Table 3. Ranges of total information content. See Reference 7. "Bits" are units of amount of information, according to information theory.

	Range (bits)
Bacteria	0.01 - 0.07
Vertebrates	0.02 - 0.03
Invertebrates	0.01 - 0.11

viation from independence is greater than the maximum value for all other lower organisms examined. Significantly it is this deviation from independence that is the most important single measure of the ordering of a sequence of symbols, i.e., information.[7]

Not enough samples have been calculated to determine if there are differences in information content at the various grades mentioned in the first part of this paper. Nevertheless it seems reasonable to conclude that information theory demonstrates a tendency for increased information content with higher organisms.

These observations support the general principle of creation. However, this does not constitute proof of creation. The trend noted here can also be explained in evolutionary terms. This paper does show that the principles upon which neutral scientific creationism[8] are based are consistent with the observed world.

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THE LIMITS OF HUMAN THOUGHT AND THE CREATION MODEL

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The results of Goedel's Theorem and some of its implications regarding the limits of human thought are examined, especially as they relate to science and origins. The parallel thinking of others is presented and similarities between Goedel's Theorem, the Second Law of Thermodynamics, and language are given. It is concluded that human reason is essentially incomplete and can be validated only by reference to a higher Reason. Hence all "self-explanatory" systems, such as presented by atheistic evolutionists, are ultimately irrational. The creationist paradigm is seen to be the only fully consistent alternative. Two appendices are provided for more detailed discussions of statistical thermodynamics and the essential non-neutrality of science.

Introduction

In 1931 the young mathematician Kurt Goedel presented a proof relating to the nature of mathematical thinking. It is called Goedel's theorem. Ernest Nagel and James R. Newman in their presentation of Goedel's proof suggest that this theorem applies to the axioms of any discipline and, indeed, that it has profound epistemological implications.[1]

In this paper the results of the theorem will be briefly presented and then, by analogy, the parallel thinking of others, working independently and using different lines of reasoning, will be shown to have arrived at similar conclusions. It is suggested that such commonality of thought implies a general principle of the limitation and contingency of human reason. This principle will also be related to the second law of thermodynamics and to the question of origins.

The Results of Goedel's Theorem

There are two main results of Goedel's theorem. The first result involves the consistency, or logical orderliness, of a system of axioms (or assumptions). It is always desirable to know that the system is free from contradiction so that any theorems or conclusions drawn from the system will be consistent. Goedel showed, however, that the consistency of a non-trivial mathematical system of axioms cannot be formally proved or determined from the axioms themselves, i.e., from statements derived from the axioms. Rather, the only possible proof, or determination, of consistency would be one whose rules of inference were *essentially* different and *more powerful* than those of the system in question, i.e., such rules would then be independent or "outside" the system. This would further mean that these new, independent rules of transformation would themselves require a proof of consistency and so *ad infinitum*. There could be no formal, finitistic proof of consistency!

The second result was considered even more astounding since it indicates a limitation of the axiomatic method itself, or incompleteness of the method. Given any consistent set of arithmetical statements, Goedel showed that there are true arithmetical statements that *cannot* be derived from the set. To put it another way: any consistent nontrivial mathematical system is *essentially* or *necessarily* incomplete because there will be true statements (or features, characteristics) of the system which can be determined only by statements outside the system of axioms in question.

An example may help capture the spirit of this dilemma. Consider the statement from a Cretan that Cretans always lie. If the statement is taken as true (Cretans do lie), the problem immediately arises that

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this "true" statement is delivered by a Cretan who is *not* lying in which case the statement is false. Thus, if the statement is true, it is false. In order to evaluate the honesty of Cretans, someone who is not a Cretan but is undoubtedly honest must be used, i.e., someone outside the class or system of Cretans.

Dr. Victor F. Weisskopf, in a recent paper, described the theorem this way:

> "The mathematician Goedel proved that a system of axioms can never be based on itself: in order to prove its validity, statements from outside the system must be used."

He then extended the theorem to science:

> "It must be pointed out that science itself has its roots and origins outside its own rational realm of thinking. In essence, there seems to exist a 'Goedel Theorem of Science,' which holds that science is possible only within a larger framework of non-scientific issues and concerns. . . . Science itself must have a nonscientific base . . ."[2]

Science, like mathematics, is not "self-validating." Weisskopf goes on to argue that poetry, music, philosophy, etc. are all part of the "larger issues and concerns." Exclusive reliance on science is detrimental to culture and ultimately to science as well. We must pay attention to the larger framework without which science could not exist.

