation wherein apparent movement is seen. The rate at which the structural aggregates are formed in the cognitive process is very likely much slower.[24]) If one desires to use the term, the quantum structures may be regarded as structured energies. As each quantum

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[[24] Based on summaries of a vast, sprawling literature which includes hundreds of studies on: apparent and real movement, form perception, apparent visual kinetics, critical fusion studies, contour and visual acuity studies, time perception, etc., it is possible to state that the time it take to form one structural aggregate in the visual modality lies between 30 and 200 msec. The actual rate of structuring or the time it takes to form one structural aggregate depends upon at least 20 variable which ordinarily work together.]

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structure of the structural aggregate, and the structural aggregate as a whole, 289
spontaneously approach their intrinsic structural symmetry, the changes from structural asymmetry to structural symmetry (or patterned changes in energy) within the aggregate, are experienced as psychological phenomena. Thus, psychological phenomena are a function of structural (energetic) changes in quantum structural aggregates as these aggregates change from a less to a more symmetrical organization in the above structuring process.[25]

In perception, we experience directly the basic character of the universal formative process at work in that this universal process consists of the development of form by the decrease of asymmetry. Since our underlying neural structures are part of the structured field and since our psychological phenomena are resultants of asymmetry to symmetry structural changes in structural organizations (aggregates) of this field of which we are a part, we experience directly the unitary process in operation in perception. From the point of view of the structured field, structural asymmetry is disappearing in the field at these particular moments of aggregate formation; that is, more symmetrical structural organizations are differentiating from the field and are about to become a part of the complex structural organizations we call the nervous system. We can observe this process happening in perception because of the hierarchical nature of our nervous system—the perceptual processes represent a lower or less complex process in the system which the higher cognitive processes includes and controls to an extent. Thus, the hierarchical nature of our nervous system permits our most complex cognitive process to "observe" and control the lower process. Certain parts of the structured field—the parts of the stimulus—are separating out in an isolable process and forming more symmetrical structural organizations. That is, the elements of the stimulus, or quantum structures, combine into a larger aggregate, and in the process we experience definite forms such as a straight line, a circle, a square, etc. (In the cognitive processes, the forms of course are much more complex.) In

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[[25] Tinbergen, Lorenz, Hess, and colleagues state that a great deal of evidence from ethology (studies of instinctive behavior) and neuro-physiology points to the fact that somewhere between the central nervous system and the receptor systems there must be a mechanism that takes qualitatively different configurational impulse patterns, combines them in a purely quantitative way, and takes care of re-dispatching them in reintegrative form so that a configurational movement results. Tinbergen, for example, believes that the hypothalamic experiments of Hess hit a way station in this neural mechanism which he calls the Innate Releasing Mechanism. This writer holds with Tinbergen, et al. as to the existence of such a center but postulates that these are the specific recombining centers underlying the reticular formations of the brain-stem. The centers hit by Hess are regarded by this writer as motor areas serving such a center rather than the "integrating" center itself. The term "combines them in a purely quantitative way" and the view regarding the center as an integrating center is the result of employing the nerve impulse concept in their thinking.]

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other words, the elements of the stimulus or quantum structures come 290
together and build up the whole which is the structural aggregate and whose intrinsic processes (toward symmetry) yield the configurational aspects of our perceptions. (Configurations, pattern, organized whole, assembly, mechanism, organization, shape, contour, form, etc. in psychological processes all find their empirical referent in the structural aggregate, in their sub-structures, and in their intrinsic tendency toward symmetry.)

These structural aggregates formed in the specific centers are the basic units of psychological meaning—the ultimate unit is in the quantum structure and in its gradient of asymmetry to symmetry changes wherein a range of qualitative properties may be manifested. The formation of chains of these structural aggregates (in the central reticular centers on the same level) give complex meaning which in perception we call object or situational meaning. The structural aggregate and aggregate chains gives a dichotomous continuity—but one aggregate with its sub-structures is the basic unit of meaning. Long chains of these structural aggregates coupled to one another yield object meaning while breaks in the chain delimit one perceptual phenomenon from another. In other words, the basic unit of meaning is the structural aggregate; complex meaning arises from spatial inter-relationships between these aggregates. Both of these yield meaning.[26]

It should be carefully noted that the process heretofore called an integrating process is not simply one of integration—that is, a summation of parts. The process is one in which the number of elements are reduced; the whole is less than the sum of its parts.[27] It is due to this feature of symmetry formation that psychological phenomena are said to have properties other than

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[[26] This writer is deeply indebted to Allport and Gestalt theory for this viewpoint.

[27] One of the investigators (during the brain mechanisms symposium) remarked during a discussion of the reticular formation that the reticular formation could not serve as a basis for "psychological integration" because information was ostensibly lost by the converging neural impulses and the competitive-restraining aspect of the reticular formations. "But one point on which I (Bremer) do not agree would be the location of that integration, if it has indeed a location, and for me it is very doubtful, because I consider integration as a dynamic abstraction and not localizable in space. However, I would certainly not have chosen the reticular formations for that location on account of the fact that information is lost there by reason of neuronic convergence and occlusion. Conscious integration excludes dilution and loss of information." From the neural impulse viewpoint and from Cybernetics (information-communication) theory based on that viewpoint, this would be a telling argument. But from the viewpoint that the quantum structure is the basic neural parameter "convergence and apparent loss of information" is exactly what would be expected for, as Whyte points out, symmetry is formed only by the reduction of previously more numerous asymmetry elements (in this case quantum structures).]

