as evidence for the reality of divine action."[2] Within Van Till's context of emphasis that God is the Creator and that the cosmos is His creation, he states further:

> Perhaps we all must be reminded that the Creator revealed in the Bible is not only the Originator of the cosmos, but also its Preserver, Governor, and Provider. Let us learn to see all phenomena as the product of divine activity: not just the extraordinary or unusual, but the ordinary and usual as well; not just the discontinuous or singular events, but the continuous and universal phenomena as well; not just the special events of the past, but the common events of the present as well.[3]

I am indebted to Professor Van Till for providing this insight because I agree with him so specifically when he makes explicit that detected processes in the natural environment, that is, "patterned behavior of matter," are manifestations of divine governance. Thus, in the 1980's, he affords an excellent re-statement of the thinking of many of the founders of modern science.

Van Till points out that scientists label their *descriptions* of patterned behavior of material systems by the term "natural laws." Then he states that he would "strongly prefer to call them the 'patterns of divine governance'" (p.38). I agree because then the Biblical oriented scientist and parent indicates acceptance of the contingency of the entire cosmos. The entire cosmos is dependent upon God; the entire cosmos is *not* independent of God as proponents of Materialism, Naturalism, and Determinism would maintain.

Conclusions

In conclusion I recommend teaching about scientific laws as limited, man-made, descriptive generalizations. Scientific laws are descriptions by human beings of already existing, contingent relationships "found" by scientists. Thus scientific laws are not prescriptive as are societal laws.

Scientific laws are not deterministic. Therefore scientific laws do not control existing patterns of behavior or processes involving natural objects and/or events. Hence, one would *not* state, "The universe is governed by natural laws."

Rather, for the theistic oriented person, scientific laws may well be representations or manifestations of divine guidance and sustenance and maintenance. All the cosmos is fully contingent upon God the Creator of all things. The evidence is all around.

References

1. Moore, John N. 1983. How to teach origins without ACLU interference. Milford, MI: Mott Media, pp. 80 and 138. Condensed or abridged treatment of related methods of teaching about origin questions are developed by the author in *Creation Research Society Quarterly* 21:115-19, 21:189-94, 22:20-25, and 22:183-88.
2. Van Till, Howard J. 1984. The cosmos: nature or Creation?, *Occasional Papers from Calvin College*, 3(1):41.
3. *Ibid.* p. 26. Note taken from context of author's emphasis on the difference between "cosmos" and "nature."

D-WORLD EVIDENCE

ROBERT A. HERRMANN*

Received 26 August 1984; Revised 4 April 1986

Abstract

This is the final article in the series **Nature: The Supreme Logician.** *This article discusses indirect evidence for the acceptance of the deductive-world model. This evidence includes the unification of certain incompatible logics internal to quantum mechanics, other physical theories and computer science; subparticle models for quantum transitions, the formation of elementary particles and fields, the local Special Theory and how such subparticle models explain the experimental results associated with the Bell inequality. It is shown how a special interpretation correlates the deductive-world model to Scripture.*

1. Introduction

It may not be obvious to a reader of the previous articles in this series but I am actually expounding a very restricted philosophy of science. Historically, human or machine observations and measurements preceded attempts to correlate such observations to mathematical structures. When a compatible structure is accepted, then many of its predictions are open to verification. If these predictions did not correspond to a preponderance of experimental evidence, then the mathematical structure was often altered or a new structure sought. Unfortunately, in modern times, this process has been reversed. For example, in quantum mechanics the indirect evidence for $\beta-$decay does not verify certain conservation laws within the theory. Pauli, in an attempt to save the physical integrity of the theory, suggested the use of a physical term the "neutrino" that would be endowed with physical "life" by assigning to it the missing theory predicted analytical components. Many scientists accept this term as objectively real rather than simply admitting that this invention may be a pure theory catalyst having no objective reality (i.e. the term neutrino need not correspond to anything in reality) or that for this particular scenario the theory or the mathematical structure may be incorrect. What physical terms for assumed indirectly detectable objects are in reality catalystic and what are not is unknown, but the more that are inserted in order to extend a restricted theory to other scenarios seems to me to imply that the original theory has an intrinsic weakness. This unfortunate philosophy of science is what this author has attempted to avoid with the construction of the deductive-world model (i.e. D-world model.)

All known scientific theories with one exception[1] are restricted by the use of standard discipline languages and mathematical structures to specific "states of affairs" where it is hoped that their descriptive content mingles rationally into a general theory. Recall that quantum mechanics has recently been shown to be

*Robert A. Herrmann, Ph.D., Mathematics Department, U.S. Naval Academy, Annapolis, MD 21402.

incomplete in the sense that within the discipline language there is a description for an experimental preparation that cannot be analyzed by the theory's mathematical structure.[2]

The deductive-world model is concerned with the possible existence of a more fundamental unifying reality than that expressed by the standard language theories. It is a substratum model that partially describes this background world, and in so doing yields and preserves the descriptive content of other standard theories. Please note that certain theories for the behavior of natural systems, such as quantum theory and the various "relativity" notions, have been criticized due to additional philosophical implications— philosophical constructs that need not be valid. Mostly these implications tend to deny that the predicted effects can be rationally described by means of some more fundamental cause and yet retain the content of these and other such theories. As shown by the previous treatises in this series the deductive-world model eliminates this philosophic predilection and restriction.

