good deal of intrinsic heat aside from that generated by gravitational attraction, for they have recently emerged from the sub-structuring process. But apparently they are too small to initiate the thermonuclear reactions on a large scale despite their high temperature.)

The cyclic group of stars and planets that has emerged from the sub-structuring processes, under the organizational control of the normalizing process, is separated by the normalizing process to form a cluster of stars (which appears at this point probably much like the recently observed O-associations), which is related by the normalizing process to a particular multiple system of stars called star clouds. The normalizing process, having a continuing organizational influence over the sun (and its planets) determines both its position within the multiple system of which the sun is a part and its half-dozen or so intricate movements within that system. The

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[41 It should be noted that except for the high asymmetry level and the postulated originating influence of the normalizing process, this is closely following the scheme outlined by the dust cloud theorists.]

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stars in a particular multiple system must change their relative positions to 213
one another very slowly—due perhaps to the continual creation of new stars and final symmetrization of old stars which must change the configuration of the multiple system as a whole. This is the reason we see such configurations in the sky as the Big Dipper which, however, are destined to disappear some day to be replaced by other configurations.

Some five billion years ago, our sun was formed in one of these sub-structuring processes at or near the central plane of the Milky Way. This is a manifestation of the continuation of the differentiated growth of our galaxy which must certainly be going on at the present time, new suns and planets being created much like those of our solar system. (This writer would venture to guess that it took a thousand or even less years to form the aggregates that became our sun and planets in the sub-structuring process. This is to be contrasted to the estimates of other theorists which range from one hundred million to five billion years. The reason for these higher estimates, the writer suspects, is that many theorists are beginning to sense that the universe involves vast eons of time, comparable to the vast reaches of space and far longer than the five billion years that is now being postulated.[42] As the cyclic group that was to form our solar system moved

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[42 Basing his views on the assumption that the universe originated in a cataclysmic explosion some five billion years ago, Baade offers the hypothesis that all population two stars were created at one time about five billion years ago and that the population one stars have been created since that time and have followed their diverse evolutionary paths since their respective births. But there are many factors which indicate that our earth and sun are very young stellar objects and we know that our solar system is about five billion years old. Moreover, Baade tells us that the population two systems of stars are systems of “very old stars.” It seem paradoxical to hold that our solar system is a very young system and at the same time to hold that the population two stars are systems of very old stars, yet ascribing an age of five billion years to each at one and the same time. It seems either that there is something drastically wrong with the age that Baade assigns to the population two stars or that we are not determining the age of our solar system correctly. There are, however, too many independent checks on the age of the earth to suspect that the latter is the case; consequently, we must suspect that the population

two stars are systems of stars far, far older than our solar system. The writer consequently rejects Baade's spontaneous generation hypothesis of the population two stars and postulates that these stars at one time underwent the identical evolutionary sequences which we now observe in the population one stars.

This writer will postulate below that the structuring processes going on in our perceptual and cognitive systems are identical to those structuring processes taking place in the galactic group and in the individual galaxies, except for the differences in degrees of complexity. It will also be postulated that the asymmetry level in the human's nervous system is as high as in the normalizing process of the universe. Therefore, if the normalizing-respiratory rate is as rapid (referring to the vibratory rate of the individual quantum structures of the normalizing process) as that in the galactic structuring processes, this might offer us a crude method for determining the age of our galaxy, provided other essential facts were known. It takes, let us say,

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out from the sub-structuring center, our sun was apparently the only aggregate large enough to initiate the thermonuclear reactions; the rest of the aggregates simply went through the molten stage and formed the present objects of our solar system. 214

The sun and each of the planets and other objects of our solar system form a unitary process with the normalizing process of the sub-structuring center that gave them birth. The formation of such a unitary process allows each quantum structural aggregate of all the larger solar aggregates to manifest both tendencies of the structured field. Thus, each of the planets and the sun has its own asymmetry to symmetry tendency depending upon its internal makeup and its own normalizing process. The normalizing process in each quantum structural aggregate of each solar aggregate causes dispersal of its gravitons; the configurational symmetry tendency of the gravitons, in turn, determines what we call gravitational attraction. (The gravitational attraction between the various solar aggregates determines the size of the solar system.) In the first long eons of its existence the sun and its planets must have acted much like an irregular galaxy; that is, at first the normalizing process must have been dominant in all objects of the solar system. Our solar system, in acting like an irregular galaxy, must

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X years (which the writer guesses to be about one thousand) for the sub-structuring process to build an average sun with its average solar system (the sub-structuring process is assumed to form a number of such suns concurrently). By taking the number of sub-structuring processes in the galaxy we could calculate how many average suns were produced in X years. Then by dividing the total number of suns now present in our galaxy by the number of average suns produced in X years, we may get an approximation of the length of time it took to create the galaxy as it is today. (For example, if there are two sub-structuring processes, one in each tail of the spiral galaxy, and each forms an average of 100 suns concurrently, there would be about 200 suns and solar systems formed every thousand years. Dividing this number into 100 billion, the number of suns estimated to be in our galaxy, it would have taken 500 million periods of 1000 years each or 500 billion years to form our galaxy.) This writer would hazard a guess that future research will show that our galaxy is a fairly middle aged galaxy—somewhere between three and four hundred billions years young.

The unitary man can only be thrilled by these vast vistas of time he is only beginning to comprehend, for he knows that he himself represents a long historical process of five billion years of continuous differentiated creative activity by the creative-formative process underlying the universe. He not only stands fully among these cosmic events of the universe, but he transcends in importance and age such majestic terrestrial splendors as the lofty, still growing, Himalayas which are of a relatively low order of organization and only a few million years of age.

If the views outlined above as tot he various ages of the various stellar systems turn out to be in the large part correct, our galactic group would be a very young group, we would live in a middle aged galaxy, in perhaps one of the youngest and fastest growing parts of that galaxy.

Our sun is a very young and stable star; our planet like our sun is also very young; and the human race is in the very morning of its existence on this beautiful abode of the heavens.]

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have been at first highly irregular in form and wildly turbulent in internal 215
motions but as the intrinsic asymmetry to symmetry tendency manifested itself, the solar system progressively settled down to a more orderly existence. (At this very early period, the proto-continents were formed on our planet. The irregular motions of the earth continually drove the lighter granite to and fro until it finally congealed to form the irregularly shaped continents, leaving the graniteless basins in between. The structuring process going on at the atomic and molecular level in the interior of the earth formed water which was forced out of volcanoes to fill partially these basins to form the primary oceans of our planet. Other volcanic gases formed the primary atmosphere of the earth much as outlined in the section on micro-evolution above.) Thus, it is postulated that the orbits and motions of the planets were at first very erratic and have only recently become elliptical and more orderly and may still be somewhat on the erratic side. The symmetry tendency of each structural aggregate of each sub-system of our solar system now probably acts in close cooperation with the normalizing process that created it. This is manifested in the orderly one-way development of structural aggregates within the sun and within the earth and on the surface of both bodies. (In other words, the solar system is now probably in its young spiral stage in comparison to the evolutionary sequences of the galaxies.)

This writer postulates that all the planets of our solar system and their satellites, have the same asymmetry level as our sun. The planets and satellites without atmospheres are far from being dead objects. Perhaps man shall someday succeed in making the moon and the more remote planets and their satellites fit for human habitation. Each quantum structural aggregate in the sun and in and on the planets of the solar system continues to operate on the principle of decreasing asymmetry which acts in cooperation with the normalizing process (each micro-system actually forming a tiny structuring process) to form more complex aggregates. Nuclear evolution must certainly be going on at the present time in the sun, but that the sun is not a very potent site of such nuclear processes is indicated by the low energy of cosmic particles emitted by this body. This probably holds true in varying degrees for all the suns of the galaxy. Nuclear evolution in the sun, it is postulated, is actually an indication of the ongoing nature of the unitary process in the sun much as biological and geological evolution are indications of the same ongoing process on and in the earth. The intrinsic structural asymmetry of the sun is decreasing by being converted into structural symmetry; the major process is perhaps the nuclear cycle described above. The electromagnetic 216
radiation emitted by the sun as a by-product makes our earth a comfortable and beautiful abode for life and provides the asymmetry re-supply to sustain the normalizing process in living organisms that dwell on its surface. Both the sun and earth are constantly converting their intrinsic structural asymmetry into structural symmetry but they do so in cooperation with the normalizing process which continually inducts structural asymmetry into each quantum structural aggregate thus preventing it from

reaching its final symmetrization and allowing each aggregate to continue its differentiated growth. For some reason which is explicable by a knowledge of its internal makeup and other relevant factors, our sun undergoes its unitary tendency very slowly generating heat at a rate far less than that of the human body, and is destined to live a very long life in comparison to other stars. But in some far distant eon our sun is also destined to become a population II star, to become a red giant, then a white dwarf, then a nova, and then return to its creator—the unitary field of the universe.