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those of the sum of the properties of its parts. The structuring process is a 291
truly creative and order-producing process. New qualitative (form) properties appear due to the symmetrization nature of the structuring process and by definition the symmetrized structures of "psychological wholes" that are produced are more ordered that the asymmetrical structures of which the aggregates are composed. In other words, the actual "whole" (structural aggregate) shows properties that are absent from its isolated parts. The new properties or the "wholeness" are inherent to or immanent in and not transcendent to the structural aggregate.

What emerges from these specific spatial symmetrization or structuring centers are trains of quantum structural aggregates which are now spatial equivalents of the original configurational distal stimuli. These trains are not as yet coupled to one another, a property which must underlie temporal order and a function which the normalizing-respiratory process is

conceived to perform. Thus, as each stimulus of each sensory modality is in the process of being spatially symmetrized or structured in the specific reticular quantum centers they must rapidly feed into the second center, a spatially ordering center which is also within (and on the same level as) the quantum organization sub-serving the specific structuring centers.[28]

It is the structural aggregate nature of the structuring process within the reticular formation that is postulated to be the important factor accounting for the "selective," abstractive, or limiting nature of the action at the reticular formations rather than the more nebulous notion of a "limited neural space." At the reticular centers there is an alternative of choices among possible aggregates that can be formed. But because only one structural aggregate can be formed at one time, all other contemporaneously arriving aggregates must be denied entry to the reticular center. This selective action provides for the simple resultants of our psychological phenomena at the various levels despite the fantastically complex nature of underlying events.

M. The Spatially Ordering Process (Association)

The experimentally established neuro-physiological function of the respiratory process that operates at the site of the reticular formations is less well known than the properties and functions of the reticular formations themselves. Fortunately, a great deal is known of the respiratory process at other levels. Based on this data, as well as this writer knows it,

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[[28] Or do the two processes occur in one and the same center?]

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the nature and role of the respiratory process in the central spatially 292
ordering centers is conceived as follows:

It is known that respiratory processes induce a directed polarization in the form of a high rate of repolarization pulses along a unique axis of molecular structures. Whyte, however, from the point of view that the unitary field is a structured entity, regards this induction of "free energy" into a system as actually the induction of structural asymmetry into a system. From the point of view that the unitary field is composed of three-dimensional free energy field structures, this writer regards the induction of free energy or structural asymmetry into a system as the induction of these three-dimensional asymmetrical free energy structures into the system. The (physico-chemical) appearance of the phenomenon called "free energy" is actually asymmetrical field structures in a state of high tendency toward symmetrization. ". . .tension of force within any system can be regarded as a consequence of the tendency to establish its characteristic symmetry."[29] That is, the normalizing process reestablishes a particular sub-system to its norm by the induction of these three-dimensional asymmetrical structures into the system. When the sub-system is activated and allowed to approach its

intrinsic tendency, "free energy" or force properties are observed to appear.[30] Thus,

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[[29] Force or energy as an entity separate from a structure does not exist. Wherever force or energy is manifested there is a structure in the process of change from asymmetry to symmetry. "Matter", "energy", "psychological processes", "consciousness", are all aspects of the nature and behavior of structured fields and complex structural organizations of these fields.

[30] The normalizing process (which empirically is a chain of asymmetrical free energy field structures) inducts these asymmetrical structures into quantum structural aggregates and/or atomic-molecular systems and by so doing, changes their configurations by a series of configurational steps. (The term configuration includes the motion of the particles of the quantum aggregate and atomic-molecular structures.) These new configurations of the quantum aggregates or atomic-molecular systems are now in a higher state of asymmetry (or instability or reactivity or energy level per orthodox quantum theory.) Or in a word, the aggregates and atomic-molecular systems are now in an activated state. The quantum structural aggregate or atomic-molecular system is now able to go spontaneously to its more symmetrical configuration again—the changing structural properties and motion of the configurations exerting the force or "free energy" properties. (The aggregates and atomic-molecular systems in their activated state may couple with other such aggregates in their activated state forming larger aggregates with new formative properties and tendencies.) The formerly inducted asymmetrical free energy field structures now emitted as radiation, are now in more symmetrical states; i.e., the free energy structures were in a more asymmetrical configuration when inducted than when emitted as quantum radiation. The spontaneous change in the asymmetry level of the quantum aggregate or atomic-molecular system is the free energy change in the system (_□F) and the emitted, more symmetrical quantum structures represent the "entropy increase" in the universe. That is, "entropy increase" is actually the decrease in the absolute asymmetry level in the structured field for the three-dimensional

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asymmetrical field structures of whatever complexity (in following their 293
intrinsic field tendency toward symmetry) manifest force properties that thermodynamics and physical chemistry have ascribed to the disembodied "free energy." Hence, it is these three-dimensional asymmetrical field structures, of whatever qualitative type, manifesting their intrinsic field tendency that are the basic source of all driving potential behind all spontaneous processes in the universe. The asymmetrical structures inducted into larger systems raise the asymmetry level of these larger systems (actually change their configurations) so that they manifest force properties when they are allowed to approach their intrinsic symmetries.

This writer, from the point of view that the unitary field is composed of three-dimensional free energy field structures, extends this view of "free energy" beyond the current concept that regards free energy solely as the source of force, tension, and driving potential. The suggestion, applied in this particular context, is that when free energy is directed along a particular molecular axis by the respiratory process, chains of varying widths and lengths of coupled and highly pulsating, asymmetrical free energy field structures are actually directed along these axes.[31] That is, it is postulated that the directed polarization along a particular molecular axis actually consists of uniform chains of varying widths and lengths of linked asymmetrical free energy structures. In the case of the reticular formations and the quantum organizations within these formations, it consists of such asymmetrical chains being directed along the neuro-anatomical path of the reticular projections and within the central reticular systems themselves.