Since journal resources require that this final series article be briefly presented, a prolonged discussion of these philosophic matters will not be undertaken. However, the conservative philosophy of science purposely incorporated into the D-world methodology will be discussed. Further, various definitions that appear in the previous articles[3-5] will not be repeated and no formal derivations will appear. All derivations are being made available upon request, while supplies last, free of charge.[6]

Patton and Wheeler claim that many known "laws of nature" (i.e. descriptions for assumed invariant relations) are mutable under certain circumstances.[7] It can be strongly argued that standard *descriptive* theories (theories that predict behavior and do not explain why objects behave in the predicted manner from a more fundamental point of view[8]) apply only to certain experimental preparations or scenarios. Not only is the behavior of a natural system only partially describable by a coalescing of distinct standard theories, but such concepts as energy and momentum conservation need not be absolutely inviolate. For these reasons when experimental evidence and methods are modeled, only the most common features of many theories and those methods that have survived the tests of time and experience will be considered. The modeling will remain extremely conservative in the *a priori* selection of presumptions. It utilizes only the most simplistic logical processes and finitary procedures.

One basic restriction is predicted by results determined by Gödel's incompleteness criteria. When individuals restrict themselves to finite human choice it can be shown[9] that there is no known method for establishing a *fixed* nonvarying, nonintuitive rule within the standard world of communication that will allow them to determine automatically whether or not a description F for natural system behavior is a member of a certain theory Γ. Much to the surprise of theoreticians this "Gödel effect" is nullified within the natural world (i.e. N-world) by the deductive-world model. Within the D-world there is a *pure* D-world process that does determine whether or not F is a member of Γ. However, even though the D-world bypasses all such N-world Gödel effects, it does force one to be very conservative in the selection of additional D-world hypotheses. This basic and absolute restriction is called the (D-world) *hypothesis law*. It has been established that within the D-world there are pure D-world procedures (laws?) that yield automatically pure D-world developmental paradigms. These developmental paradigms may be assumed to represent *refined* D-world behavior as presented in a D-world language that has no counterpart in the natural world— including our new D-world metalanguage.[10] Also recall that human languages describe natural system behavior if and only if developmental paradigms exist, paradigms which contain descriptive elements that cannot be expressed explicitly in any human language. This rationally implies that there is refined D-world behavior that cannot be described in any N-world language. For this reason the *hypothesis law* states that unless some significant information can be transferred from the N-world into the D-world by allowable mathematical procedures then unreasonable speculation should not be used. The results stated above imply immediately that our descriptive knowledge of the D-world must remain very incomplete, disjointed and piecemeal in character.

On the more positive side, the concept of a developmental paradigm may be applied to sequences of statements that describe "natural laws" themselves., both standard and nonstandard laws. Thus within the D-world the hyperfinite choice process— a prior nonrandom choice process— may be assumed to yield rationally the very "laws" that produce N-world *and* D-world behavior.

In the following sections, I will adhere to the above conservative philosophy. It is essential that commonly accepted or actually observed N-world behavior patterns be our major guide to the hidden aspects of the deductive-world.

2. Local Evidence

The D-world model is not simply attached to various standard world models in some haphazard fashion. The D-world model is being constructed from the class of all D-world structures, where a structure is a logically generated collection of sentences within a mathematical theory. The D-world structures exist if and only if the standard mathematical structures used to generate applied mathematical models exist. You cannot have one without the other. Moreover, the standard structures are "embedded" into the D-world structure in a nonarbitrary manner. A D-world structure completely "invades" the standard structure and, indeed, a standard structure is usually considered to be a substructure of a D-world structure. Consequently, as the D-world model is constructed it will become a *unifying* or *universal* model for all of the known applied mathematical models that claim to describe humanly comprehensible or observable system development.

When applied mathematical models generate physical language descriptions then certain special descriptions occur that are termed *states of affairs*. These states of affairs concentrate upon particular portions of one or more physical paradigms and often utilize a language that is exterior to the physical language generated by the applied mathematical model. The *discreteness paradox* is produced by an apparent clash between equally predictive theories that bridge what

is called the boundary line between quantum mechanics, its probabilistic outcomes and discrete alterations, and the classical concepts of a "continuous" change. Relative to the quantum physical situation Gerald Feinberg assures us that: "The changes in the actual physical situation . . . occur suddenly."[11] Patton and Wheeler seem to contradict Feinberg when they write: "But in quantum physics no change is sudden."[12] Employing the infinitesimal portion of the D-world structure, the discreteness paradox has been solved. From the viewpoint of the D-world there is no paradox. The apparent contradiction is a simple indirect manifestation produced by the D-world model. The complete solution can be found in the references,[13] and it tends to yield indirect evidence not available from any other source for the acceptance of the D-world model.