In short, then, Goedel's theorem states that no system of axioms is self-validating but requires statements external to the system, and perhaps more complex, and which constitute a larger framework or matrix to justify it.[3]

Parallel Thinking of Others

Other thinkers seem to have reached similar conclusions in other areas but from different perspectives.

For example, Michael Polanyi indicates that

> "Physics is dumb without the gift of boundary conditions, forming its frame; and this frame is not determined by the laws of physics."[4]

A scientist imposes certain fixed conditions which constitute a "frame" surrounding his experiment but which are outside his immediate interest and which cannot be explained by the physics and chemistry of the experiment.

Polanyi uses the example of a watch to make his point. A complete physical-chemical topography or description of a watch would not identify it as a *watch* nor *define* a class of watches. He writes:

> "The impossibility is of a logical kind, similar to that by which a poorer deductive system cannot define the terms of a richer one. For example, propositional calculus cannot define arithmetics."[5]

Only by referring to its operational principles, its purposive function, which constitutes its boundary conditions can the object be identified and a class defined.

More importantly, living organisms have a similar "frame" which Polanyi calls the boundary condition, namely, their morphology which delimits the domain within which physical and chemical laws operate but which are not reducible to those laws. Such irreducible boundary conditions (morphology) lie outside the system of physics and chemistry and constitute, Polanyi says, "a profoundly informative intervention."[6] In fact, he states that

> "All objects conveying information are irreducible to the terms of physics and chemistry."[7]

Polanyi also tells of the impossibility of reducing all things to the behavior of matter by recounting the futility of one such attempt. Ernest Nagel tried to eliminate the purposive character of physiological functions; he tried to reduce them to purely physical/chemical terms. However, Polanyi notes:

> "Moreover, despite his reductionist claims, Nagel admits irreducibility of vital functions by using their biological names for talking about them. He must do so, for the mere shape of a living being defeats any physical-chemical definition and this is true throughout the anatomical features of life."[8]

This is especially interesting since Nagel's attempt to explain everything in terms of physics and chemistry is similar to mathematicians trying to explain mathematics or validate it in terms of itself.

In a manner similar to Polanyi and at about the same time, Armstrong considered whether DNA was merely a material cause in the Aristotelian sense.[9] He concluded that it was not; rather, its form or morphology was a non-material cause and could not be completely explained by a system of pure matter/energy. In a later paper Armstrong presented a more comprehensive argument from form and showed that all form comes from pre-existing form and ultimately comes from the Mind of God. For example, the form of a typewriter can only be determined (defined) by that which is not "typewriter," such as a lathe which is a more complex form and is independent of or outside the system "typewriter." As Armstrong writes:

> "Indeed, it is not too strong a statement to say that the admission that forms can come only from pre-existing forms logically compels one to admit that there is a Creator."[10, 11]

Richard Weaver also places science in a matrix or framework which validates or defines its sphere of activity. Using the classical philosophical approach of dialectics and rhetoric to analyze the Scopes trial, Weaver showed that to evaluate the function or role of science in society (but not to evaluate its empirical content) requires a system of thought or statements outside of science. In this case the system was the law which constitutes a broader set of statements of philosophical opinion about a narrower set of statements, science. Clarence Darrow didn't understand this. He thought he could win the case for "science" just by being scientific, i.e., by calling on scientists to present their "empirical" arguments. Weaver observes:

> "But in doing this, one assumes that there are no points outside the empirical realm from which one can form judgments about science. Science, by this conception, must contain not only its facts, but also the means of its own evaluation, so that the statements about the statements of science are science too."[12]

Or in a more general way as Weaver later stated:

> ". . . experience does not tell us what we are experiencing . . ."[13]

The judge eventually realized this and on the 6th day of the trial banned the scientists' testimonies. The

issue could not be decided by the recitation of the "facts," experiences or empirical content of science or of the two opposing propositions, evolution vs. creation, but only by determining the legal relationships between science and society and between the two propositions. The matter was not self-defining but required the broader, independent statements of the law to delineate science's social "boundary conditions." (Weaver thus anticipated Weisskopf by about 25 years.)[14]

C. S. Lewis also investigates the problem of validating human reason. He concludes that rational thought must be left outside any discussion or inquiry:

> "All arguments about the validity of thought make a tacit, and illegitimate, exception in favour of the bit of thought you are doing at that moment. It has to be left outside the discussion and simply believed in, in the simple old-fashioned way. Thus the Freudian proves that all thoughts are merely due to complexes except the thought which constitutes this proof itself. The Marxist proves that all thoughts result from class conditioning — except the thought he is thinking while he says this. It is therefore always impossible to begin with any other data whatever and from there to find out whether thought is valid. You must do exactly the opposite — must begin by admitting the self-evidence of logical thought and then believe all other things only insofar as they agree with that. The validity of thought is central: all other things have to be fitted in round it as best they can."[15]

In other words, reason serves as an external standard to evaluate or validate, a discussion. It can therefore never be the subject of reasonable inquiry.[16, 17]

Lewis also shows that the orderliness of nature is due to reason and that reason must be imposed on the natural ramblings of consciousness. He concludes that though human reason is independent of nature, it is dependent on a higher, self-existent Reason which must be the source of one's own imperfect and intermittent rationality: human thought is not God's but it is God-kindled.[18]

Lewis also argues that experience is not self-explanatory but must be validated by the sound reasoning of philosophy:

> "What we learn from experience depends on the kind of philosophy we bring to experience. It is therefore useless to appeal to experience before we have settled, as well as we can, the philosophical question."[19]

May we not say the same about human culture, identity and existence in general? Determining life's "consistency" or meaningfulness, and if meaningful, its other basic features, is not within man's power alone for man is essentially incomplete. Man's existence cannot be validated by himself.

Frederick Wilhelmsen seems to have pointed out a Goedel's theorem of human identity when he criticized modern man's thought or attempt to justify himself in his own terms. To find out who he is, modern man has turned inward in a rationalistic effort to determine his own way. This attempt has been modern man's crisis. Speaking of modern man, Wilhelmsen writes: downfall and has led to the present cultural identity

> "He looks within and he now finds, after so many centuries, that there is simply nothing there to hold him up, to sustain him, that — looking through the mirage of the rationalist ego — there is only a bottomless pit."[20]

The answer to this dilemma lies in recognizing the limits of the self:

> "I am the self I am thanks to what is not self but other."[21]

Man must look outside himself to the "other" to discover his identity, to determine the "boundary conditions" of his existence, to find meaning, to be "validated." However, what is the "other"? Wilhelmsen gives his answer:

> "Bereft of any internal ontological identity of our own, constituted dynamically even as the selves we are through our marriage to the other, the final secret of the search for identity is the identity of Being, God, . . . the 'I am Who I am . . .' (Exodus 3, 14)."[22]

Man's identity then lies outside of man in the Self-Identified, Self-Defined God Who alone validates man's existence.

Goedel's Theorem and the Entropy Law
Form and Order

There is an important similarity between Goedel's theorem and the entropy law as it relates to the concept of "order." Thermodynamically, disorder is related to the mathematical concept of entropy in the familiar equation $S = k \ln w$, where w is the disorder parameter. But this gives no complete definition of "order" or "disorder," especially as it is applied in creation/evolution discussions.

Armstrong notes the need to define entropy according to the context of the discussion and uses the word "arrangedness" to clarify the meaning of "order" which he defines as,

> ". . . conformity to some plan. In something which has parts, it is adaptation of the parts to the whole, and of the whole to some plan . . .
>
> "If the system in question should be one for which entropy is already defined through thermodynamics or statistical mechanics, that entropy may as well be used. If not, an entropy may be invented for the purpose . . ."[23]

The definition of order, then, includes a concept of plan: an intentional, purposeful design. Without reference to such a plan the concept of order is not always intelligible. And the purpose and function of that which is planned is embodied in its form. Speaking in biological terms, Wightman comments:

> "From the organisms point of view, *form* is the embodiment of *function*, which in turn is the mode of realisation of *end*. If this sounds Aristotelian, let it be so . . ."[24]

A natural system is said to be ordered when its parts are properly related to one another and it conforms to some plan, i.e., conforms to its intended purpose. Order *is* form and the breakdown of order is a loss of form. The rusting of an automobile is an example: unless some external, intelligent agent intervenes, the

form (order, "arrangedness") will be lost. The entropy law, in this sense, does not deal with matter and energy *per se*, but more precisely deals with the unique or distinctive *distribution* of matter and energy.[25] The entropy law is a statement of form.[26] To put it another way, form (order) is informative because it communicates, or makes intelligible, purpose.[27]

Like the axiomatic method, the existence of order is not "self-explanatory" or "self-validating," i.e., it cannot be accounted for in terms of itself or by purely physical-chemical laws to which it is irreducible. It is fully comprehensible only in terms of a broader, encompassing context of order.