It has been noted that the electrical activity emanating from the reticular complexes is that of a continuous rhythmical sort and that this

activity apparently acts as a pacemaker for the cortical areas which feature was briefly noted above. "The continuous electrical activity of the brain appears to be under separate independent control of the brain-stem reticular system. . ." (Penfield). "The (the reticular formations) exhibit spontaneous

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asymmetrical free energy field structures are now more symmetrical. Consequently, the asymmetry level in our galaxy or galactic system represents the absolute free energy available in these systems. (Incidentally, it is the ATP system that apparently is the structural unit which serves the normalizing process on the molecular level. The ATP-enzymatic system induces specific configurational asymmetry into various processes and is responsible for the precise timing of the fantastic array of orderly processes in the cell.)

[31] Since the individual field structures of this asymmetry chain constantly approach symmetry in providing their force function, they must be constantly replenished. This sustaining function is accomplished by the phosphagen-ATP-catabolistic system using the fluid matrix as the channel of communication.]

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activities generally in a rhythmic form, and exert action as pacemakers" 294
(Fessard). However, as Kubie suggests in the same symposium, the "continuous rhythmical activity" may well be due to the respiratory process, and it may be the respiratory process which activates the reticular formations and serves as a pacemaker rather than the other way around. [32]

[[32] Kubie suggests several experiments that could prove or disprove this point of view. Most of the viewpoints in this section are based either on experimental data or extrapolation of this data; however, even those which are as yet not, could be put to experimental test even with current techniques that are geared to the "nerve impulse" point of view. Moreover, if the knowledge that this writer has of the historical development of field theory is correct, experimental and theoretical elucidation of the nature of the underlying quantum organizations of the human nervous system should not be long in forthcoming.

As an experimental test of this writer's postulate that all biological order from this genetic level to the level of our conceptual-symbolic psychological processes rests upon an organization of quantum field structures, the following (after the quotation) is suggested.

> Bullock: By the way, Dr. Shedlovsky, if you wish a case of magnetic fields having physiologic effect, there are at least two such that I know of, Barlow has reported subjective visual effects of high-intensity magnetic fields brought near the head, and Lissman has found fish that are quite sensitive to an ordinary hand magnet brought near the aquarium in which they are swimming. These are solid experimental findings. The fish case is perhaps understandable on the basis that there are certain fish which have a remarkable development of ordinary muscle action potentials, large enough to produce appreciable currents through the fresh water in which they live, and they have receptors which detect the voltage gradients. They can detect this field and distortions of it. This is apparently their normal function. If the field is distorted by a magnet, they detect it.
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> Shedlovsky: Are these facts or reports? Are there confirmations?
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> Bullock: This is experimental.
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> Reynolds: The effects of magnetic fields of a.c. electromagnets on visual function have been reported at least a dozen times since the beginning of this century.
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> (Leikind, M. C., and Weiner, J. Editors: *Magnetism: Its Effect of Living Matter*. A Bibliography. Unpublished Library of Congress Science and Technology Project, Washington, D.C., 1949.)

As a start on experiments which would begin to prove that our psychological processes rest upon a quantum field organization, this writer suggests the repetition of all experiments in which there have been produced subjective visual effects by high intensity a.c. magnetic fields in the human. It has been suggested above that the retinal cone-rod system disperses the individual photon into its electrical and magnetic components (quantum field structures) and that it is the quantum magnetic field structures which are transported from one atomic nucleus to another in the visual and neural pathways. This writer furthermore suggests that the subjective visual effect produced by the high intensity a.c. magnetic field is due to the effect that these external fields have on the visual-magnetic quantum field structures as they travel from one atomic nucleus to another. (In other words, the external field effects are inter-nuclear. Most of the mutations on the genetic level are also, perhaps, inter-nuclear.) Therefore, if an a.c. magnetic field of proper strength and frequency could be put in the

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Kubie further makes the suggestion that "the rhythm of the respiratory 295
center" may rest on a biochemical basis. This view is an established fact, but as suggested above, it does not go far enough. The respiratory process and rate is the normalizing process and asymmetry norm of the field as a whole manifesting itself in the living process. In order to work out this rationale it would be necessary to go back to the dawn of life on this planet and trace the evolution of the respiratory process. This has already been done by Oparin and Pringle. This theory is buttressed by a vast background of experimentally adduced data. A next step is to identify experimentally the quantum field normalizing process with the respiratory process.[33]

O. The Role of the Normalizing Process in the Reticular Centers

This then leads to the following conception of the role of the normalizing-respiratory process that appears at the reticular sites. It will be

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proper direction in relation to the traveling neural quantum field structures, two effect might be produced (an electrically charged a.c. electrode might be required by modalities other than the visual to produce the following effects): 1) An external frequency and intensity of the a.c. magnetic field might be found which would "beat" with the quantum field structures traveling up the neural pathways. In this case, all subjective visual effects in the organism would be nullified or eliminated although most of the macro neural-electrical effects would go on as before; 2) The quantum field structures might be deflected out of the neural tracts and the quantum field structures might be experimentally isolated and their properties studied in a Wilson cloud chamber much like the properties of the fundamental particles are now studied. (It may well be that the tracks produced in the Wilson cloud chamber by the quantum field structures deflected out of the visual neural pathways will be similar if not identical to those produced by the positron in the cloud chamber.) Then, as a corroborating experiment, these quantum field structures, by proper arrangement of an intervening apparatus, could be transferred from one organism to another (say from a monkey to a human); the latter organism should experience the psychological phenomena that the former organism would have experienced, had not the course of the internal stimulation been interrupted.