With respect to the solution of the discreteness paradox and applications of infinitesimal modeling to developmental paradigms be advised that two distinct procedures are utilized. First, consider the descriptive *general* technique termed "hyperfinite composition" which is modeled after the human process of combining finitely many objects together to produce a single entity. This process may be assumed to yield standard N-world and nonstandard D-world entities that may correspond to objects in objective reality. The second process is a special technique used to model *refined* behavior and termed "hyperfinite summation." This process is combined with such concepts as the standard part operator as well as other internal and external procedures to yield mathematical objects such as real or complex numbers, or vectors that *characterize* possible N-world or D-world objects. In the D-world theory the concepts of hyperfinite combinations, supermind processes, hyperfinite choice, supercontinuity and the like are *general* processes that are not eliminable since they are gleaned from the most common aspects of human experience or are common to most scientific theories. However, the refined techniques arc obtained by modeling the common aspects of some *specific* standard theory. If a portion of the standard theory that was used to establish some portion of refined D-world behavior is found to be in error, then this would invalidate the refined D-world description. On the other hand, this would *not* invalidate the established general techniques.

With respect to an N-world sudden alteration demanded philosophically by quantum mechanics (the Feinberg statement) and a classical continuous change recall that the method developed for the solution of the discreteness paradox obtains a supercontinuous alternation within the D-world that manifests itself in an apparent N-world "sudden" alteration. There is an additional interesting aspect of the D-world itself. The general notion of hyperfinite combinations is reflected within the D-world by (A) discrete "sudden" D-world hyperfinite summations that yield *all* of the physical quantities that characterize elementary particles and processes from one fixed number (0 $^{\omega}$) On the other hand, there are (B) supercontinuous D-world functions that also take this single number and obtain the appropriate N-world physical quantities. Analyzing the (B) case it is discovered that there exists another type (A) process (C) generated by the (B) functions that also produces these characterizing quantities. Thus even though (A) is totally discrete and not itself supercontinuous in character it does mirror the D-world (B) type processes. It is significant to note that there cannot exist any N-world method that can differentiate between cases (A), (B) or (C) and that the dominate feature within the D-world may be assumed to be supercontinuity. This should yield strong evidence in favor of the D-world model for those individuals who adhere to the belief that the ultimate organization of our universe is classical in character.

The metalogic used to argue for many quantum concepts is classical logic. The mathematical theories used throughout the sciences are usually obtained by either classical or intuitionistic logic. Of course, there are also computer logics and the distinctly different inner logic for certain sequences of quantum mechanical descriptions— quantum logic.[14] Indeed, the usual quantum logics are incompatible with all of these other deductive systems. It is self-evident that scientists are faced with a perplexing situation involving competing and even contradictory logical schemes.

The inner logic for the developmental paradigm eliminates this confusing situation. It has been discovered[15] that the basic logical operators S and *S that appear in all of the previous articles in this series may be replaced within every statement in which they appear by the operator S_0 and $*S_0$, respectively. The significance of this substitution is that the deductive system that generates S_0 and $*S_0$ is weaker than quantum-logic with the Mittlestaedt's conditional,[16] classical logic, intuitionistic logic, computer logic and, indeed, all known inner logics for any of the known scientific theories. This means that S_0 is compatible with respect to all of these logics and any of our previous statements in which the symbols S_0 or $*S_0$ appear is consistent with each of the known inner logics associated with scientific theories.[17] This yields more indirect evidence for the acceptance of the D-world model.

As discussed in section 1, the Gödel effect and the developmental paradigm notion imply that *all* word-pictures including diagrams and computer generated imagery of any type must be incomplete in that these "symbol" models do, not represent a fixed rule that forces automatically an experimentally determined description into a specific theory. It is for this reason and the hypothesis law that I am forced to reject any describable configuration for the entities called "subparticles." The multifaceted subparticles are not to be construed as particles nor waves nor quanta nor anything that can be represented by some *fixed* imagery. Subparticles are viewed only *operationally,* and observe that this will tend to eliminate many of inter-theory biases and actual contradictions that occur if theories are not restricted to specific states of affairs.

After examining the numerous infinitesimal methods utilized since Archimedes, many of the operationally described mental processes of the human being and the general paradigms generated by statements common to scientific theories, it appears likely that each subparticle may be characterized or represented by a sequence $\{a_n\}$ of hyperreal numbers.[18] For convenience we let each $\{a_n\}$ be represented by an "n-tuple"

$$(a_1, a_2, \ldots, a_n, \ldots) \qquad (1)$$

where the sequential values will be termed "coordinates." The first coordinate a_1 is a positive hyperreal number and is a "naming" coordinate. The other co-

ordinates correspond, in a manner to be explicated, to the various real number, complex number or vector quantities that are measured in order to characterize certain physical qualities defined within various theories. The use of such sequences to represent subparticles is an indication of our lack of knowledge of D-world mechanisms.