Our earth, like every solar aggregate, has an independent symmetry tendency determined by its internal constitution, and each quantum structural aggregate within the earth acts in cooperation with the normalizing process of the sub-structuring center which process invests each structural aggregate (and, of course, each larger organization of such aggregates) with its asymmetry level. The fields operating between the earth and sun consist of at least two components: 1) the normalizing dispersal process operating out of the earth and sun, and 2) the symmetry configurating tendency of the quantum structures that the normalizing process has dispersed. The earth's angular momentum and its orbit around the sun (which yields our year) may be due to a balance between these factors. The reason for the retrograde movement of Pluto and the moons of Saturn and Jupiter may well be due to an imbalance of these factors—all of these objects are in the outermost orbits of the bodies that they encircle. The earth's rotation on its axis (which yields our day) and the inclination of it axis to the sun (which determines our seasons) may well be related to the asymmetry to symmetry changes going on within the various layers and the sub-layers of the earth. The great ice ages which have seen glaciers sweep over large areas of the earth's surface and the equally long periods of tropical warmth which have brought tropical flora and fauna to the poles, may be a function of the changing internal structure of the earth which may change both the earth's rotation and its inclination to the sun. (These changes may also be responsible for the great periods of mountain building upon the earth.) The great spiral motions of 217
our oceans and the spiral trade winds (which greatly influence our weather) may be further evidence of the degree of the earth's asymmetry to symmetry evolution. Both of these great motions of the oceans and the winds, not too long ago, may have been highly irregular in form and these may have been the factors that caused the great periodic floodings of the earth's surface and, at other times, exposed the great land bridges between the various land masses which played important roles in biological evolution. The intrinsic asymmetry to symmetry changes in the earth's interior, on the smaller scale, produce the chemical combinations, the many beautiful types of crystals including the useful minerals, coal, jewelry for personal adornment, etc., that the geologist studies in his laboratory and, on the larger scale, results in major adjustments within the earth's crust which produce what the geologist calls diastrophism—periods of violent deformations of the earth's crust accompanied by lava spewing volcanoes and the creation of new islands and new mountain ranges. Such a period is going on now in various regions of the world especially within, and at the outer land perimeter of, the bowl formed by the Pacific Ocean.

All of these factors, as we just noted, operate together to shape the face of the continents, to leave the fascinating tale of one-way development called the "record of the rocks" whose deciphering must also be considered as one of the truly great wonders of modern science.[43] All of these terrestrial changes have been potent factors in biological evolution for they constantly changed the environment of living organisms causing the normalizing process to create new structuro-functional organizations that facilitate normalization in accordance with the new conditions of the environment.

If anything is important in the universe it is life. Life is a creative manifestation of this great formative process that pervades the entire universe. The true significance of what we call the unitary field comes in the consideration of its properties—energy, matter, life, and the human personality—these are all creative manifestation of this unitary field. It is these very unitary field structures in aggregates of a highly differentiated

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[[43] It is interesting to note that most of the early geologists set forth hypotheses of spontaneous generation to account for the features of the land that are now known to have been caused by the "tooth of time," the eroding action of the winds and rains—the great leveling-down process of geology called gradation. To account for these seemingly catastrophic topographical features, these early theorists of geology postulated that a cataclysmic explosion must have occurred. It may be that all view of spontaneous generation can be ascribed to common sense explanations which are conditioned by a particular culture's environmental setting. For example, it has been pointed out that the geological hypotheses of spontaneous generation originally stem from the Mediterranean region where earthquakes and volcanoes are frequent occurrences.]

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form which, in their interrelationship, yield perceptual meaning, our 218
concepts, our value experiences and our personality. The unitary man is a proud part of this cosmic-formative process; he is the process and lives by virtue of its operations. The unitary man learns to regard himself as he is—the product of a long historical process at least five billion years old. In this framework, he stands among and with the cosmic events; he uses himself as a measuring stick. He is certainly not the creature of chance and uncertainty, a mighty mote on a middling planet of a second rate star as envisioned by the materialistic monist who, at the core, is a dualist. There is no dualism in the universe. There is no dualism that sets man apart in a tiny sphere; this dualism is a product of man's taking apart what belongs together. The unitary process requires one thing, and one thing only, that man must live according to its rules; otherwise man is free.

Death for the human, as in the galactic system, is due to the great over-dominance of the inner formative tendencies. In maladjusted humans, in states of disruptive normalizing distortion, this inner symmetry is being approached due to the dissipation of "available energy" which in turn is often due to the human falling out of relation with his interpersonal environment. Both in life and death, however, the quantum structural organizations that underlie the human's cognitive processes and personality never leave the quantum structured field. (If man has a destiny beyond his final symmetrization and this became fully known, the

well-spring of human motivation that has led to his noblest achievements, and wondering about his existence and the striving after better knowledge and greater understanding might well disappear.) Each human is an individual; nevertheless, he is part of a larger structure, social groups and a culture. . .

4. THE EVOLUTIONARY APPEARANCE OF LIFE ON OUR PLANET

219

> What I wish to make clear in this last chapter is, in short, that from all we have learned about the structure of living matter, we must be prepared to find it working in a manner that can not be reduced to the ordinary laws of physics. . . The new principle is not alien to physics. . .For the new principle that is involved is a genuinely physical one: it is, in my opinion, nothing else than the principle of quantum theory over again.
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> Schrödinger—*What is Life?*

In the sections above, we have followed the view that the chain of events leading to the evolutionary appearance of life on our planet is to be pushed back from the biochemical and organic sphere, into the realm of the chemical evolution of the atomic elements, to the origin of the elementary particles, to the unitary-creative-formative-structured field underlying the universe.[44] Let us briefly summarize the sequence of events that we have outlined above which were due to this creative-formative process and its salient characteristic of continuous one-way development. We have postulated that the normalizing process, as part of a continuously operating structuring process, after a long sequence of quantum structural development, differentiated out of the unitary structured field, the thirty elementary particles, each particle having its own characteristic set of field properties. The normalizing process, its intrinsic activity continuing, subsequently structured these elementary particles into tiny quantum structural microcosms which marked the beginning of the next step in the heterogeneity-complexity hierarchy with a new set of properties—the evolutionary origin of the chemical elements. (Significant events were also

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[44 Pringle points out that "the idea of a continuous form-building process at work throughout the history of matter and not merely during the biological phase" postulated in a scientific framework is not new, at least not with Oparin, Bertalanffy, Whyte and of course, not with this writer. Schafer (a biologist), as long ago as 1912, postulated "a gradual process of change from material which was lifeless to materials of a borderland, to materials to which we attach the characteristics of life." But the hypothesis apparently found few supporters (until Oparin pointed out the evolutionary increase of carbon and nitrogen complexity as a function of a descending order of temperature and connected this increasing complexity with the origin of life on our planet) perhaps mainly because the materialistic empirical referents, atoms and molecules in motion, did not afford any organized concept of an empirical referent that could account for this continuous process. The modern advance of field theory, upon which unitary theory is based, offers the concept of a structure building and structure organizing unitary structured field as Schafer's continuous form building process. The forms, however, are not mysterious; they are the structures studied by the basic sciences, physics and chemistry.]

220

taking place on the larger scale; the earth was being formed in the sub-structuring process and later passed through its molten stage with the subsequent formation of the granite continents and the formation of the earth's primary oceans and atmosphere.) The normalizing process,

continuing its intrinsic structuring activity on the micro-scale in each atomic nucleus (each atomic nucleus acting as a tiny structuring process), continued to develop the next level of the organizational heirarchy in the primary atmosphere and hydrosphere of our planet. This new level of the hierarchy marked the appearance of a new dimension in nature—the realm of molecular structures and processes.

At some very early time in the existence of our planet, the atoms and molecules that were to form living processes left their fellow atoms and molecules behind (the latter of which are now governed by the laws and principles of thermodynamics) to develop the higher levels of the organizational hierarchy. The reason that living systems work on a more fundamental principle than the physico-chemical processes we observe in our laboratories is that living processes are systems displaying the continuity of process. They are the resultant of a long continuous process of one-way structural development in which the normalizing process had appeared on each successive level of the organizational hierarchy together with its organizational properties and high asymmetry level. Such one-way development is mediated by the continuous one-way development of quantum structural aggregates on the quantum level; these ordered aggregates serve to preserve a record of the past and direct the differentiated development of the species and the ontogenetic development of the organism in the present. The physico-chemical processes of our current experiences, on the contrary, represent processes of only a short duration involving structures whose development had long ago been arrested; such processes are now taking place at a time in the present when the two unitary tendencies of the structured field are acting in close cooperation on our planet. If an external source of structural asymmetry of sufficient magnitude were to be applied to these stable atoms and molecules representing states of arrested development, they could be made to continue their development. This, with the use of mediating catalysts, is what is being done in our laboratories and physico-chemical processing industries. The configurations of these systems with the arrested development are changed by the catalysts, which permit them to display their symmetry tendencies; the induction of asymmetry (via heat or other forms of energy) acts as the normalizing process. The catalysts initiate the physico-chemical reactions and the structural asymmetry continues them until 221
more symmetrical structural aggregates are formed.

Pringle postulated above that at the beginning of organic synthesis there were already steady states with a long evolutionary history behind them in the inorganic sphere. These steady states, forming a dynamic-equilibrium, Pringle postulated, were a balance of auto-catalytic synthetic processes and “death” or entropy increasing processes, with the balance in favor of the autocatalytic synthetic processes. It was these autocatalytic synthetic processes that yielded branching chain reactions resulting in organic synthesis. (This is opposed to the Haldane-Oparin-Bernal scheme which attributes the initial formation of organic compounds to the direct action of ultraviolet light.) Flow and ratio of components, self-regulation to sustain the balance of components, irreversibility, growth characteristics,

minimum entropy production, etc.; all these properties Pringle postulates were due to these balanced steady states.