This experiment which is basically very simple, would need the cooperative effort of a team of expert specialists from many fields. (The only drawback would be the possible injury to the cellular apparatus and cell walls by the high energy magnetic or electrical fields.)

Its successful achievement would close the dualistic-philosophical era in psychology and would open up vast new vistas of application in every field of biology (which, of course, includes psychology) and would find extensive application in new fields such as space research.

[33] From the point of view of modern biology, we can readily conceive the respiratory process to be a part of a vast extended system—the salient aspect of the normalizing process. Thus, we can trace the high asymmetry induction rate (free energy rate) back through phosphagen reserves, to cyclic catabolistic processes, . . .to its galactic group, to the galactic group's relationship to the universe as a whole. Thus must go the causal chain of events which provides living organism with the features of the normalizing process as outlined by Whyte.]

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recalled that each train of spatially aggregated quantum structures from 296
each modality is conceived to pass from these specific centers to spatially ordering centers within the quantum organizations underlying the reticular formations.[34] It will also be recalled that the respiratory process feeds its chains of coupled asymmetrical structures into these central centers. Now then within these central centers it is conceived that each specific spatially equivalent quantum aggregate from each modality feeds onto and couples with the long uniform parallel chains of coupled asymmetrical structures that are provided by the normalizing-respiratory process.

By the coupling of these structures in parallel to the common asymmetry chain, each structure is thereby placed at the asymmetry norm or level of the field as a whole. That is, the coupling of the quantum aggregates (the stimuli) to the asymmetry chain provided by the normalizing-respiratory process is due, in the final analysis, to the intrinsic tendency on the part of the field as a whole to bring each symmetry tending structural aggregate formed in the isolable process back to the asymmetry level of the field as a whole. The second aspect of the unitary process, by this intrinsic operation or symmetry tendency, beings the structural aggregates into spatial (and hence temporal) interrelation on the common asymmetry chain in such a manner that the interrelated aggregates (from which psychological meaning arises) facilitate the symmetry tendency of the normalizing process. This latter characteristic of the normalizing process will be taken up more fully in the section on one-way development. Thus, the specific and central centers are the two aspects of the unitary process, appearing as highly differentiated sub-systems acting in close cooperation. The normalizing process, by so interrelating the structural aggregates, provides the properties of psychological meaning, temporal order, and one-way development (which is the basis of all adaptive processes) to all psychological processes, and prevents the isolable aggregates from reaching their static symmetry forms by maintaining them as viable forms (memories or dynamic quantum structural organizations on the genetic and perceptual-cognitive level) as long as a sustaining asymmetry supply is always kept available.[35]

[[34] The unidirectionality of the human's psychological sense of time is a function of the participation of the quantum organizations underlying the reticular centers in the quantum field processes which equip all processes with an arrow of time. The unitary tendency to structured fields from asymmetry to symmetry defines a time direction which appears in both "physical" and "psychological" processes.

[35] We shall see below how the human nervous system is so structurally arranged that it has control of the normalizing process or asymmetry chain and how, through this control, the human is able to energize his behavior and is able to manipulate the cognitive structuring process.

This spatial arranging and relating on the asymmetry chain of the 297
structural aggregates so that one structural aggregate follows the other, it is postulated, provides the temporal property that is called serial order within each specific modality. These structural aggregates are being arranged and spatially related on the asymmetry chains as structural changes are going on in these aggregates. The latter yield our psychological phenomena and the former their temporal characteristics. Moreover, since the structural aggregates of each specific modality couple with the same asymmetry chain in parallel, this action provides inter-sensory relationships and interactive effects between the various modalities.[36] This sequential and lateral-parallel interlocking on a common asymmetry chain of these structural aggregates, later to be recorded as memory quantum structural aggregates, provides the contiguous temporal relationship between the sequential events (sometimes referred to as the causal chain of events) taking place external to the organism (exteroceptive) and sequential events taking place internally in the organism (cognitive, interoceptive, proprioceptive, and tonic). These spatially contiguous structural interrelationships between chains of these structural aggregates have been called by various names, the most common being association. However, instead of association (which term implies that the units being associated are more or less static entities), the terms structural and spatial interrelationship seem to be better since the empirical referent is the chain of structural aggregates which are spatially and structurally interrelated and, in the process, yield the temporal relationships previously described by the term "association." The new terms take into account the comparatively new data on interactive effects. Thus, the temporal characteristics of all internal and external processes are

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The intrinsic functioning of this particular structuring process which this writer calls the "central semi-autonomous process" (to distinguish it from perceptual processes) provides the human with his cognitive processes—thinking, reasoning, etc.—and the features of intentional behavior.

[36] When the structural aggregates (which, it should be remembered, are highly dynamic and flexible quantum structural organizations) from the various specific centers feed onto the asymmetry chains, they apparently interact to produce the well-known inter-sensory interactive effects between modalities. The structural aggregates that feed onto the common chains are exteroceptive, interoceptive, proprioceptive, and tonic. In this way, the internal conditions of the organism can affect the perceptual processes of the organism. For example, "fear" is known to produce a de-differentiation of perceptual and cognitive processes in the human.