For example, $a_2 = 1$ is the counting coordinate— the hyperreal a_i; i = 3, 4, 5, 6 may represent the D-world space-time coordinate location of the subparticle named by a_1 — the a_i, i = 7, 8, represent the concept of the positive or negative charge associated with every subparticle — the a_i, i = 9, 10, 11 are hyperreal numbers that represent inertial, gravitational and intrinsic (rest) mass respectively. For vector qualities such as the electromagnetic field vector E, I assume that they are representable in the Euclidian D-world by four vector components a_i; i = 12, 13, 14, 15. So as not to be biased also include, as if they are independent qualities, the various defined energies, apparent momenta and other physical quantities required within the theories that must combine in order to produce a reasonable description for N-world behavior. Application of the law of simplicity yields the postulate that in general many of the coordinate values are independent from one another and that the subparticle represented by such a sequence may be the "substance" of which our universe is made.[19]

All of this may seem very ad hoc in character if it were not for a substantial piece of mathematical evidence that lends credence to these assumptions. Using the concept of fixed and private units of measure within the D-world it has been established that there exists a special hyperreal number (0^{ω}) where ω is an infinite natural number (an element of *N - N), and each subparticle sequence value, with the exception of the first and second, may be assigned the fixed values of either $+(0^{\omega})$ or $-(0^{\omega})$ The human ability of constructing material entities by combining together finitely many material objects is modeled within the D-world by hyperfinite composition, which is, in turn, numerically characterized by (independent coordinate) hyperfinite summation. This latter summation process when applied to subparticle sequences with these fixed coordinate values yields, within the N-world, all of the numerical characterizing quantities for all accepted elementary particles and zeros for those coordinates that do not have any characterizing content.

For example, let m_e, q, $|\mu_Z|$ represent, with respect to the common N-world units of measure, the intrinsic mass, charge and magnetic moment, respectively, for the electron. Then there exist three hyperreal natural numbers M, Q, Mg such that

$$\left.\begin{aligned} \mathrm{st}\left(\sum_{1}^{M}(1/(10^{\omega}))\right) &= m_e; \\ \mathrm{st}\left(\sum_{1}^{Q}(-1/(10^{\omega}))\right) &= q; \\ \mathrm{st}\left(\sum_{1}^{Mg}(1/(10^{\omega}))\right) &= |\mu_z| \end{aligned}\right\} \qquad (2)$$

In (2) the symbol "st" represents the well known standard part operator that inserts this subparticle combination into the standard world. However, within the D-world a great deal of additional information exists relative to this composition. Intuitively, the second coordinate states that the number of subparticles that have been combined together in order to produce this *one* electron is (M)(Q) (Mg) and a new first coordinate *name* may be assigned to this particular electron. The coordinates that within the N-world appear to be assigned the value zero do not have zero values within the D-world. This is a significant fact for subparticle theory since it yields an explanation for all quantum transitions, if such processes exist in objective reality, and the effects of electromagnetic and gravitational fields. Intuitively, even though the electron can now be identified within the standard world by its common numerical characteristics, the combination still retains, within the D-world, other coordinate representations that include all of the possible interactions the object can have with respect to N-world material objects and fields.

Notice that the electron is not required to have any particular geometric configuration after it is inserted since it is the N-world theory that may require the use of such geometric language. Further, cardinality studies indicate that there are "more than enough" subparticles to produce all of the material universe where the elementary particles have any definable "shape" or common density feature.

As to the perceived N-world behavior of such objects, it is the broadly deterministic nonrandom D-world supermind processes and hyperfinitely selected "laws" that govern the inter and intra coordinate relationships between these characterizing numerical quantities. Due to the hypothesis law there can be no human language that will describe all of the appropriate relationships.

Even after all of the material universe is formed from subparticle combinations general paradigms indicate, and it is consistent with the mathematical theory, that there exist numerous subparticles that are not specifically required for corporeal reality. It is a portion of these remaining subparticles that can be used to model the concept of a completely dense substratum that exhibits all of the various field properties.

One might conclude that there are but two levels of activity for subparticle D-world behavior, but once again general paradigms and the methods of infinitesimal modeling indicate that this is not the case. From the intuitive point of view this third D-world substratum has some unusual behavior characteristics that are generated *directly* by the mathematical methods. For example, the influences that this third level has upon the N-world are classical in character and this third level appears to be an absolute uniform substratum from which the D-world "laws" are applied. It also provides a background source of distinctly different collections of subparticles that may be utilized to measure all of the N-world alterations. Do not assume that these three D-world subparticle levels exhaust the D-world structure. Once again cardinality studies clearly indicate that these three levels need only represent a minuscule portion of the D-world model.

Is there additional historical and scientific evidence for the acceptance of the D-world model with this added subparticle feature? Consider that for 2200 years the concepts and intuitive procedures of infinitesimal modeling have been successfully applied to obtain

thousands of statements that correctly predict natural system behavior and these techniques have now been made rigorous. The evidence for the acceptance of these procedures is more conclusive than for any other known device for such predictions. Further, it appears to be difficult for the human mind to disassociate itself from what is perceived to be a local Euclidean world. Infinitesimal reasoning takes advantage of this quality by forcing upon this "unperceived" infinitesimal world the simplest of Euclidean behavior. It is an overwhelming empirically accepted fact gathered over these many years that this "unperceived" infinitesimal world has directly yielded those most cherished of our scientific predictor expressions. A secondary disjoint fragment—the G-model— actually suggests that it is the D-world itself that has implanted the concepts of infinitesimal reasoning upon our conscious mind and not conversely.