The evolutionary type of dynamic process with successive stages of synthesis from the inorganic to the organic sphere which Pringle postulates to be the balanced steady state, was, this writer postulates, the unitary tendencies of the structured field acting in cooperation and appearing in these atomic and molecular systems with the balance in favor of the normalizing process. (Pringle's "death" or randomizing tendency is conceived to be nothing more than the normalizing process restoring the asymmetry level in a particular system by its intrinsic action; a system is either dispersed, or invested with a high asymmetry level, or both.) This is best seen in the long chain of enzymatically catalyzed reactions that lead to the synthesis of proteins, nucleic acids, nucleoproteins, etc. in the living cell. The highly specific enzymes and coenzymes change the configurations of the reactants (lower the energy of activation) allowing them to follow their symmetry tendencies which result in synthesis. Structural asymmetry (free energy), which is also carried by the highly specific enzymes and coenzymes in the form of high energy phosphate bonds, is then inducted into the products of the reaction so that they are dispersed into larger fragments to form the reactants of the next step in a long sequence of such reactions which finally eventuates in the synthesis of a complex compound. This is then still under the organizing control of the normalizing process.[45] These enzymatically catalyzed processes comprise the

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[[45] The coenzymes seem to be important agents of the normalizing process on the biochemical level. They are movable stable intermediates which serve to transfer structural asymmetry (in the form of high energy electrons) from one oxidation system to another and help integrate the activity of the cell as a whole. In other words, the coenzymes serve to transfer structural asym-

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bulk of each living cell and turn over free energy at extremely high velocities. 222
It is these processes and mechanisms that maintain living organisms in a decreased state of entropy. It is this network of enzymatically catalyzed processes that auto-catalytically increases the energy released in the cell and provides living organisms with their free energy maximizing (or entropy decreasing) property. These anabolistic-catabolistic processes are nothing more than the differentiated expression of the two aspects of the unitary tendencies of the structured field acting in cooperation on the molecular level. One aspect of this formative process forms structural aggregates and thus displays the features of anabolism or synthesis, and the other aspect restores each aggregate to the asymmetry norm and thus displays the features of catabolism, a driving free energy maximizing force. In cooperation the two aspects are characterized by minimal entropy production and result in the formation of structural aggregates which tend to increase the organism's heterogeneity and complexity; in other words, they result in the organism's growth. The features of the steady state—the conditions (e.g., temperature, pH, etc.), the component material and proportionate quantities in the fluid matrix and, hence, in each cell remaining relatively constant—are actually the mode which the normalizing process uses to restore and maintain its asymmetry level by 1) obtaining sustaining supplies of structural asymmetry and other structural components from the environment and 2) offsetting sources of normalizing

distortion from the environment. The steady states in an open system are thus maintained by the normalizing process in its intrinsic tendency to restore the asymmetry norm. The steady states in turn permit the unitary structuring process to operate continuously. Thus, the cooperation of the two unitary tendencies yields a formative process which possesses the features of catabolism and anabolism. The end product of the formative process is used by the normalizing process to form structural organizations on the larger scale of size to facilitate normalization on the new level of organization.

Flow and ratio of components, self-regulation to sustain the balance of components, irreversibility, minimum entropy characteristics, anabolism and catabolism and its resultant growth, the "uphill driving" and the consequent tremendous velocities of the physico-chemical reactions, are all intrinsic features of the unitary process. Thus, according to unitary theory,

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metry from foodstuffs to the ATP system in the form of a flow of high energy electrons or electrons in a state of high structural asymmetry. The normalizing process operating in the ATP system carries this structural asymmetry to all parts of the cell.]

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the process of evolutionary development of, and on, all levels of the organizational 223
hierarchy, including the evolutionary appearance of life on our planet, is to be explained by a long series of such structuring processes in which the normalizing process continually synthesizes patterns of structures to facilitate normalization. All that was needed for the unitary process to continue its structuring activity of the chemical, the biochemical, and then the physiological level was a molecular structure which would serve to facilitate its intrinsic tendencies.

This brings us back to the story of micro-evolution on our planet which we have already traced in some detail above. Geo-physicists and geo-chemists have fairly well established that the primary atmosphere of our planet contained a mixture of: hydrocarbon radicals, unsaturated hydrocarbons such as the aldehydes, saturated hydrocarbons such as methane, super-heated steam, nitrogen, carbon dioxide, ammonia, hydrogen, oxygen, alcohols, organic acids, ammonia salts, amines, amino acids, heterocyclic compounds and various other carbon and nitrogen-containing compounds. In time, the primary hydrosphere must have also contained these constituents which must have included: carbohydrates (among them being the pentose sugars d-ribose and 2-desoxy-d-ribose, the former of which is found in ATP and the latter in DNA), phosphate radicals or groups, amino acids, the heterocyclic compounds (among them being the purine and pyrimidine bases, a type of the former is found in ATP and both types in DNA) and an almost infinite variety of other inorganic and organic atomic and molecular systems. But each of the complex molecular organizations, this writer holds, was due to the organizing action of atoms acting as tiny structuring processes, the random or chance encounters serving as the means whereby the atoms and molecules could come into close contact and the structuring further effected. Consequently, we must reject hypotheses that imply that this increasing carbon and nitrogen

complexity was due solely to the random coherence of atoms and molecules made possible by decreasing atomic and molecular motions (due in turn to a systematically decreasing temperature such as in Oparin's hypothesis) and we must reject all hypotheses that rely upon statistical and classical thermodynamics as fundamental explanatory conceptuologies (Blum, Pringle in part, and Baranski, above). When these materialistic empirical referents and conceptuologies are employed, the origin of even the nucleoprotein (which must have been quite a simple feat in the primary hydrosphere) becomes impossible to account for. A far more systematic order-producing organizing process must have been at work.

5. THE ORIGIN OF THE ATP SYSTEM AND ITS SIGNIFICANCE

224

All that was needed for the unitary process to continue its structuring activity and to bring forth all the higher levels of the organizational hierarchy on our planet was a molecular structure which would serve to facilitate its intrinsic tendencies. This structure must have been the ATP system which is known to play a central role in metabolism. The basic idea is that the normalizing process, continuing its structuring activity on the molecular level in the ATP system, first formed, from nucleotides, the DNA molecule and then, from amino acids, formed the first protein the whole of which constituted an ATP-DNA-protein system. This, it should be noted, essentially follows the hypothesis of sequence of events suggested by Blum above. The ATP-nucleoprotein formed a continuously operating, cyclic, self-maintaining structuring process. The normalizing process, continually active in this structuring process, gradually differentiated out from the nucleo-protein system the complex structuro-functional organizations we observe on all levels of living organisms.

Returning to the micro-evolutionary sequence: with the appearance of the above constituents in the primary hydrosphere, we could readily predict that the ATP molecule and the nucleotides (fundamental units of the nucleic acids such as adendylic acid) would have been formed in large quantities for these molecular systems are relatively simple molecular structures composed of purine or pyrimidine, a sugar and one or more molecules of phosphoric acid. The ATP system was "selected" by the normalizing process to continue the development of the higher levels of the organizational hierarchy, because it proved itself to be the possessor of many stable physico-chemical properties (in relation to its hydrosphere environment), because of its ability to transport structural asymmetry (free energy) from one molecular system to another without using up the structural asymmetry itself or dissipating it in the form of heat, and because of its ability to develop the nucleic acids and nucleoproteins which contain myriad structural patterns in potential form that could be used by the normalizing process to develop more complex structuro-functional organizations on the larger scale. These organizations could in turn facilitate the restoration of the asymmetry norm of the normalizing process.

The ATP molecule is composed of the purine-adenine, the sugar-d-ribose and three phosphate groups; two of the latter groups possess what are called "energy-rich phosphate bonds" due to the large quantity of "free

energy" each such phosphate group carries. The special importance of ATP 225
arises from the fact that, under the influence of the appropriate enzymes, its terminal energy-rich bond can be transferred intact to other substances so that energy is, as it were, forced into the phosphate receptor.

> This appears to be a fundamental operation in the synthesis of complex biological compounds from simpler starting materials, and as far as we know at the present time, synthetic operations of this kind can only be accomplished at the expense of the terminal energy-rich bond of adenosine triphosphate. ATP itself can be reformed from ADP at the expense of the free energy of the numerous catabolic processes that lead to the generation of new energy-rich bonds, but the transmission of these bonds to other substances can only be accomplished through the intermediation of the ADP≒ATP system.
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> Baldwin—*Dynamic Aspects of Biochemistry*

This writer postulates that this structural asymmetry or "concentrated free energy" of the terminal phosphate groups (or of the electrons of these groups) of the ATP system was actually part of the normalizing process itself acting as part of the dynamic process, the ATP system. The inducting of free energy into phosphate receptors via the intermediation of the ATP system was the normalizing process restoring the asymmetry norm in these structures. The normalizing process acting as this tiny structuring process—the ATP system—was, it is postulated, the direction and driving process that developed static and cyclic patterns of structures to facilitate normalization which we call anabolism and catabolism on the biochemical level. Thus, with the origin of the ATP system, a structuring process was formed wherein both field tendencies combined to form a continually ongoing developmental process on the molecular level.

The DNA molecule which is known to be the structural site of genetic order, consists of a long chain of simple nucleotide units. The genetic DNA structure is linearly arranged into two close-fitting complementary chains of phosphate-sugar backbones that are linked together by their side groups to form a dual helical structure. Each backbone is made up of a long chain of alternate sugar and phosphate groups; the sugar is always the same sugar (2-desoxy-d-ribose) and is always joined onto the phosphate-sugar chain in the same way. The side groups which protrude from each sugar consist of two purines and two pyrimidines and are arranged in irregular order which has led to the hypothesis that this order is somehow a coding of biological order. It is these purine and pyrimidine side groups of the two backbones that are linked together to give DNA its helical shape. We might now ask how the normalizing process, acting as part of the ATP structuring system, could have caused the initial polymerization of DNA 226
nucleotides link to link to form DNA without the catalytic action of protein enzymes which were yet to be developed.