It is via this spatial contiguity that internal affects (the primary drives, emotions, feelings, etc.) become related with exteroceptive (perceptual) and cognitive (conceptual-symbolic) processes in the human. For example, it is a well-established fact that concepts contain interoceptive, exteroceptive, proprioceptive and probably tonic components at one and the same time. Moreover, it is this spatial contiguity of quantum structural aggregates that is meant by the term "relational isomorphism."]

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conceived to be mediated via the spatial-structural relationships of 298
sequential and continuous chains of quantum structural aggregates. These chains of structural aggregates (after they have been dispersed into quantum field structures) are ultimately recorded as memories. In this way, as will be indicated below, the normalizing process is responsible for the growth,

differentiation, and development of our memories whose organized aspects appear as attitudes, personality attributes, etc.

In summary, in the specific centers we have the resultant of one aspect of the unitary or structural field process—a continual tendency of field structures within a relatively isolable system toward structural asymmetry which results in the continuous formation of quantum structural aggregates. In the specific centers, the structures of the stimuli recombine and approach their intrinsic symmetry. (This process has been previously called integration.) In the central center, we have the resultant of the other symmetry tending aspect of the structural field process (acting in close cooperation with the first continuous tendency toward structural symmetry), a continual tendency on the part of the normalizing-respiratory process to establish the asymmetry norm which brings the symmetrized structural aggregates back to the asymmetry level of the larger system—the structured field as a whole. By so doing, the normalizing process in these central centers spatially relates the structural aggregates both sequentially and laterally which provides the psychological properties of meaning and the temporal properties of serial order within a particular modality and interrelation (previously called association) between modalities. Thus in these second centers, the structural aggregates are spatially interrelated into sequence of these structural aggregates whose differentiation over time (of the quantum pattern memories) yield what we call object, situational, and conceptual-symbolic meaning. The salient characteristic of the structuring process is that it is a creative and order-producing process. The properties of the structural aggregates that appear are other than the sum of the parts that went into the formation of the aggregate and the aggregate represents a bit of increased symmetry in nature which has come about by reducing the previously more numerous and more asymmetrical structures. The creative and ordering process reaches its highest expression in the human cognitive processes where every human has control over this structuring process. He is able via this control to create new structural aggregates (concepts) and spatially reorder past sequences of aggregates. Out of both activities new meaning arises. This ability to create psychological meaning is the source of human greatness and weakness, the source of great adaptation in some spheres (material, physical, technological, etc.) and 299
severe maladjustment in others (social and cultural). The psychological phenomena are regarded as being due to structural changes taking place in these units of differentiated order or structural aggregates. The particular nature, the complexity and momentary variations of our psychological experiences, is determined by the particular momentary nature of external and internal stimuli being fed into the structuring centers underlying the reticular formations and by the nature of the complexing (memory) quantum structural organizations. The continuous and rapid rate of coupling (the asymmetry chain is moving at a high velocity) of the structural aggregates of the various modalities onto the asymmetry chain provides for what we experience as—aptly put by James—the "central stream of consciousness."

Before we leave this section, it may be well to clarify the difference between psychological phenomena and "consciousness."[37] "This supports the increasing weight of evidence presented throughout this book that the

various mechanisms most related to conscious cerebral function are located in the reticular network of the brain stem." Penfield postulates that consciousness might be due to the to and fro movement of neural messages between the cortical areas and the centrencephalic system in the brain stem. In other words, for Penfield, both psychological phenomena and consciousness occur in the projection tracts of the reticular formation. This writer differs from this point of view and holds that psychological processes are due to

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[[37] It is of interest to note that modern psychology arose from the philosophical problem as to the nature of awareness. We can now see why the philosophical approach of reasoning and logic alone would never have resolved the problems, for that which gives reasoning and logic their power—concepts related to their empirical referents (denotability)—was lacking. What was needed was an inductive approach of controlled observation to the empirical referent itself and this, scientific method provided. (Thus, it should be understood, scientific method is not necessarily what a scientist does, but it is that procedure any human goes through, based on past experience, to yield concepts and valid knowledge he can trust.) Now after four hundred years of the science of Galileo and Newton, after three hundred years of physiology and neuro-physiology initiated by Harvey, after eighty years of psychology initiated by Wundt, seventy years of micro-biology initiated by Loeb, etc., the converging lines of evidence from all of these sources permit us to make some reasonable statements about the problem of awareness. Logic and reasoning are as powerful as the denotable concepts they employ. What is not there in the first place will not be ground out by logic and reasoning. What will be ground out is a reified cognitive system giving the illusion of sophistication. However, we should not be so brash as to dismiss philosophical speculation altogether for, the philosopher quite often did keen thinking on his problem of interest. His insights should not be lost and deserve to be studied carefully. The works of Cassirer and Russell afford us with outstanding examples.]

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structural changes taking place in the structural aggregates within the 300
reticular center as postulated above. "Consciousness," on the other hand, it is here postulated, is due to the inner symmetry tendencies of the numerous structures that comprise the asymmetry chain passing through the reticular formations. "Consciousness" is located in the reticular centers because these are centers of high concentration of structural asymmetry activity. There is a world of difference, however, between "psychological phenomena" and "consciousness." Consciousness is not that which distinguishes life from non-life. The key to life lies in the process of the continuous organizational activity of the structural field which activity, after at least five billion years, is responsible for the differentiation and integration of our psychological phenomena. That is, the psychological phenomena, as we experience them, are due to five billion and more years of creative structural differentiation of what we call our nervous systems which differentiation and integration we carry on during our life-times. Whereas, on the other hand, "consciousness" may be no more than a crude and general property of the structured field—wherever structural asymmetry exists in this universe, the phenomenon of "consciousness" may also exist to some degree. It is not due to a mysterious entity referred to as "mind" by the philosopher but to a structured field in a high degree of symmetry tendency. For example, in the human, as the respiratory rate is progressively lowered or reduced, there are progressive losses in "awareness" or "consciousness" but the psychological processes are not necessarily disrupted. The reason for the "loss of consciousness" is that there is a lesser concentration and rate of structural asymmetry to approach its symmetry; high concentration and rate of asymmetry to symmetry tendency yield the phenomenon of consciousness. To be sure, lowering the respiratory rate still further brings disturbances in psychological processes