Subparticle theory, simplicity and infinitesimal reasoning may lead to a better understanding of some of the effects predicted by the Special Theory of Relativity. The major natural system in which we locally exist is a space-time system. This seemingly empty space-time has only a few characteristics when viewed from a Euclidean perspective. From the D-world, electromagnetic propagation is investigated relative to a very small Euclidean neighborhood of space-time.

Recall that one of the basic precepts of infinitesimal modeling is the experimentally verified *simplicity* of such a local system. For very small actual time intervals certain physical processes take on simple behavioral descriptions.[20] Experiments show that for such small standard time intervals and even much larger ones the linear Galilean theory for average velocities (speeds) suffices to give accurate information relative to the composition of such velocities. If you assume, as required by the methods of infinitesimal reasoning, that such Euclidean behavior occurs within an infinitesimal space-time neighborhood of a standard N-world location and also that light acquires the velocity of the emitting material, then a special type of equation is obtained that represents how transverse (linear) displacement is measured. This result is based upon how electromagnetic radiation is employed within the N-world to measure physical quantities. One solution to this equation leads directly to the mass-energy and velocity transformations of the *local* Special Theory of Relativity. However, the apparent restrictions that these transformations place upon natural system behavior do not apply with the D-world.

As an example, consider an electron with rest mass m_e having measured linear (scalar) velocity v with respect to an N-world observer. An observer stationed within the D-world employing third level objects, that are termed hyperfast subparticles, and various D-world laws measures the electron's linear velocity as w with respect to D-world units. The N-world observer would determine that the inertial mass of the electron has apparently increased by the value $m_e(1 - v^2/c^2)^{-1/2}$ while the D-world observer states that for the local N-world neighborhood under consideration the inertial mass would be $m_e(\cosh(w/c))$. Thus even though the N-world observer would not be able to measure the inertial mass if v = c, the D-world observer has no difficulty in measuring the apparent mass as being $m_e(\cosh(1))$. Subparticle theory gives a "physical" basis for such unusual results. The mass and velocity transformation laws merely indicate possible D-world propagation properties of electromagnetic radiation as they have been perceived from our N-world experiences with measuring procedures. Since all corporeal N-world objects carry D-world field coordinates then these results indicate how these field coordinates interact with the everywhere present local fields of the second level. All of the apparent measured Special Theory variations in mass and energy may be manifestations of the existence of subparticle substratums—manifestations that yield an ultimate resistance to increased N-world linear propagation of a material object. Such a restriction does not exist within the third D-world level since it is exterior to first and second substratums. The methods of infinitesimal modeling suggest that the D-world laws allow both material objects and fields to be partially propagated as a fixed system in a simple classical manner. However, it can be shown that these transformations yield extremely incomplete information relative to such D-world propagation. Indeed, there are infinitely many different propagation schemata within the D-world that produce the same N-world mass-energy and velocity effects. (The coordinate, length and time transformations, if they are absolute and not material in character, require the introduction of an additional global hypothesis.) Once again this yields indirect evidence for the acceptance of the deductive world model.

In May 1984, this author became aware of the Bell inequality and dEspagnat's discussion of local realism.[21] DEspagnat writes:

> Perhaps in such a world [D-world?] the concept of an independent existing reality can retain some meaning, but it will be altered and one remote from everyday experience.[22]

The concept of the general paradigm leads to a possible mechanism that can send "instantaneous" informational signals between all standard particles or aggregates within the D-world and not contradict standard world Einstein separability (i.e. no influence of any kind can propagate faster than the speed of light.)[23] This would reconcile the apparent contradiction between the Bell inequality and the experimental results predicted by the quantum mechanics formalism.

As previously stated there is a "large" quantity of subparticles that are not utilized for standard particle or field construction. In our derivation for the mass-energy and velocity transformations for the local Special Theory of Relativity, the standard substratum points correspond to standard world positions for particles, fields and the like. There is no *a priori* justification in assuming that this local Special Theory applies to other D-world objects. It is a basic tenet of infinitesimal reasoning that without further justification the only properties that are to be associated with such unutilized objects are the simplest classical ones. The logic of particle physics and general paradigms allow us to accept the existence of such unutilized particles without any additional justification. A somewhat lengthy derivation yields the following results as viewed from the D-world. Hyperfast subparticles may propagate with velocity $\lambda \varepsilon {}^*N - N$ and subsequently input all types of state changing information into various coordinate positions-information that from the N-world would appear to be "instantaneously re-

ceived." In doing so these hyperfast subparticles would not contradict the various conservation laws even if they have transmitted such information for an infinity of events. This D-world state of affairs lends credence to dEspagnat's explanation of why the Bell inequality is violated and gives further evidence for the acceptance of the D-world model.

> The basic law that signals cannot travel faster than light is demoted from a property of external reality to a feature of mere communicatable human experience. Although this represents a step toward philosophical positivism, the concept of an independent or external reality can still be retained as a possible explanation of *observed* regularities in experiments. It is necessary, however, that the violation of Einstein separability be included as a property, albeit a well-hidden and counterintuitive property . . .[24]

What is being described throughout this section has been previously alluded to by one of the world's foremost scientists. There is no question that a "pregeometry" as first discussed by Wheeler[25] is being outlined and verbally presented. Even though this research is preliminary it is, for the present, a reasonable speculative model and it has enabled this author to eliminate the more glaring inconsistencies of all of the modern day predictive theories while retaining some of the old states of affairs and all of their numerical predictions.