6. THE EVOLUTIONARY ORIGIN OF THE FIRST NUCLEOPROTEINS

The normalizing process operating out of the ATP system inducted structural asymmetry into other molecular structural aggregates via its structural asymmetry- (or free energy-) transporting phosphate groups. (The phosphate groups in the living system must possess organizing properties

for they are continually under the organizing influence of the normalizing process, operating in the particular living system, via its enzyme agents. Outside the living system, however, both ATP and its phosphate groups are just so much organic matter without organizational properties. They have then fallen out of relation with the normalizing process existing in the living systems and display the same thermodynamic properties as do other organic molecules.) The phosphate group of ATP must have initially acted both as a catalytic agent and as a repolarizing agent. Its configurational properties depolarized the molecule upon which it was acting, allowing the particular structures involved to follow their tendency toward structural symmetry and resulting in physico-chemical reactions and the formation of more complex physico-chemical structural organizations. As a repolarization agent the phosphate groups inducted its structural symmetry into the newly formed system; the reestablishment of the asymmetry level re-invested the particular structural system with potential configurational force properties which could be activated by further enzymatic action of the phosphate group.

The ATP system originated in the turbulent waters of the primordial sea at a time when the sun was hotter, the day and night swifter, the tides and terrestrial heat vaster than today, and all of this was accompanied by tremendous storms and violent earthquakes. We can well imagine that the ATP systems must have collided frequently with many types of molecular species co-existing with them in their particular stratification layer. The ATP systems, acting as tiny structuring processes, must also have come into frequent contact with molecules very similar in structure to themselves—the mononucleotides. The phosphate group of ATP, acting as a catalytic agent, depolarized the sugar group of these mononucleotides, both groups then undergoing their unitary tendencies toward greater symmetry with the result that a dinucleotide was formed. This coupling action was immediately followed by the restoration of the asymmetry level of the newly formed structural aggregate by the normalizing process. It is here postulated that the now-polymerizing nucleotide chain was simply continuously dispersed (by the normalizing process operating in the ATP 227
system) until another nucleotide appeared in its environment; it was then structured into the nucleotide chain by the normalizing process. (This dispersal process may also have marked the origin of the property of morphoenergetic replacement or maintenance in living organisms. That is, the individual nucleotide units of the polymerizing chain were continuously undergoing their intrinsic formative tendencies. The dispersal process simply cast off these symmetrized parts. As parts of the molecular pattern were removed, field forces were set up in the pattern which attracted other like molecules to fill the gaps. This process permitted the continuous incorporation of similar but new nucleotide units from the hydrosphere environment. In higher organisms, this morphoenergetic maintenance process is under the control of the parasympathetic nervous system which is a part of the homeostatic system which keeps structural and energy components in constant supply via a series of storage reserved.) After a long sequence of this structuring activity, the structural organization we call DNA—its side groups arranged in random order—and its conjugated partners, the proteins, appeared together in the same structural

organization to form the nucleoprotein. (The proteins were formed by the coupling of simple amino acids link to link.) The origin of the nucleoprotein marked both the appearance of the first proteins on this planet and the appearance of the next level of the organizational hierarchy; the colloidal level with all of its manifold new properties. [It should be remembered that the normalizing process must have greatly predominated at this stage of micro-evolution, the aboriginal ATP system thus possessing an exceedingly high asymmetry (free energy) level.] [46] The properties on each new level of the organizational hierarchy are incorporated into the

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[[46] This writer has postulated that the normalizing process must have greatly predominated when the aboriginal ATP structuring process was first formed on this planet. (It may even be possible, although the writer seriously doubts it, that the synthesis of the first nucleoproteins, although the result of a continuous structuring process, had their appearance long delayed, say for a billion years or more, due to the predomination of this dispersing normalizing process in atomic and molecular systems.) Moreover, it is here postulated that the nucleoproteins, although having many spatial duplications, had only one temporal duplication or, in other words, the nucleic acids and nucleoproteins appeared at one point in the intrinsic asymmetry to symmetry one-way development of field structures on our planet. In view of these two positions, this writer would venture to predict that, if we can induce a free energy field of the proper strength into a sterile solution containing the primary constituents and approximating the conditions under which the nucleoproteins must have first formed in the hydrosphere, nucleic acids and nucleoproteins would be formed in quantity under the controlled conditions of the laboratory and these nucleoproteins would be viable. There is no need, as Pringle has suggested, to postulate a concentration and separation mechanism. The dispersal and organizing action of

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developing entity by the organizing process. Thus many of the structuro- 228
functional features of the cell and of the larger organism are present, not due only to maturation, but simply acquired by the appearance of new intrinsic properties with a particular level of the hierarchy.

The factors that gave the ATP-nucleoprotein system its dynamic permanence over the long geological ages and its fantastic potentiality for development were due, it was mentioned above, to the ability of ATP to channel structural asymmetry to other molecular systems and to the fact that the nucleoprotein afforded the normalizing process, operating as the ATP system, myriad structural patterns in potential (para-crystalline) form which could be influenced by environmental variations and which could be shaped by the normalizing process to form structuro-functional organizations that facilitate normalization. (Bertalanffy points out, incidentally, that all structures and functions are to be considered as processes: “What are called structures are slow processes of long duration, functions are quick processes of short duration.” Thus, the view that a structure is something static has become archaic as the recent work and theories in morphology and morphogenesis bear out.) That the normalizing process, operating in the ATP-nucleoprotein system was successful in facilitating normalization or, as Pringle puts it, was successful “in the direction of available (free) energy into useful channels” is borne out as we look backward over the billions of years of evolution on all levels of the organizational hierarchy, each level of which—from the biochemical to the to the neuro-physiological—involves the ATP-nucleoprotein system.

Thus, the origin of the ATP-nucleoprotein system, within which operated

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the normalizing process in the ATP system and the myriad number of random atomic and molecular collisions make it a certainty that these nucleic acids and nucleoproteins would be subsequently formed...]

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the normalizing process, marked the appearance on our planet of an 229
organizing process with structural and force properties and diverse labilities in potential form which was destined to lay the molecular basis for the subsequent evolutionary appearance of both the plant and animal kingdoms.

7. THE APPEARANCE OF BIOLOGICAL ORDER

> During the past 15 years ideas on the nature of genetic material in the chromosome have been developed which are rather different from those of classical genetics. . .these ideas try to replace the statistical atomistic view of classical genetics by a dynamical relational view which sees in the chromosome a hierarchical system of a polarized structure, the parts of which may function in different sub-units of hierarchial order. . . This system (neo-Darwinian) lends itself to impressive mathematical treatment but neglects completely the fact that at the basis of all evolution is the organism itself.
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> Goldschmidt—*Science,* 1954

We might now ask how the normalizing process, operating in the ATP-nucleoprotein system, could have led to the evolutionary development of the protein catalysts called enzymes. These enzymes act as agents of the normalizing process causing the synthesis of patterns of structures via long sequences of physico-chemical reactions and these patterns of structures are organized into structuro-functional organizations on the larger scale to facilitate normalization.

The ATP-nucleoprotein system, it has been here postulated, at the time of its evolutionary appearance on this planet, formed a continuously operating structuring process, but was yet without an underlying biological order. The normalizing process or asymmetry chain originating in the nucleus of the ATP system, this writer postulates, continuously coursed through all parts of the DNA molecule in a systematic fashion, ultimately feeding back to the nucleus of the ATP system via the nuclei of the DNA atoms, whereupon the cycle started again to continue constantly in this cyclic fashion. [47] The normalizing process, actually a chain of structural asymmetry, modified by configurational environmental variations (which transformed the free energy field structures into quantum field structures) formed structural patterns with particular configurations that were related to the external environmental conditions of the ATP-DNA system. These

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[[47] Due to this systematic cyclic action of the asymmetry chain which originates at the most basic level of the organizational hierarchy in the organism, all structuring levels of the organizational hierarchy function as one unitary process; the growth of structural organization one each level of the hierarchy including the increasing ordered complexity of quantum memory organization, takes place at certain fixed ratios. We will deal with this feedback and synchronizing action of the normalizing process on the three levels of the human nervous system below.]

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quantum field patterns were then deposited by the normalizing process in one of the dual structural chains (in the atomic nuclei) of the DNA molecule. These modified field patterns, it is here postulated, marked the evolutionary origin of biological order or the aboriginal beginning of gene-memories. 230

We can thus envision a slow growth of structural order on the quantum level of the DNA molecule due to the cooperation between the two unitary tendencies in the ATP-nucleoprotein system. Modified free energy field patterns (quantum structures) of varying configurations were constantly being fed into the memory areas on the quantum level, [48] like structures coupling to like structures. This served to complex and to extend the modified free energy field patterns already present as residue-memories. Over a long period of time, there was a tendency to build up chains of quantum field structures of a similar configurational form and a tendency to suppress configurations which did not fit into the developmental tendencies of the system as a whole.

The appearance and development of biological order (quantum field structures) in the evolving ATP-nucleoprotein system is certainly nothing mysterious. It is simply an aspect of the fundamental mode of operation of the structured field process which feature we have called transaction. What comes into the DNA atomic nucleus combines with what is already there, a more complex unit of order is formed (to which we may refer either as biological order or by the more general term "memory") which take the past differentiated order into account. This transactional nature of the unitary process is what permits one-way development of structural organization to occur on any level of the organizational hierarchy. [This mode of process of the unitary field is best demonstrated by the transactional perceptual demonstrations such as those which are present at Princeton University. The demonstrations show that what we experience as perception takes into account both what is coming into the system (stimuli) and the past historical order already present in the human's perceptual memory system. The structural aggregates formed in the perceptual structuring process which now contain both the present and the past in the same structure, serve to extend similar memory organizations already present in the system. This particular type of one-way development of the underlying biological order yields us object and situational meaning and is called perceptual learning in the field of perception.]