but this is because that factor (the asymmetry chain) which is responsible for the meaningful and temporal properties of our psychological processes is being impaired. That the structuring process still goes on when the respiratory process drops to lower levels is indicated by our phenomenon of dreaming. Dreams are due to the formation of aggregates with the structuring process impaired so that the meaningful and temporal characteristics of our psychological phenomena are altered. Dreams, of course, are not prognostic of the future, which belief, incidentally, is a superstition which belongs in the same class as astrology, parapsychology, and a whole host of other beliefs many people take delight in entertaining. However, dreams are diagnostic of the past (ontogenetic past—to reject Jung's notion of the "racial consciousness") and a trained psychiatrist or clinical psychologist can use this abnormal or altered cognitive activity (dreaming) to 301
determine the nature of the individual's needs, goals, and problems.

P. The Nervous System—A System in Process

In this section we shall attempt to grasp some of the dynamic and organizational activity of the unitary process, operating in the differentiated sub-systems of our nervous system, as the nervous system intercepts, disperses, complexes, converges, symmetrizes, structures, and experiences incoming quantum stimuli and as it dispatches configurational quantum structural aggregates and evokes sequences of muscular activity which exert an organizing and ordering effect on the various aspects of our environment. We shall note that the human nervous system is in a process of continuous development which reaches its acme in the continuous development of the human personality.

We should always keep in mind that the structural organizations called sub-systems are not static entities but rather are structural processes that contribute (via memory formation) to their own continuous development and/or to the development of some higher sub-system in the organizational hierarchy. And we should remember that these highly organized entities transact with incoming stimuli (via the method of complexing described above) and through these stimuli, transact with one another. Via this transactional process, the historical order and organization already in these systems is taken into account in producing further organization. The salient organizational tendency of this developmental process—one-way development—will be taken up in the next section.

In order to facilitate understanding of the following section, a brief and superficial statement will be made describing the basic hierarchical organization of the nervous system as interpreted from the point of view of this development.

The dispersed, translationally moving, series of quantum structures (actually stimuli) have a possible three levels of structuring to traverse. Before entering the first (tropistic) level, the stimuli sweep through the complexing centers or memory areas at that level. The similar memories (quantum field patterns) are decoupled and carried with the stimuli to the first structuring level. From this level, as well as from the two higher levels of structuring, there are three paths along which each structured aggregate

travels; the first path feeds back to the complexing (memory) areas from whence it just came, the second path is that to internal and external motor areas, and the third path leads to the memory complexing areas of the next 302
higher structuring level. Thus, each of the three levels of structuring is similar in that it has at least three pathways leading from it. However, each level is more complex than the one preceding it; this increasing complexity is manifested in the increased number and complexity of the memory levels on each structuring level. The first structuring level has but one such memory level, the second two, and the third level three.

Since there is no higher level to which the third pathway of the third structuring level can lead, this pathway is conceived to feed back continually through its three complexing levels.

This system will now be described in greater detail.

This threshold process begins with the selective-decoupling action, by the specialized quantum organizations within the various internal and external receptor systems, of the successive environmental stimuli which are in varying degrees of symmetry and asymmetry.[38] In other words, the receptors transform the stimuli from macro-mosaic forms into temporal series of translationally-moving quantum structures.[39]

[[38] Actually the most important process of the human's psychological processes is the semi-autonomous central process to be described below. The conceptual-symbolic quantum memory organizations that this system utilizes must be acquired via the route now being described.

[39] To take an example of a sensory modality so as to permit the comparison of accepted basic views of the operation of the sensory mechanisms with those stemming from the unitary view: modern physics conceives light as made up of photons or particles of electromagnetic energy which cannot be subdivided. Modern physiological research on the eye (specifically that of Hecht and co-workers) indicates that one photon of light is sufficient to initiate "the minimum photochemical event" in the retinal rod-cone structure. This "minimum photochemical event" presumably is the absorption of the photon by the photochemical substance in the rod or cone and the generation of a nerve impulse which goes to the optic nerve. Nerve impulses are regarded as the common denominator of all sensory modalities.

Unitary theory, as interpreted by this writer, postulates that the photon is composed of quantum field structures; hence, the "elementary" photon can be dispersed into these smaller quantum field structures. According to the unitary view, the function of the photochemical substance in the rod or cone structure is to capture on photon, decrease its speed, transform it into quantum field structures and transmit these quantum structures to the optic nerve and eventually to the central nervous system via passage through the interior of the nuclei particles of the atoms involved in the neural projection system. The quantum structures that reach the higher levels of the nervous system are either those of the electromagnetic stimulus itself or the quantum structures stemming from the transformation of the electromagnetic stimulus into quantum field structures by the retinal process. If the latter alternative proves to be correct, each sensory modality must be specialized both to receive and transform particular types of environmental variations into particular types of quantum structures. These quantum structures are the common denominator of the nervous system; configurational conduction of a differentiated nature takes place along the projection tracts of each sensory modality. (As the quantum structures pass into and out of the atomic nuclei, a process of depolarization and repolarization takes place in the whole atomic-molecular system which disturbs the

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These macro stimuli, now traveling in successions of discrete quantum 303
structures, go to geniculate bodies or their functional equivalents which spatially disperse them into possibly discrete quantum structures.