Thus far it would appear that I am simply describing a higher form of nature. As part of the next section it is shown how another distinct portion of the D-world— the Grundlegend model— explicates certain patterns of human behavior. It is the G-model portion that places the D-world model into a unique position and it is this portion that continues to supply the controlling mechanisms for all of the events thus far discussed.

3. A Special Interpretation

In August 1978, the Grundlegend structure[26] (i.e. G-structure) was constructed for the sole purpose of modeling certain areas of psychology— areas that are not presently susceptible to numerical modeling. The G-structure is the specific supermind substructure for the D-world model and it was employed originally to model the concepts of the conscious mind, the possible subconscious mind, subliminal perception, the possible (exterior) vertical parasubconscious, the vertical paraconscious and various relations between these states of awareness. Immediately after the original constructive attempts were completed, it was discovered that this crude structure also models an idea of de Broglie,[27] among others, and C. S. Lewis'concept of the Divine mind.[28]

> . . . that events in the remotest parts of space appear to obey the laws of rational thought . . . There is in our minds something that bears a faint resemblance to it.[29] According to it what is behind the universe is more like a mind than it is anything else we know.[30] What appears to be my thinking is only God's thinking through me. [31] He lends us a little of His reasoning power.[32]

An entire book was written delineating various relationships between Lewis'concepts and the very general descriptive content of the G-mode1.[33] It was only after this endeavor that the refining D-world procedures were developed and the combined theories yield the deductive-world model. It is an obvious and interesting fact that by simply substituting throughout the deductive-world theory for the word "deductive-" or the symbol "D-" the words "Divine" or "Supernatural" then a rational theological description emerges. Further, this new model or interpretation predicts a vast array of Jewish and Christian behavior when one assumes that such behavior is supernaturally associated with the Divine mind.

There exist some special G-model and, hence, D-world logical processes such as "strong reasoning from the perfect" that can be rationally assumed to directly influence human mental processes. This influence is externally generated from the D-world in a supercontinuous manner and from a human point of view may take place instantaneously. Such G-model processes are, of course, D-world subprocesses that may at first be considered to produce weak parasubconscious influences that guide the conscious mind through a process modeled after subliminal perception. Different processes yield different mental influences. Even though these procedures may be applied by the supermind portion of the D-world to humanly unknowable word forms, the consequences of many of these G-model processes are humanly comprehensible. One can assume that the D-world supermind procedures aid or influence the human brain in producing some verbal expressions. In contradistinction to certain psychological assumptions, it is rational to assume that human thinking is not the only cause that can yield a human verbal expression.

It would not be difficult to obtain statistically meaningful evidence by means of standard psychological testing or by the gathering of experiential evidence— evidence that could verify empirically the existence of these G-model subprocesses. Hence, many of the G-model conclusions are at least *capable* of indirect verification. We have discussed subparticle mechanisms that could actually mediate these mental influences. However, recall that the D-world model explicitly states that there are infinitely many possible D-world properties that are neither humanly knowable nor comprehensible. Many of these properties and mechanisms may be described in a pure D-world language that could not be humanly comprehended even with application of our extended metalanguage descriptions. Further, the supermind portion performs supermental processes that are much stronger than any logical process that can ever be produced by a purely human or machine brain.[34] Thus it is rational to assume that if some of the D-world mechanisms and processes are being described correctly, then there are numerous other D-world mechanisms and processes that are humanly unknowable.

There is present within much of the world's literature actual extraordinary (indirect) evidence that a supermind of some sort may indeed have influenced the minds of certain individuals. For thousands of years many descriptions for the behavior and characteristics of named natural systems as well as the behavior and characteristics of named constituents contained within these natural systems have been written down. Some of these descriptions include statements that imply that the human being can appreciate the beauty of such uniformly developing systems, can discover for

himself some of the uniform processes that allow for natural system development and even apply these processes to the material available within his environment in order to create objects that apparently did not exist within his environment previously.

On the other hand, there are other descriptions that appear in these literary works, say F_i and F_{i+1}, such that they include a perceived internal design or beauty to the human mind, but they also imply that a human observer could not comprehend a mechanism that is capable of producing the described system development or logically changing one system (description) F_i into an adjacent system (description) F_{i+1}. Moreover, the descriptions were all written at about the same general cosmic time and they refer to system development that could not have been predicted by an unaided writer. If viewed from the D-world, one would conclude that these descriptions were obtained from outside-external to-the development itself. This is exactly what happens relative to the developmental paradigm approach and its production by supermind processes. The supermind operation is outside of the development itself.

The type of descriptions I am referring to are, of course, those that are traditionally called revelations or prophecies as well as other illuminations for how certain developing systems such as our universe or earth have come into being. It is important to note that these descriptions were obtained by what can be rationally described as a vertical paraconscious process— a process that forms an acceptable subsystem of the D-world. Since many of these remarkable descriptions were obtained prior to the development of the canons of modern science and the mathematical methods utilized in order to show that such descriptions are completely rational and "scientific" in character, then acceptance of such descriptions, if they can be (indirectly) verified, yields additional evidence for the acceptance of the D-world model. It is a remarkable fact that many of these descriptions, these illuminations or revelations if you wish to call them that, have indeed been verified.