[[48] That is, the quantum structures were fed into the nuclear particles of the atomic nuclei of the DNA system.]

The normalizing process, its asymmetrical structures being modified by configurational environmental stimuli as it courses through every part of the ATP-nucleoprotein system, thus transmits all modified structures to quantum memory areas which are in the nuclei of the atoms of DNA. The evolving entity, thus, from its aboriginal beginning, was an entity-in-environment system. The quantum memory organizations are gradually built up by the normalizing process in such a way as to shape the evolving entity (adapt it) to its environment. When the variables or conditions of 231

the environment change, the normalizing process makes compensatory changes to maintain its norm (which is its intrinsic tendency) in the organism by selectively inhibiting, reordering, or creating new quantum memory organizations. This results in the appearance of new quantum memories and, hence, new biological characters.[49] (On the highest level of the organizational hierarchy, this is what we call human cognitive learning—learning, however, so that the human is adapted to his environment. On all levels the structures, including ideas, concepts and values, must be developed so that the human is adapted to his environment and when this happens, the intrinsic tendency of his normalizing process is facilitated.)[50] If the quantum memories do not facilitate normalization, the

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[[49] When structuro-functional organizations fail to promote normalization, the normalizing process simply fails to furnish structural asymmetry for their further synthesis. The process now involved in normalizing distortion is gradually selectively eliminated and new characters are gradually developed to take its place.

[50] With each new level of the organizational hierarchy, new structural organizations with new properties appear to facilitate normalization (e.g., learning) and new secondary determinants of the course of evolution arise. A salient aspect of promoting the intrinsic tendency of the normalizing process is an increase in ordered complexity in an organism via differentiation (and integration) of what it possesses to correspond to the new conditions of the environment. Those structural organizations, whether the level of the organizational hierarchy be genetic or conceptual-symbolic, that do not promote this adaptation of the organism to its environment, will ultimately disappear and, if the organism can not (or in the case of the human, is not willing to) change, that organism (or society) will ultimately disappear. All that the unitary process requires of living organisms is that they promote its intrinsic tendency—that they develop structural organizations which keep the organism in correspondence with the various aspects of the environment. That the normalizing process is continuously in operation on the human cognitive level is seen in human cognitive disorders (the so-called "mental illnesses"). Those humans suffering from functional "mental illness" are those who have acquired conceptual organizations that do not correspond to their environment, which separate them from various aspects of the environment of which they are a part, and which lead to disruptive normalizing distortion experienced as intense affects...]

(NOTE: A lengthy social dissertation of the author located here, at the bottom of both pages 231 and 232, has been omitted from the text as not relevant to the subject interest.)

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memories and their structural organizations (or characters) are selectively 232
changed in small degrees or selectively eliminated by the normalizing process. [The normalizing process on the genetic level seems to be very slow acting but, at the same time, exceedingly sensitive to slight environmental change. For example, the temperature of various areas of our planet at one time decreased by as little as one to two degrees a century. (This was during the "Laramide" geological revolution which occurred during the latter part of the Cretaceous period of the Mesozoic Era.) By the time the temperature drop reached extreme proportions, the normalizing process had already developed structuro-functional organizations (heat-generating mechanisms and processes which gave us "warm-blooded" mammals) to offset this form of normalization distortion. Such structuro-functional innovations, however, are brought about by the normalizing process only if such potentiality is 233
present in the living system to begin with and centuries are available for the slow change.] The quantum memory organizations represent a highly

organized system with many different kinds of chains of quantum structural patterns, each chain having structures of similar configuration which lead to different patterns of growth tendencies on the various levels of the organizational hierarchy.

The normalizing process, together with stimuli from the environment, builds up the quantum memory organizations but at the same time also enters the quantum memory area and decouples links of similar quantum field structures in specific sequences and causes the structuring of these into a complex quantum structural aggregate which we shall identify with the gene.[51] The process which forms the quantum structural aggregate-gene is a creative process. The gene is not a summation of all the qualities or configurations found in the individual quantum field structures but less than and different from the sum of the parts, being more symmetrical, less than if all the configurations of the individual structural aggregates were simply integrated.

[[51] The central concept of the neo-Darwinian (statistical) approach to genetics is that genic action is effected by the action of fundamentally discrete particles; this leads to the expectation that the genetic units of inheritance are to be found in irreducible particles called genes (which at one time was believed to be the DNA molecule). The central concept of the point of view that Goldschmidt advocates is that the chromosome acts as a sort of a super molecule, the parts of which may function in different sub-units of hierarchial order. The view that is here presented suggests that the quantum structural aggregate is the fundamental unit of biological order and that the various quantum field structures which make up a gene are scattered throughout the nucleoprotein nuclei of the chromosomes. Thus, if this view is correct, it would seem that both the neo-Darwinians and Goldschmidt are in part correct—the parts of a gene are scattered throughout the nucleoprotein nuclei of the chromosomes and hence, irreducible genetic particles will not be found but when the quantum field structures go into action, they are structured into discrete entities which we may call genes (and which catalyze the formation of enzymes). The main difference between the two views, it seems to this writer, is in their emphasis on the organizational aspects of the organism. The neo-Darwinian view, for example, conceives of the organism as an integrated mosaic of distinct and independent qualities or characters whereas Goldschmidt conceives the organism as an hierarchically-ordered arrangement of interrelated and interdependent sub-systems. One view equates the organism to a machine, the other view equates the organism to a creative process. In our polemic concerning the statistical view, we must not forget for a moment the vast contributions of this view to all branches of science—pure and applied. And this pertains particularly to the field of genetics from Mendel, its founder, to modern statistical-geneticists such as Muller, Horowitz, Dobzhansky and many other distinguished researchers. Without the statistical methods and concepts, genetics, which many regard as the most distinguished field in all biology, would today be virtually non-existent.]

A long development of these gene-quantum structural aggregates led, 2.3.4
subsequently, to synthesis on the molecular level of a long chain of amino acids linked in a unique and specific order—the first protein-enzymes. These enzymes, acting as agents of the normalizing process (thus taking over the catalytic functions from the aboriginal ATP-phosphate group catalysts), determined the rate and direction of specific physico-chemical reactions which in turn synthesized structural organizations (proteins, nucleic acids, etc.). [52] Many of such structural organizations were then combined to form structuro-functional organizations that facilitated normalization on the larger scale. The specificity of the enzymatic catalyzing action lies in the particular configurations of the quantum field memories that formed them. The order of physico-chemical processes

initiated by the enzymes lies in the order already present in the memory areas (in the interrelated nature of the patterned field structures) and in the order of the stimulus configurations coming into the quantum memory areas from the environment. (The quantum field structures that go together to form a particular aggregate are separate in space but interrelated by their similar configurations.) That is, the asymmetry chain-normalizing process with the stimuli of the environment modifying its structures in a particular manner, passed through all memory organizations in a certain order and decoupled similar links of quantum structures, both of which were structured into complex quantum structural aggregates or genes. Sequences of such genes in turn catalyze the polymerization of amino acids, link to link, to form the protein enzymes which in turn catalyzed the physico-chemical reactions which formed structural organizations that facilitated normalization on the larger scale. (It may be that the structural aggregate-gene is actually a part of the quantum field structure of protein enzymes and it is they that do the catalyzing.) Stimulus configurations from the newly formed structural organization constantly fed back to the genetic memory areas to form new sequences of quantum field memories. In this way the order appearing in the ATP-DNA system tended constantly to create more order.

One can well see why it took the normalizing process several billion years to develop the complex organizations of the biochemical level. The developing entity might have had to wait for long eons for a chance contact,

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[52 As Oparin pointed out, the hormone system was later evolved to increase the efficiency of the directive-enzymatic system. Hormones work by catalytically increasing or decreasing the supply of enzymes which in turn are formed by the genes. Thus, the function of hormones is essentially replicative while the function of the gene is the creative-development of the enzyme.]

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for example, with a particular type of amino acid that it could use to 235
complete a particular synthesis which could be recorded in the underlying biological order. Or to take another example, it had to wait for billions of years for radio-active potassium to decay into calcium (Heilbrunn) so that the evolving entity could acquire a skeletal superstructure. The late appearance of calcium may account, as has been suggested, for the paucity of fossils, other than fossil carbon, beyond the pre-Cambrian era.

The normalizing process, it appears, develops (extends) the quantum memory organizations of only one of the dual complementary chains of helical DNA and decouples quantum field memories, which are structured into genes, from only the other complementary chain. (After the normalizing process decouples links of quantum structures in the one chain, the chain that undergoes memory formation serves immediately to resynthesize the decoupled structures. The raw stuff for this resynthesis is structural asymmetry or free energy. The same function is performed when the quantum memory structures are first laid down in the developing DNA chain; complementary quantum structures are subsequently synthesized which then may be decoupled by the normalizing process.) Due to the normalizing process decoupling structures from only one of the two complementary chains, only one optical form of gene-aggregates is formed which in turn catalyzes the synthesis of enzymes containing only the l-type

of amino acids which in turn synthesize proteins containing only this type of optical isomer.

The gradually increasing complexity and differentiation of underlying quantum memory organizations gradually led to more complex and differentiated forms on the macro-levels of development; the more complex macro-organizations in turn increased the complexity and differentiation of underlying quantum memory organizations in a continuously cyclic but one-way process. As this underlying quantum memory system or system of biological order achieved a high degree of organization and had thus acquired diverse developmental potentialities, the entities that we ordinarily call living slowly appeared on this planet. It is this quantum memory organization or biological order (from which the normalizing process ontogenetically develops the organism) which gives rise to an organized physico-chemical system with definite growth tendencies that are transmitted from parents to offspring. It is this hierarchically arranged quantum memory organization that increases its ordered complexity throughout the whole life span of each offspring; each generation furthers the one-way development of the underlying biological order.