I. THE FIRST OR TROPISTIC LEVEL

The first step in the symmetrization of these now dispersed quantum structures occurs, it is postulated, in the quantum organizations within the reticular complex at the level of the thalamus. But before reaching these centers, the dispersed quantum structures of each macro-stimulus pass through complexing (memory) areas[40] on the thalamic (tropistic) level such as in

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electro-chemical steady states within the neural cell. The process of depolarization, the disturbance of the steady states, and then the process of repolarization and the re-establishment of the steady states give rise to minute electrical potential which summate to yield the complex wave forms or nerve impulses associated with receptor stimulation.)

It should be clearly understood that this sketch has grossly oversimplified the neural operations of the nervous system and this certainly applies to the sensory mechanisms. A vast and steadily accumulating literature (which ultimately must be fully accounted for by unitary theory) exists on the sensory mechanisms and includes some of the most dramatic research and theorizing in the field of psycho-physiology. This writer is thinking in particular of the current experimental-theoretical controversy in the field of audition—the place vs volley-place theory of audition. E. G. Weaver in his book *Theory of Hearing* brings together much of the modern research in the field which affords us one of the finest examples of the persistent quest of pure science for full understanding (not to mention the great practical benefits that this particular research have yielded)—in this case an understanding of how living organisms acquire the auditory aspect of their experience. But as Boring points out, we should not lose sight of the fact that the idea of physiological localization of attributive analysis in the peripheral sense organ rests on the assumption that there is a one-to-one relation between empirical stimulus correlates and psychological attributes in a particular modality (e.g., for sound this would mean a one-to-one relationship between the psychological attributes—pitch, loudness, volume, density—and the stimulus correlates—intensity and frequency). But numerous experiments have shown that all of these attributes are joint functions of both intensity and frequency. [Moreover, in the field of vision, according to Weymouth, F. W. (Amer. J. Opt., 1955, p. 186), "the period of mass action photochemical explanation" of intensity attributes "have come to a close in retinal physiology."] That psychological attributes are interdependent functions of intensity and frequency indicates that these attributes are determined in a site which brings the two variables together in a common structure. Thus, the configurational aspect (or frequency) of a tone is "analyzed" by its dispersal, transaction and re-synthesis in the reticular centers. The asymmetrical aspect (or intensity—remember, the stimulus is configurational asymmetry) of the tone is experienced in the same process when each quantum structure is falling through its asymmetry to symmetry gradient—the structuring process itself relates the two variables of intensity and configuration. Transportation experiments also indicate that the experience of an attribute is a central phenomenon and not determined by peripheral analysis.

[40] Each quantum memory chain of any sensory modality, it was postulated above, contains all other modalities activated at the same time as subsidiary chains. These subsidiary chains are carried along when the central memory chain is decoupled and also reach the structuring centers. The incoming stimuli, in passing through all quantum memories of

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the hypothalamus, medulla, colliculi, and in other areas surrounding the 304
reticular structure wherein each quantum structure decouples similar quantum structures (or linked chains of such quantum structures) from the molecular organizations that subserve these memory organizations. The complexed quantum structures now sweep to the centers of symmetrization within the reticular formations.

Spatial structuring of the stimulus structures occurs, according to a rule of structural organization determined by the formative tendencies intrinsic in the incoming field structures themselves, in the specific quantum structural organizations within the reticular formations. That is, the discrete quantum structures of the decoupled and dispersed macro-stimuli are brought back into the same (equivalent) spatial relations as in the original stimulus but are now transactionally complexed (differentiated) by similar memories present in the organism at this level. Here they undergo symmetrization, the nature of which is determined by the incoming structures of the stimuli themselves.

After stimuli from each sensory modality active at the time have been individually spatially structured, each modality feeds its structural aggregates into a central collecting quantum structural organization also sub-served by the reticular formations at the tropistic level.[41] The normalizing-respiratory process also continuously feeds long chains of asymmetrical structured quantum chains into and out of this central quantum organization. The discrete trains of spatially equivalent quantum structural aggregates of each specific modality now feed rapidly onto, and couple in parallel with, the common asymmetry chain. At the moments of coupling, the discrete nature of the traveling successions of quantum aggregates, which have just undergone spatial recombination, disappears. At the moment of asymmetry chain coupling, serial order within a specific modality appears and inter-sensory relationships between, and intensity attributes of, all modalities being activated also appear. Moreover, at these moments, the structural changes in, and the structural asymmetry being inducted into, the quantum structural aggregates coupling onto the asymmetry

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a particular level and transactionally complexing with similar memories, are the basis of generalization on all levels, in this case, sensory generalization.

[41] Or perhaps, as mentioned above, the specific and central structuring processes occur in one and the same center. If this is so, then both the configurational and intensity attributes of our experiences occur during the downward swing of the depolarization cycle—that is, during the structuring process.]

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chain are experienced and are the basis for internal and external "ground" 305
of perceptual experience. (These structural changes are experienced as generalized, diffuse, and undifferentiated sensory phenomena. According to Gesell, Piagèt, and others, such tropistic experiential phenomena characterize the phenomenal-psychological world of the infant during the first six months.) The psychological phenomena are, moreover, the resultants of underlying ongoing structural events and do not themselves cause these underlying events to take place.