With respect to exact Scriptural quotations, I am confident that the reader could easily supply references. However, I provide a few examples. As previously stated the D-world theory exists if we have standard languages that describe natural system behavior. This is also indicated by Romans 1:20, II Corinthians 4:18. Moreover, throughout Scripture the processes of creating both corporeal and incorporeal objects are modeled after language and thought processes. Genesis 1:1-26, Job 34:14, Psalms 19:1,33:6 & 9, 98:6, 147:15 Proverbs 2:6,3:19, Hebrews 1:3, Hebrews 11:3.

As shown during this investigation all of the supermind logical processes being partially described by the Grundlegend portion of the D-world model are more powerful in scope and infinitely beyond any "natural process." Furthermore, the entire set of all natural "laws" may be beyond human comprehension. The Scriptures indicate these possibilities in II Chronicles 2:14, Job 9:10, 11:7, 28:12-13, 33:12, 37:23, 38:33, Psalms 93:2, 139:6, 145:3, 147:5, Ecclesiastes 3:11, 8:17, 11:5, Isaiah 55:8-9.

The relations previously established between the workings of the human mind and the supermind are modeled every time the Scriptures state that God "speaks" to a prophet, or any Jew or Christian. These relations also model Job 32:8, 38:36, Psalms 44:21, 94:11, 119:34, 139:2, 4, 17-18, Proverbs 2:6. Isaiah 22:14, Jeremiah 17:10, 31:33, Daniel 2:20, 28, 29, 46 and Amos 3:7. The G-model predicts a supernatural relation between the spiritually indwelled Christian and Jesus Christ as it is implied by John 16:13, Romans 8:14, I Corinthians 2:10, 2:16, Ephesians 4:20, Philippians 2:5, 1 John 2:27. Not only are the conscious mind aspects of the gifts of the Spirit as outlined in I Corinthians 12:8-10 modeled, but the D-world model yields a possible mechanism for the corporeal and miraculous processes that never cease but continue throughout all of God's creation— including those exemplified by the fully indwelled Christian believer.

As indicated by Job 25:1 and Ecclesiastes 3:11, the D-world model also predicts a God's harmonious ordering of His Creation— but an ordering that can only be slightly understood while human beings remain in their present restricted state. Also notice that the fact that there are single entities such as the operator $*S_0$, the number (0^{ω}) a single subparticle representation, among others, intuitively reveals the unity and oneness of the Godhead.

Obviously, the above examples correlate only a small portion of Scripture and the D-world theory and certainly the reader could add many features to this new interpretation. However, I must include a disclaimer. This special interpretation need not be accepted. As pointed out in the second article in this series[35] this special interpretation is not required to establish the validity of the D-world model. This interpretation is useful intuitively, but it indicates only that the D-world model may be consistently embedded into a theological description.

I do not apologize for the fact that the D-world model has this theological interpretation. Note that the theological expressions carry many *additional* connotations that are *not* established by the D-world model directly even though they are rational extensions of the D-world theory. These additional concepts and expressions also have an emotional impact that tends to cloud the pure analytical results obtained. Whether or not an individual accepts this special interpretation is a personal preference that should not be dictated by a theoretical scientific investigation. Such acceptance should be based upon deep personal reflection, experience and many of the imponderables of human existence. An individual's elimination of this special interpretation in no manner invalidates the D-world's explanatory power and usefulness as a predictor of natural system behavior— as a pregeometry. It is the responsibility of every thoughtful scientifically minded individual to determine the value of the D-world model based upon its analytical contributions and not upon a pure personal philosophy exterior to its actual content.

References

1. Herrmann, R. A. 1986. A solution to the grand unification problem, *Abstracts of the American Mathematical Society* 7:238.
2. Aerts, D. 1984. The missing elements of reality in the description of quantum mechanics of the E.P.R. paradox situation, *Helvetica Physica* 57:421-28.
3. Herrmann, R. A. 1985. Subparticles and realism in quantum theories, *Creation Research Society Quarterly* 22:84-89.
4. Herrmann, R. A. 1985. Language and, science, *Creation Research Society Quarterly* 22:128-37.