The mode of reproduction of the aboriginal ATP-DNA system seems 236
to have been that of self-duplication which, this writer postulates, was made possible by the dispersing action of the normalizing process. This action also served to prevent the molecular system that carried the biological(ATP-DNA) from approaching its inner structural symmetries too far which, if it had occurred, would have prevented the appearance of life on our planet. Based on the work of Crick, Henderson, and co-workers, it seems that self-duplication of DNA proceeds in several stages. First there are present the two nucleotide helices (actually two DNA molecules) coiled one about the other. Then, in the second stage, the two helices are split apart and dispersed by the normalizing process (or its enzymic agents) into separate nucleotide units which frees the components for attachment to other nucleotide units in the surrounding fluid environment. (On the level of the higher organisms, the autonomic process activates hormones which in turn activate these enzymic agents.) In the third stage, the normalizing process forms two complete new ATP-DNA helices. This dispersing action of the normalizing process may well be the process that is basically involved in meiosis and mitosis. In the former process, it appears that the dual helical structure of DNA is first split apart into two DNA chains. Then each chain is further dispersed into its component nucleotide units; a recombination, based on the laws of chance, of these structures carrying the biological order then occurs. In the process of mitosis which is involved in the growth of the cellular organism via consecutive cell division, it appears that the dual helical structure of DNA is split into two chains without the chains being further disrupted into their component units. Each chain then adsorbs new nucleotide units from its fluid environment and subsequently invests the new helix with a biological order in the manner suggested above. [53]

[[53] The evolutionary development of the function of sex or reproduction in the higher organisms, this writer postulates, was actually the development of a means for splitting apart and dispersing the nucleotide chains of DNA. This serves to prevent the biological order present

in these structures from going too far in its intrinsic tendency toward symmetrization and permits the one-way tendency of increasing ordered complexity to continue from one generation to another. (The sex drive, expressed through the hormone system on the level of higher organisms, may be the normalizing process expressing itself in this form to insure the continuity of development of the underlying biological order.) Either the male or female on the human level has developed a molecular mechanism, such as is known to exist in viruses, that disperses the DNA molecules of the other sex. It is probably the male sperm that possesses this molecular dispersal mechanism. This is not to be equated with aggressive dominance of the male over the female in various cultures in matters of romance and sex. The drive to disperse the nucleotide chain and the urge to have these chains dispersed, which is here equated with the sex drive (really

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8. SENSITIVITY OF THE NORMALIZING PROCESS TO SOURCES OF NORMALIZING DISTORTION IN THE ENVIRONMENT

237

> All-over progress, and particularly progress toward any goal or fixed point, can no longer be considered as characteristic of evolution or even as inherent in it. Progress does exist in the history of life, but it is of many different sorts and each sort occurs separately in many different lines. One sort of progress in structure and function that stands out as particularly wide-spread and important is increasing awareness of the life situation of the individual organism and increasing variety and sureness of appropriate reactions to this. Among

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the drive to continue developmental continuity of the underlying biological order), must be equally strong in men and women when they are each taken as a group, for both are part of the same unitary process...]

> the many different lines that show progress in this respect, the line leading to man reaches much the highest level yet developed. . .
>
> Another and probably even more important element in many lines and sorts of evolutionary progress has been "change in the direction of increase in the range and variety of adjustments of the organism to its environment . . ." It is increased awareness and perception of the environment and increased ability to react accordingly. . .The progressive trend is to gather more and different kinds of information about the environment in which the organisms do, in fact, exist and to develop apparatus for appropriate adjustments in accordance with this information. . .
>
> Simpson—*The Meaning of Evolution*

238

We may now ask why the normalizing process developed particular types of structuro-functional organizations in the ATP-nucleoprotein system and not others in the course of its one-way development on this planet. This writer is referring to the general dynamic features of living organisms such as vision, hearing, gustation, olfaction, motility, homeostasis, etc., not to their diverse outward morphological forms.

To answer this question we need look only to the properties of free energy which have been exactly established by research in physics and chemistry over the past one hundred years. Whyte and this writer have both identified structural asymmetry with free energy and it has been here postulated that the normalizing process in the ATP-nucleoprotein system was actually a chain of structural asymmetry. (The normalizing process in

developing static and cyclic structural organizations that facilitated normalization was thus a free energy maximizing process—that is, a process that developed inter-related structures and processes which facilitated the appearance of a high free energy level in the evolving ATP-nucleoprotein system.) We know that the free energy change of a system is influenced by practically all the common environmental variables: pressure, temperature, electromagnetic radiation, pH, gravity, volume changes in a system, chemical variations of ionic and molecular species related to a system, etc. Thus, the normalizing process was impeded in its intrinsic normalizing tendency by those environmental conditions. In other words, these environmental variables tended to lower the asymmetry level of the normalizing process and hence were sources of normalizing distortion.[55]

[[54] This footnote was eliminated as it was a reference in part of another previous, non-applicable footnote from page 237.

[55] The evolving entity was wired, so to speak, on a normalizing distortion opposing principle. When normalizing distortion appeared in the environment, the normalizing process developed

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The normalizing process continuously channeled structural asymmetry 239
(free energy) into the nucleoprotein system via the ATP system which structural asymmetry was constantly being modified by the external and internal environmental variations. These differentiations, in the form of quantum field structures, were constantly being deposited by the normalizing process in the underlying DNA atomic nuclei as genetic memories which permitted a continuous growth of order and organization on all levels of the organizational heirarchy. (The underlying biological order was thus related at one and the same time to the normalizing process to the form of the ATP-nucleoprotein system, and to the particular internal and external environmental variations of the system.) The variables or normalizing distortions which cause configurational changes in the normalizing asymmetry chain which were to become a part of the biological order of the system also, however, impeded the intrinsic tendency of the normalizing process from restoring its asymmetry level. The normalizing process subsequently decoupled the quantum memory organizations, structured them into genes and used these genes to catalyze the formation of enzymes which in turn formed cyclic or static structures that facilitated the re-establishment of the high asymmetry norm. The particular structuro-functional organizations developed by the normalizing process from the quantum memory organizations and in the nucleoprotein patterns were developed to facilitate normalization in the evolving entity in accordance with that entity's structural organization and the particular types of normalizing distortion in its environment.

Before the colloidal level of the organizational hierarchy was developed, the individual structure of the asymmetry chain was little affected by environmental variations but with the appearance of the colloidal level (whose origin was marked by the appearance of the ATP-nucleoprotein system) the environment became a potent factor. Due to the configurational environmental normalizing distortions, the structures of the normalizing process were now made to approach symmetrization rapidly.

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structures, processes, and functions to oppose such distortion which action served to facilitate normalization in a system in accordance with the system's particular environment. The process that related the quantum field structures from each new structuro-functional organization, which in turn subsequently permitted the evolving entity to respond to the environment in an increasingly discriminative and efficient manner, was the normalizing process itself. As the evolving entity developed higher levels of the organizational hierarchy, the organizing normalizing process became increasingly centralized (along with its more complex biological order which developed from the genetic memories) in what we now call the autonomic and central nervous system. The actual structuring that increases the complexity of the underlying biological order on these higher levels, we will postulate, takes place in the reticular formations.]

The normalizing process to maintain its asymmetry level, therefore, had to 240
acquire an additional supply of asymmetrical structures to replace those that had undergone symmetrization and those which had been deposited as genetic memories. The normalizing process could not secure these replenishing quantum asymmetrical structures directly from the structured field for the structured field was already supplying the normalizing process (operating in the ATP-nucleoprotein system) with its maximum asymmetry level. The only solution to the symmetrizing effect of the environment was apparently for the normalizing process to secure the structural asymmetry from other structures that were a high level of asymmetry in the environment (and subsequently from the sun). The normalizing process thus slowly developed enzymes which formed cyclic processes that broke down carbon and inorganic compounds (which the colloidal ATP-nucleoprotein system had adsorbed or could selectively adsorb from its environment) and used their structural asymmetry to restore its asymmetry level.[56] The development of these processes marked the appearance of the first catabolistic systems in the ATP-nucleoprotein system. In effect, the normalizing process as an asymmetry chain originated in the ATP system, passed through the nucleoprotein system causing synthesis and at the same time underwent modification by the configurational environmental variables, passed to the nucleus of the DNA molecule and deposited these configurational field structures as genetic memories—thereby losing some of its asymmetrical structures and lowering the asymmetry level; then it decoupled chains of quantum structures and passed back to its point of origin in the ATP system. When the normalizing process returned to the ATP system, its asymmetry level was restored by the asymmetrical structures being channeled into the ATP system by the catabolistic processes. (It should be carefully noted that the structural asymmetry channeled into the ATP system via the catabolistic processes was not driving the normalizing process but rather it sustained the asymmetry level of a driving process that was already intrinsically present in the system. In other words, the ATP system mobilized free energy to sustain the asymmetry level of the normalizing process which in turn caused the driving of syntheses, the normalizing process utilizing the biological order -

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[[56] Quantum memories that are structured into genes which catalyze the formation of enzymes may be regarded as past specific memories that have served to remove some particular form of normalizing distortion. In other words, the structures and processes which, in the past, have offset pressure, volume, temperature, etc., normalizing distortions are codified in the underlying memory organization and served to offset or oppose the same distortion in the living organism of the present.]