After structuring and spatial ordering and simultaneous psychological manifestation, these aggregate-carrying asymmetry chains are spontaneously dispatched from the central quantum organizations along at least three separate paths. (Thus, each structural aggregate formed in the structuring process must be replicated a number of times after structuring is completed.)

One of these is the feedback path to the complexing (memory) areas of each specific modality on this particular level of symmetrization (tropistic) which extends and differentiates quantum memory chains already present and which forms the complexing means of future stimuli. A second path is to complexing (motor memory) centers which results in the initiation of sequences of external and internal muscular contractions. A third path is to the complexing (specific projection) areas of each sensory modality on the next level of structuring. Each complexing level on each structuring level, it should be noted, contributes to the complexity and organization of the aggregates going to higher levels so that underlying the highest levels of human psychological (cognitive) activity there must be a field complexity of fantastic proportion and an equally fantastic organization and ordering of this complexity.

Referring now specifically to the first path of the asymmetry chain there is continuous to and fro sub-threshold movement between areas of final quantum chain extension or memory formation and structuring centers even after the cessation of the initiating stimuli, resulting in a progressive rather than an abrupt extension of quantum memory chains. It is during this prolonged feedback activity that the phasic proprioceptive (motor) stimuli are fed into the various specific modalities. The initial selection of quantum memory chains that are subsequently extended (differentiated) is determined by configurational similarities between the structural aggregates emerging from the central quantum organizations and the specific quantum patterns (memories) already formed. The memory organizations formed now serve as a complexing means for future stimuli. It is doubtful if much such ontogenetic differentiation occurs on the tropistic level; it seems that 306
most of the quantum memory organizations on this level are phylogenetically determined.

Referring now specifically to the second path, the aggregate-carrying asymmetry chains feed into complexing centers of the internal and external muscular systems. (Dispersal must again occur and each configurational structural aggregate dispersed ultimately results in a macro-configurational muscular contraction.) The complexing centers of the former seems to lie in the hypothalamus and the complexing centers of the latter in various areas such as in the cerebellum. Past internal and external motor memory chains are decoupled by similar incoming dispersed quantum aggregates. These complexed quantum patterns then sweep to areas controlling internal and external sequences of muscular contractions. The centers that control (coordinate) external sequences of muscular contractions (via the autonomic system) appear to be the supra-optic and para-ventricular centers in the hypothalamus. The sequences of external muscular contraction manifest themselves in complex locomotory-manipulative effector activity whose nature, direction, and site of operation are determined by the configurational nature of the individual quantum patterns. The basic activity, however, on this level is generalized and relatively stereotyped forms of turning and bending movements. (The reflexes on this level are due to differentiation of units from this aboriginal generalized-undifferentiated-gross pattern of muscular contractions.) On the other hand, the internal sequences of muscular contractions manifest themselves in

configurational (spatially and temporally varying) sequences of hormone secretions (pituitary, thyroid, adrenal, gonadal, etc.) into the fluid matrix,[42]

[[42] There may well be a reticular-type structuring level—acting in close synchrony with the above three levels—that controls and provides the structural products, in an organized and interrelated form, for biochemical development. The original structuring center may come from the ovum nucleus with the sperm setting the structuring process into operation. The "directive" structural aggregates used by this center to develop the biochemical characters of the cells are postulated to be the genes (in reality, quantum structural aggregates) furnished by both the sperm and ovum cells. These gene-structural aggregates synthesize enzymes which catalyze interlocked and interrelated catabolistic and anabolistic processes. The new development effected by these processes (or the byproducts of these enzyme controlled processes) results in configurational stimuli that are constantly fed back into the genetic memory centers. These stimuli initiate further sequences of developmental action the nature of which is determined by the transactions between the incoming stimuli and the genetic memories or quantum field patterns already present and, of course, by the nature of the structural aggregates that are formed in the biochemical structuring center. This continuous transactional activity between intracellular environmental stimuli and genetic memories thus

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the resultant of these secretions of hormones being the continued activation 307
of anabolistic and catabolistic biochemical processes—via the control that hormones exercise over the supply of enzymes that catalyze these processes. These temporally and spatially configurational sequences of muscular contractions and the accompanying hormone secretions serve to promote processes that develop the internal physiological sub-systems of the organism and serve to sustain the asymmetry level or rate of the normalizing-respiratory process in all internal processes and structural organizations including the asymmetry chain continuously passing into central reticular organizations and radiating to other areas.

The changes in tonicity and movements of the externally and internally oriented muscles stimulate proprioceptive, tonic, and organic receptor organs imbedded in the musculature. These stimuli in the form of quantum structures[43] go to specific and central quantum organizations within the reticular formations for structuring as part of the internal stimuli mentioned above.

The configurational proprioceptive and tonic stimuli from externally oriented (striated) muscles are experienced as kinesthesis. The configurational organic stimuli from internally oriented (smooth) muscles are experienced as part of the internal affects called the physiological drives.[44] The internal and external "motor" stimuli, after central structuring, also

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results in the continual production of structural aggregates which in turn synthesize enzymes in a particular developmental sequence which control catabolistic and anabolistic processes whose action results in the progressive appearance of the differentiated and interrelated and interdependent sub-systems of the cell. At some particular point the physiological (tropistic) structuring centers are developed and these carry on the physiological developmental processes using hormones as the developing agents and a sequence of events somewhat similar to that on the biochemical level. The whole developmental sequence, however, on all levels, is controlled by the two aspects of the unitary process appearing as the structuring process and