5. Herrmann, R. A. 1986. Developmental paradigms, *Creation Research Society Quarterly* 22:189-98.
6. Herrmann, R. A. 1986. Derivations for D-world evidence, preprint. Simply request a copy.
7. Patton, C. M. and J. A. Wheeler. 1974. Is physics legislated by cosmogony? in Quantum gravity. Oxford University Press, Oxford. pp. 538-605.
8. Dyson, F. J 1980. Fields and particles. Headings from Scientific American. W. H. Freeman & Co., San Francisco, p. 18.
9. When such expressions as "it can be shown" or "it has been established" are used they refer to the derivations that appear in reference 6 or elsewhere.
10. One basic reason for this is that a nonfinite alphabet would be required. Such alphabets are assumed and studied in abstract general logic.
11. Feinberg, G. 1977. What is the world made of? Atoms, leptons, quarks and other tantalizing particles. Doubleday, New York, p. 85
12. Patton and Wheeler *Op. Cit.* p. 569.
13. Herrmann, R. A. 1983. Mathematical philosophy and developmental processes, *Nature and System* 5(1-2):17-36.
14. Beltrametti, E. G. and G. Gassinelli. 1981. The logic of quantum mechanics. Addison-Wesley, Reading, MA
15. Herrmann 1986 (Reference 1), p. 20-1.
16. Beltrametti and Cassinelli 1981 *Op. Cit.* p. 223.
17. This means that if you let $\vdash$ denote the deductive process for any of the mentioned deductive systems, except for S_0, and let Γ be a set of propositions and F a proposition, then $F \varepsilon S_0(\Gamma)$ implies that $\Gamma \vdash F$. Further, for a developmental paradigm d with inner logic determined by $\vdash$ there exists a superword w such that $d \subset {}^*S_0(\{w\})$ and $w {}^*\vdash d$.
18. Robinson, A. 1966. Non-standard analysis. North-Holland, Amsterdam. p. 55. The hyperreal numbers is the term that is now generally used to identify Robinson's *R.
19. Patton and Wheeler *Op. Cit.* p. 543.
20. The intuitive concepts need for infinitesimal modeling were once taught under the title of the "Theory of Indivisibles." Very little on the subject appears in modern texts with the exception of some slight mention in such works as Planck, M. 1932. The mechanics of deformable bodies, Vol. 111. Introduction to theoretical physics. Macmillan, New York, p. 18.
21. dEspagnat, H. 1979. The quantum theory and reality, *Scientific American* 241(5):158-181.
22. *Ibid.* p. 181.
23. *Ibid.* p. 158.
24. *Ibid.* p. 180.
25. Patton and Wheeler *Op. Cit.*
26. Herrmann, K. A. 1981. Mathematical philosophy, *Abstracts of the American Mathematical Society* 2(6):527.
27. March, A and I. M. Freeman. 1963. The new world of physics. Vintage Books, New York, p. 143.
28. Herrmann, R. A. 1982. The reasonableness of metaphysical evidence, *Journal of the American Scientific Affiliation* 34(1): 17-23.
29. Lewis, C. S. 1978. Miracles. Macmillan Paperbacks, New York, p. 32.
30. Lewis, C. S. 1960. Mere Christianity. Macmillan Paperbacks. New York, p. 32.
31. Lewis 1978 *Op. Cit.* p. 29.
32. Lewis 1960 *Op. Cit.* p. 60.
33. Herrmann, R. A. 1982. The G-model (Applied to C. S. Lewis). Institute for Mathematical Philosophy Press, Annapolis. This book is out-of-print. However, a revised printing is planned for the near future.
34. Herrmann, R. A. 1986. Nonstandard consequence operators, *Kobe Journal of Mathematics,* (to appear)
35. Herrmann. 1985. (Reference 3).

GLOBAL HEAT BALANCE WITH A LIQUID WATER AND ICE CANOPY

GARY L. JOHNSON*

Received 17 January 1986; Revised 12 May 1986

Abstract

A new model of the pre-Flood canopy is proposed, consisting of large water globules at about 2 km altitude over equatorial regions and large ice fragment clouds at about 2200 km altitude over the polar regions. This canopy would have maintained both temperature and solar radiation at proper levels for good plant growth from pole to pole. The water globules would have collapsed at the time of Noah and the ice clouds would have collapsed several hundred years later to start the ice age.

Introduction

The first few chapters of Genesis indicate that the climate of the earth was once much different from what we now experience. There was no rain, but rather a mist rising from the earth to water the ground (Genesis 2:4-6). Adam and Eve apparently did not need clothes (Genesis 2:25) for comfort, indicating a rather narrow temperature range. The first mention of rain occurs in Genesis 7 at the time of the Flood. Then in chapter 9, God uses the rainbow as a sign of a covenant. If rain had occurred before the Flood, the rainbow would have occurred also and would not have been useful as a sign.

The temperatures on the early earth would have needed to be nearly uniform from pole to pole, or otherwise the temperature gradients would have caused weather systems similar to what we experience today, with the associated rain. The earth would have been like a greenhouse, with lush plant growth from pole to pole. The earth's temperature must have been moderated by some mechanism in order for this greenhouse effect to exist. The only possibility suggested is that of the water above the firmament (Genesis 1:6-8).

It can be argued that this water canopy would have to meet several requirements, such as:

1. It should contain enough water for 40 days and nights of heavy rain.
2. The water should be liquid, at least where Noah could see it.
3. The water should be at a height where the potential energy stored in the gravitational field would not be large enough to cause undue atmospheric heating when the water fell as rain.
4. There must be enough solar radiation incident upon the earth's surface to allow vigorous plant growth, from pole to pole.
5. The temperature at the earth's surface must be in the proper range for both human comfort and plant growth.
6. There should be a source or mechanism for very cold ice over the polar regions, to account for the

*Gary L. Johnson, Ph.D. receives his mail at 1630 Osage St., Manhattan. KS 66502