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in the DNA system to accomplish the syntheses which include the progressive 241
elaboration of the catabolic processes.) The normalizing process with its asymmetry level being constantly restored via the catabolistic processes, as constantly continued to synthesize structural organizations that facilitated normalization. This increased elaboration of the structural organizations of the evolving entity resulted in an increased sensitivity to the environment which also increased the environmental sources of normalizing distortion.[57] The normalizing process thereby required more structural asymmetry to restore its asymmetry level to offset these sources of normalizing distortion. A long series of such sequences of normalizing distortion, with the subsequent development at each step of static and cyclic structures to facilitate normalization, led to the gradual evolutionary development of the catabolistic enzymatic system which governs an intricate and interlocked series of physico-chemical processes whose function is to provide structural asymmetry to sustain the asymmetry level of the normalizing process.[58] This was manifested in the increasing structural development of the cell (namely in the increasing complexity of the mitochondria apparatus which is a complex of enzymes that are involved in the oxidation-reduction electron transmitter system—the so-called power plant cycle of the cell) and a gradual rise in the respiratory rate. The rising respiratory rate is thus the increasing appearance of the asymmetry norm of the normalizing process on the biochemical level. [59] The first several billion years of evolution seem to have been devoted to ----------

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[[57] At first all of the environmental variables were deposited (in the quantum memory areas) in the same general configuration but as patterns of similar configurations gradually differentiated from one another, the evolving entity progressively became sensitive to these forms of normalizing distortion one at a time. This underlying differentiation permitted more specific responses to similar environmental variations when these were again encountered.

[58] With the subsequent evolutionary development of the enzyme chlorophyll, electromagnetic radiation, once a source of normalizing distortion (which caused the normalizing process to develop pigmented structural organizations to offset this distortion) became a major source of asymmetry resupply via photosynthesis which process was to facilitate greatly the evolutionary development of both the plant and animal kingdoms.

[59] The intricate structure and interrelationships of the catabolistic processes have been worked out in great detail by the brilliant research in micro-biology over the past sixty years which constitutes perhaps one of the more stirring stories of research in the entire annals of science. In essence, catabolism in advanced organisms (this is, of course, on the biochemical level) involves a large series of compounds that transfer electrons of high energy from foodstuffs to the ATP system with carbon dioxide a breakdown product. All of these catabolistic processes are cyclic and may be divided into four fundamental types of reactions: 1) dehydrogenations, 2) decarboxylations, 3) conversions or condensations and 4) oxidation-reductions. As the electrons flow through the oxidation-reduction cycle (in which oxygen is involved probably as a provider of structural asymmetry and as a final carrier of the hydrogen byproduct), a voltage drop

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developing those molecular structures (that permitted the asymmetry norm 242
to appear) on the biochemical level.

When the point was reached at which the asymmetry level of the normalizing process was matched by catabolistic development on the biochemical level (or accompanying this biochemical evolution), further evolution went into the development of the next level of the organizational hierarchy—the differentiation of the physiological structuro-functional

organizations: the development of the inter-related physiological organs and glands, the increasing appearance of steady states in the fluid matrix, the development of the dual acting autonomic system with its related hormone system, etc., all of which served to facilitate normalization.[60] Related to the physiological innovations was the increasing differentiation of

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is said to occur at each step in the cycle. The energy of the voltage drop is converted into the free energy of phosphate bonds of ATP, which energy is carried by the ATP system to all parts of the cell. The voltage drop, from the viewpoint being presented, is due to an electron being deprived of its structural asymmetry which is conveyed to the normalizing process that operates in the ATP system.

[60] The autonomic nervous system governs the respiratory and circulatory processes, the digestive system, certain endocrine organs, the sweat glands and other organs and glands. Through its various activities the autonomic system maintains the dynamic constancy of the highly complex (quantitatively and qualitatively) steady states of the fluid matrix and through this control maintains the constancy of anabolistic and catabolistic components in each individual cell of the organism. The autonomic system also serves to offset environmental factors acting from within or without, which tend to cause variations in the steady states of the fluid matrix. Flow and ratio of components, self-regulation to sustain the balance (the quantity and distribution) of these components, maintenance of pattern through continuous replacement of the component parts, maintenance of conditions such as pH and temperature within narrow limits, all the features of the steady states of the fluid matrix, are effected through the action of the autonomic system upon the interrelated system of smooth muscle (organs and glands) which in turn release hormones and other components into the fluid matrix. It is here postulated that the sympathetic part of the autonomic system is part of the differentiated expression of the unitary process (the normalizing process). The other part of the unitary process is the parasympathetic and somatic nervous systems. The sympathetic and parasympathetic systems, in fact, have long been postulated to subserve processes of catabolism and anabolism respectively. (Best and Taylor) [This writer would support this hypothesis mainly because the sympathetic system seems to mediate the sexual function and seems to control the reproductive or maternal instinct. It might be added that the sympathetic system may be removed without fatality to the organism because the systems of catabolism on the cellular level remain to sustain the asymmetry level of the normalizing process. Such a removal, however, lowers the asymmetry level of the organism which impairs: its efficiency, its ability to withstand sources of environmental stress (normalizing distortion) or muscular exertions, its sensory-perceptual-emotional processes, etc.] The normalizing process, as part of the autonomic system, protects the constant states against environmental normalizing distortion by its self-regulatory action. For example, the sweat glands and shivering reactions are structuro-functional distortion due to extremes in temperature; the regulation of pH by the interesting system of carbonate buffers is another good example. By maintaining the dynamic constancy of these conditions and 243
anabolistic and catabolistic components, a high level of structural asymmetry is maintained, which is another way of saying the steady states serve to facilitate normalization. (In reference to the asymmetry level, it seems that there is a direct line of hierarchial control from the sympathetic system to the pituitary hormones which in turn are known to influence the enzymes of the ATP system.) That is, as the catabolistic processes of the cell use up their high asymmetry-providing carbon molecules by channeling this asymmetry to the ATP-normalizing process, replenishing supplies are abstracted from the fluid matrix which disturbs the balance of components in its steady states. Drive states are initiated which activate the autonomic system, particularly the sympathetic branch. The autonomic system then activates various glandular and storage (such as the liver) systems to re-establish the steady states; the sympathetic system activates the hormone system. The hormones then control the quantity of enzymes available in the ATP system which, in turn, controls the level of free energy available to the organism. Thus, by the secretion of hormones and by maintaining the dynamic constancy of the fluid matrix, the normalizing process maintains a sustaining supply of structural asymmetry on hand which ultimately finds its way to the ATP system; this in turn permits the normalizing process to drive syntheses on all levels of the organizational hierarchy.

The autonomic (emotional) system operates inwardly and is related to the externally oriented somatic (perceptual) nervous system via the mid-brain reticular structuring centers (in the human this whole unit is related and controlled to some extent by the conceptual-symbolic-feeling-learning processes via interrelations in the same mid-brain reticular structuring centers)

and the two, acting in cooperation as a unit, relate the organism as a whole to all aspects of its inner and outer environment.

The dynamic constancy of the steady states, called homeostasis by Cannon, has long been known to be related to the physiological and psychological health of the human. When the human has too much salt or base or acid or blood sugar, or not enough of these components, the steady states are restored by a marvelous and intricate system of excretory, storage and productive processes. Overdoses of these components react like deadly poisons and a dearth of them produces irreversible changes in cellular tissue leading to its degeneration. The normalizing process originating in the ATP system, ultimately passing to the cognitive processes of which the normalizing process is an actual part and then (manifesting its hierarchical control) passing to the sympathetic system of which the normalizing process is also a part, can cause disruptions in the steady states of the fluid matrix. Configurational patterns which we originate in our cognitive processes can easily cause these disruptions. For example, cognition (thinking) that involves worry and anxiety causes prolonged digestion; fear, sadness or psychological depression reduces endocrine secretion; anxiety with resentment, anger or aggressiveness cause hyper-secretion; psychological tension with anxiety cause hyper-secretion, etc. By chronically over-activating these emotions, the human works against the normalizing process in its intrinsic tendency to restore the high asymmetry norm (high energy level) and oftentimes inflicts physiological and psychological injuries upon himself by disruption the steady states of his fluid matrix. (Unfortunately the autonomic accompaniments of an emotional experience often do not subside when the emotion itself subsides so that the person quite often is unaware he is suffering from an emotional disturbance; psychosomatic disorders occur when some autonomic pattern remains persistently overactive.) This thwarting of the normalizing process is self destruction par excellence. The normalizing process works, and works wondrously, for the heath and adjustment and toward the ordered organization of the human on all levels from the genetic to the psycho-social and cultural. But the human, having a high degree of freedom, must furnish the facilitating conditions for this creative-structuring process to operate. It might be said that when our thoughts and actions correspond to our emotions and feeling there is the least disruptive normalizing

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the primary labilities into the sensory processes of the nervous system. 244
(The normalizing process used the underlying biological order which was originally differentiated out by, for example, electromagnetic radiation, to form a structuro-functional organization sensitive to this type of normalizing distortion, in this case the ocular mechanism. Then the normalizing process coursed through the sub-system in the form of this particular sensitivity which permitted the environment to differentiate further the underlying biological order. In this case, the underlying biological order is that in the localized sensory areas of the visual part of the nervous system. The primary lability to pressure and gravity differentiated to become the auditory, tactile, pain, and labyrinthine sensitivities. The primary labilities to temperature change differentiated to become thermal senses. The primary electromagnetic lability differentiated to become the visual modality. The primary pH and chemical labilities differentiated to become olfactory, gustatory and organic (food) sensitivities. The property of motility is nothing more than the unitary process all over again expressing itself in this highly specialized function due to the structural arrangement of the component parts. Modern research in muscle thermodynamics has revealed that when a stimulus enters the biochemical apparatus of the muscle, a spontaneous structuring process (polymerization) occurs which is immediately followed by the ATP-normalizing process restoring the muscle system to a high asymmetry level. Thus, the highly coordinated and integrated muscular movements of the striated muscle system are highly organized expressions of these processes on the micro-biological level. The kinesthetic sensitivity is hence postulated to have differentiated from these simple configurational expenditures of structural asymmetry (free energy) within the evolving ATP-nucleoprotein system.

Each step in the differentiated development of these sub-systems permitted the normalizing process to be further differentiated by environmental variations now acting at the receptor (internal and external) periphery. This resulted in the formation of more complex quantum field structures which were structured into the biological order (in DNA molecules in highly localized parts of the nervous system) which in turn served to

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distortion in ourselves. However, when our thoughts and actions correspond to our emotions and feelings but lead to disorder in our environment, then either we or the environment or both are maladaptively organized. In this situation, either our cognitive organizations or our environment must be changed to facilitate healthy growth and development which in turn facilitates normalization.]

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increase further the underlying ordered complexity. Gradually, due to this 245
increasing differentiation, and due to the integration of this differentiation on the level of the quantum memories, the more elaborate and organized sensory-perceptual-instinctive processes were developed. This underlying biological order subsequently yielded what we call object meaning and developed into the perceptual process. In their interrelation, quantum structures with an internal origin—as opposed to those originating in the external environment as in visual perception—became emotions and primary drives. From the biological order due to these perceptual-instinctive sub-systems, the cognitive processes were developed after the appearance of mammals on this planet. These cognitive processes are developed in man to a degree which represents the highest level of the organizational hierarchy developed on our planet in any living system. (The configurational qualities of quantum structures, in the interrelation, from these cognitive processes yield what is called concept meaning and, with language, symbolic conceptual meaning.) It will be postulated below that what we experience as cognition or thinking in ourselves is actually due to the normalizing process as it goes about its structuring activities to form the cognitive quantum memory organizations, the highest level of which is the human personality. The cognitive processes permit the human to differentiate his memory organizations to a very high degree by self-initiated operations and, significantly for man's greatness and his chief weakness, this differentiation can go on largely independent of the environment.

The intrinsic properties of the free energy field structures in the nucleoprotein were modified by gradual environmental variations over long periods of time. These field structures thus affected by environmental changes evolved to become the structural and functional processes of the tropistic level; that is, to become the general sensory and motor structures and interrelated processes including the physiological drives. The continual operation of the normalizing-organizing process operating in the genetic and nervous system resulted in the further development of the tropistic level processes to evolve into the structural processes first on the perceptual level, and later on the cognitive level. On the last—and most complex—of these levels, the human personality traits emerge. *Through* this complex hierarchical organization, the normalizing-organizing process continued to operate, now in the socio-economic system, and resulted in the evolution of the organization of society in all its aspects. This gradual evolution might be schematically summarized as follows on next page. Now a word about the currently accepted view of biological evolution before we leave this section. The modern (neo-Darwinian) theory of evolution

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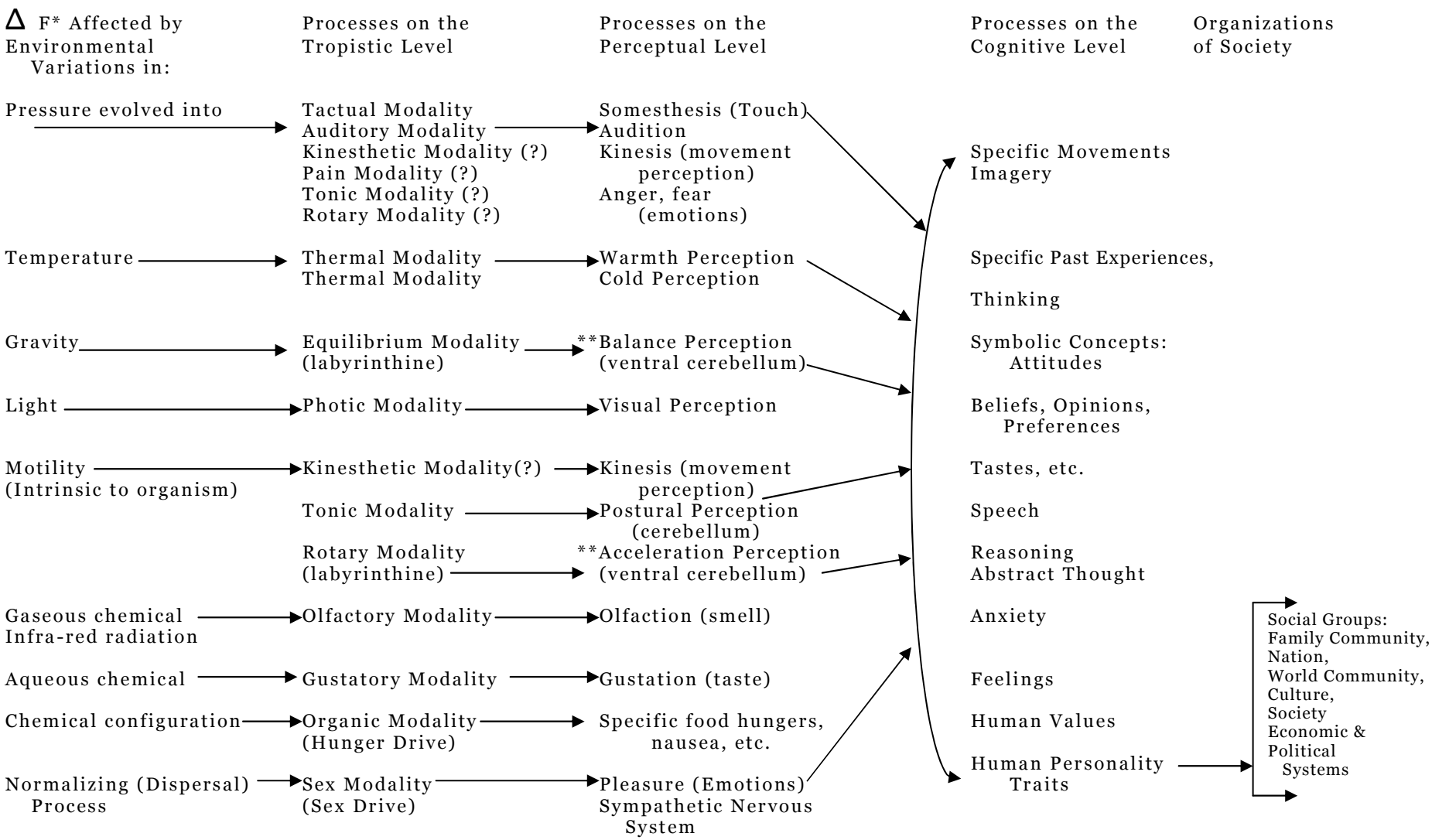
SUMMARY OF THE EVOLUTIONARY APPEARANCE AND DEVELOPMENT OF THE HUMAN PSYCHOLOGICAL PROCESSES



* A change in the energetic-structure of free energy field structures is symbolized by Δ F.
** There is no perception (Geldard).

based on statistical genetics, goes back to Darwin's theory of natural [247]
selection. The theory of natural selection is based on the observation that, although there is an enormous overproduction of offspring in many species, the number of individuals in the species remains more or less constant. In the life of the species, accidental variations now called mutations (that are relatively stable) occur in the genetic structure of its individuals; these may be unfavorable, neutral or favorable. (Based on inferences drawn from a great many experiments, it is held that most of the accidental mutations are unfavorable, that is, lethal to the organism.) In the process of meiosis and fertilization the chromosomes are shuffled and their genes recombined solely on the basis of the laws of probability which is a fact established many times over. (According to current gene theory, there are three ways in which the genes may be rearranged in the chromosome; these are what is called crossing over, accidental mutations, and chromosome aberrations. The first type of rearrangement of the genes is the random shuffling which goes on during meiosis; the other two types of rearrangements may occur at any time in the lifetime of the individual and be due to accidental causes.) Natural selection then eliminates the unfavorable mutations; the favorable ones are preserved and the individuals possessing them are more likely to reproduce themselves. (Darwin's concept of the operative factor in evolution—competition or struggle for existence—is a part of this natural selection. The deleterious character of most mutations which puts the individual at a decided disadvantage in its struggle for survival is presumably the other part of this natural selection.) Through frequent repetition over long periods, this process leads to evolutionary development, both as a creation of the multiplicity of forms in the world of living organisms and as a progressive adaptation to their specific environments.

As impressive as the evidence, both observational and experimental, is for the neo-Darwinian viewpoint, unitary theory objects to this view for, as Goldschmidt puts it, it "neglects completely the fact that at the basis of all evolution is the organism itself." Serious doubt can be raised as to the nature of the shock techniques employed in inducing mutations. Much evidence points to the fact that the underlying biological order is extremely sensitive to such massive stress and its organization may be either destroyed or severely impaired by such techniques. The observed resultants that such "accidental mutations" are often deleterious to the individual may be an artifact of experimental situations that do not duplicate natural conditions which may be preeminently necessary to arrive at correct conclusions. (The modern gene theory holds that "whereas the gene determines the nature of [248]
the inherited character, the character has no direct influence in determining the nature of the gene." Unitary theory, on the other hand, holds that there is a direct and continuous transactional relationship between the gene and the character that is effected on the quantum level via the normalizing process. The genotype determines the nature of the phenotype but the phenotype, via the normalizing process continually passing through it, transactionally determines the nature of the genes at the same time. That is, in forming new genes, the normalizing process incoming from the phenotype takes into account the historical order already present in the genotype.) Serious doubt can be raised as to the gambling-type