Time and Origins

Of course, entropic processes are further divided into reversible and irreversible. The calculation of the change of entropy in an irreversible process is dependent upon finding a reversible process whose path connects the same initial and final states. Yet in the case of the irreversible process of life there is no comparable reversible process nor can the system be restored to its earlier state. As Kestin notes:

> ". . . systems like biological ones cannot be analyzed in terms of the equations of thermodynamics because no earlier state of such a system can ever be restored from a later state. . . . A given state of the system is always described by its properties as they are measured at that state, and not by the details of the process, which enable the system to assume the state under consideration."[28]

The independence of path coupled with its irreversible nature, renders the evaluation of the entropy of living organisms largely qualitative. And yet it is just such irreversible systems which are indicative of the direction of time. For example, a film of a perfectly elastic bouncing ball could be run backward without being noticed by the viewer. Only when compared with an irreversible or irretrievable process, such as the growth of a plant, could the direction be determined. C. S. Lewis writes:

> "The movement from more order to less almost serves to determine the direction in which Time is flowing. You could almost define the future as the period in which what is now living will be dead and in which what order still remains will be diminished."[29]

For a total, comprehensive chronology indicative of time's direction a single birth/death sequence is insufficient. As Georgescu-Roegen observes:

> "For a complete chronology we need a continuous time's arrow of at least one category of individuals the lives of which overlap without interruption . . . the process of the entire universe is unidirectional, i.e., irreversible, because that of its individual members is irrevocable."[30]

This complete chronology of irretrievable events marks the unidirectional or irreversible flow of time. But it must be emphasized that one cannot validate the increasing randomness as a universal tendency by claiming that the tendency is itself random. To do so is to explain randomness in terms of itself: a fully irrational endeavor. (See Appendix A for further discussion.) It is, therefore, the fact that the dependability of increasing entropy of irretrievable processes is itself *not* contingent upon chance that gives a reliable indication of time's arrow and the sense that time proceeds in an "orderly" fashion. Only thus can the events of time be understood as sequentially arranged in a definite pattern, i.e., in a forward direction. Taken as a category, as a whole, they constitute a kind of "morphology" of time, its boundary conditions being an absolute beginning and possibly an end. Speaking of this, Sir James Jeans writes:

> "[Entropy] is still increasing rapidly, and so must have had a beginning; there must have been what we may describe as a 'creation' at a time not infinitely remote."[31, 32]

Furthermore, there is the implication of a purposive operation which points to something outside time itself. The purposefulness or meaningfulness of time cannot be understood or determined by exclusively referring to events within time. As Jastrow writes:

> ". . . you cannot describe the purpose of an entire series of events by looking [exclusively] within the events themselves."[33]

Therefore, the "beginning," if it is to validate time as meaningful, must stand "outside" time and be uniquely different from its successive events. The beginning must be a broader, more complex event than all succeeding events. The present, then, cannot account for its own origin; it is not the key to the past, if by past we include the beginning of all things. The present is derivative of the past and ultimately from that beginning. The validity of a complete chronology can be established only by reference to an ultimate origin extrinsic to it. As Timmerman states:

> "Why is it so important to view life with a sense of origin? . . . The events [of time] are shaped by, and gain meaning from, the one Creative Event. [A true account of origins] seeks to bring the light of the primordial, cosmogonic Event that shaped time to bear upon the events of the present. . . . Consider that the incarnation of Christ is meaningful insofar as it is understood in the total order of God's revelation. . . . Furthermore, without the prior fall of man, the incarnation of Christ is meaningless. Without the sense of a created perfection by God, the fall of man is meaningless."[34]

That one "Creative Event" which shaped time could have been generated only by Someone powerful enough and standing "outside" the resulting creation. Jeans describes it:

> ". . . Modern scientific theory compels us to think of the creator as working outside time and space, which are a part of his creation, just as the artist is outside his canvas . . ."[35]

As with a complete arithmetic system, the events of the present, including the irretrievable entropic processes which shape time, become meaningful only in the larger context of a purposeful beginning, which is, to borrow Jaki's imagery, "the womb of time."[36]

General Similarities

Finally, the attempt to validate a system of axioms by using statements from within it may be considered

a kind of introversion which turns the system on itself. It is therefore interesting to note that the phrase "turning in" is the literal meaning of the word "entropy." Some very general similarities or analogies between Goedel's theorem and the entropy law are thus suggested and include the following:

1. Both deal with the *orderliness* of a system. One pertains to the orderliness of a mental (logical) system, and the other deals with the orderliness of a material system (matter/energy).
2. Both deal with the *breakdown* of that order. One involves the breakdown to circular thinking (irrationality), and the other involves the breakdown (dispersion) of a physical system.
3. Both modes of "decay" result when an external restraint is removed. Decay occurs in the first case when the independent statements outside the (mental) system are removed. In the second case decay occurs when some physical-chemical restraint is removed.
4. Both types of external restraints involve intelligence acting through the medium of language. This suggests that language is the ultimate boundary condition (form or pattern) which defines or shapes mental as well as material reality.

The Validity of Language

Ultimately, the questions discussed so far are inseparably linked to the problem of language. In the case of entropy, for example, the observation has been made that it involves a qualitative dimension. This ought to be especially clear from the previous discussion of form: since form is qualitative, so is the loss of form or order. Tykodi discusses the problem of thermodynamics and mentions its independence from an "exact kinetic mechanism." He concludes that the thermodynamics of steady states should not place its main emphasis on the problems of matter and motion. In this context he adds:

> "Furthermore, the fundamental experimental system is the container plus the contents plus the interaction of container and contents with the surroundings. The experimenter would prefer a *global language* that reflects the laboratory realities. Now the experimenter never measures directly what happens at a single point in space, and a *language* couched in terms of local properties and gradients makes his life that much more difficult and gives him little or no guidance in dealing with the effect on the container or the process being studied and in deciding on ways to minimize that effect."[37] (emphasis added)

His reference to a "global language" for the experimental system is reminiscent of Polanyi's "fixed conditions" in a physical experiment. Bridgman comments:

> "One may anticipate that the extension of the entropy concept to more complicated phenomena, . . . is coextensive with the discovery of *macroscopic* parameters adequate for the *exhaustive description* of these phenomena."[38] (emphasis added)

The "exhaustive description" of life in terms of entropy will require the use of language capable of handling "macroscopic parameters." This underscores the notion that entropy includes a qualitative, macroscopic dimension and that the language of the thermodynamicist must reflect this fact. He can no more speak exclusively in terms of mere molecular motion, than Nagel could describe morphological features without using qualitative, macroscopic, biological names. Entropy defines a class or category of qualitative changes in objects, like Polanyi's class of watches, and therefore requires the use of universal concepts and terms which are irreducible to particular instances of the class or to physical/chemical analysis. Speaking thus of definition and language Weaver observes:

> "First, one must remark that the language of definition is inevitably the language of generality because only the generalizable is definable. Singulars and individuals can be described but not defined, e.g., one can define man, but one can only describe Abraham Lincoln."[39]

Similarly, the entropy law defines a class of general, qualitative changes between a system and its "boundary conditions." Because it is not reducible to or derivable from mere kinetic considerations, the concept and the terms referring to it must stand outside the system or class in question in order to define it, similar to the validation of a complete, nontrivial mathematical system.

Just as Tykodi's statement mentioned above applies not only to thermodynamics experiments but to science in general, so too the link with language applies to science generally. Science as an intelligible, purposeful endeavor is dependent upon language. Or as William Urban Marshall concludes:

> "It is part of my general thesis that all meaning is ultimately linguistic and that although science, in the interests of purer notation and manipulation, may break through the husk of language, its nonlinguistic symbols must again be translated back into natural language if intelligibility is to be possible."[40]

Language provides a framework which defines and validates science. To paraphrase Weaver, the empirical community of science avails nothing without the metaphysical community of language.[41, 42] (See Appendix B for further discussion.)

If Weisskopf's "Goedel Theorem of Science" is true, that science is validated in terms of the "broader issues and concerns" of the surrounding culture, then it is clearly contingent upon the validity of the language which expresses those issues and concerns. Furthermore, this contingency is true for all human knowledge or as Oller points out:

> "Natural discourse logically exceeds the complexity of any knowledge expressible in it. Any knowledge which can be expressed must be less abstract and less complex than the language in which it is expressed."[43]

If, however, the purpose of words is to deal with matters other than words, as Bertrand Russell stated,[44] then the question arises as to how words can be used to explain words. Or, what validates language? We cannot define a word in terms of itself but require something "outside" the word in question in order to set boundary conditions around it, thus giving it meaning and rendering it comprehensible:

> "The limits of the definition are thus the boundary between the things and the non-thing."[45]

But we can define words in terms of other words only so far without becoming tautologous; we eventually begin to repeat ourselves. Thus, Weaver refers to language as a closed system and observes:

> "If we can never succeed in [ultimately] getting out of the circle of definition, is it not true that all conventional definitions are but reminders of what we already, in a way, possess? The thing we have never heard of is defined for us by the things we know; putting these together, we discover, or unbury, the concept which was there all the while. . . . Finding the meaning of the *definiendum* is finding what emerges naturally if our present concepts are put together in the right relation. . . . Such conclusions lead to the threshold of a significent commitment: ultimate definition is, as Aristotle affirmed, a matter of intuition. Primordial conception is somehow in us; from this we proceed as already noted by analogy, or the process of finding resemblance to one thing in another."[46]

The materialistic evolutionist, however, tries to break out of this circle by defining the richer system of language in terms of the poorer system of science or human language in terms of animal communication. He feels compelled to break through the "veil" of language to "get at" reality and does not realize that it is language which ultimately shapes material reality.[47]

The reason for this seems to lie in the nature of language. All forms have inclinations as Aquinas said and language is a complex system of mental forms and thus is tendentious, i.e., it has purposeful, philosophic quality to it:

> ". . . language is intended to be sermonic. Because of its nature and of its intimacy with our feelings, it is always preaching."[48]

But the materialist's desire to break away from the philosophic quality and reduce all language to purely neutral, positive terms would be possible only with a formless language, i.e., it would be no language. Without linguistic form a mental system, like a material one, is disordered:

> "The reason lies in one of the limitations imposed upon man: unformed expression is ever tending toward ignorance."[49]

His passion for a philosophically neutral, self-validating language is irrational and leads to ignorance. It is not at all surprising to find that he has no explanation for the origin of language,[50] nor any guarantee that language corresponds to anything in material reality or that it conveys any knowledge or truth. In short, he is not sure he knows what he is talking about. His attack on the validity of language undermines the validity of all subsequent thinking including science and math.

The only satisfactory explanation is to recognize that language, like logic, is not self-validating but requires a more complex cause external to it. It requires the recognition that language is ultimately neither created nor evolved but is *given* and *received* from God in whose image man is formed and which ever points to the Supreme Linguist, the One Who created and sustains all things by His Word.

Conclusion

The commonality between Goedel's theorem and these other statements, including the entropy law, when taken together indicate a general principle of the limitation and contingency of human thought. The ordered operations of the human mind, like the orderliness found in nature, are not "self-validating" but are instead dependent upon some external agency more highly ordered and powerful than man. Only in terms of such an agency can the "boundary conditions" that define and delimit the mind and the material world be explained.

As far as science is concerned, the materialistic evolutionist attempts to explain the entire universe in terms of itself, i.e., by purely physical/chemical interactions. Not only does this approach fail to explain much of reality (morphology for example) but more importantly such reductionism is tautologous, and in that sense, irrational. As J. B. S. Haldane succinctly put it:

> "If my mental processes are determined wholly by the motions of atoms in my brain, I have no reason to suppose that my beliefs are true . . . and hence I have no reason for supposing my brain to be composed of atoms."[51]

This irrationality actually constitutes a threat to modern science, for it robs science of the metaphysical foundation needed for its validation.[52, 53]

The theistic evolutionist's position is also untenable. Though relying on God as the explanation of ultimate origins, he tries to validate the broader, more powerful explanation of Scripture in terms of the narrower one of so-called science. Actually, it is an attempt to evaluate and re-interpret the traditional concept of origins in terms of a secular scheme of purely human thought, the product of men devoted to an anti-God ideal. This position is as irrational as the atheist's with the additional fault of tending to promote the beliefs of the latter while claiming belief in Scripture.

The creationist perspective, on the other hand, is fully rational *precisely* because it relies ultimately upon validating statements external to science, namely, divine revelation. It is thus both logically and theologically consistent. This allows the creationist to determine the consistency or meaningfulness of science and to discover other properties which cannot be determined strictly scientifically, e.g., the problem of origins. The creationist recognizes that science is essentially incomplete and must be based on something more profound. Therefore, creationism is the preferred frame of reference within which science should be conducted.

More generally, all closed systems of thought, i.e., those which refuse to recognize man's inherent limitations and contingency, as well as that of the material world, upon a superior, external agent are also tautologous. Attempts to find "self-validating" explanations for such fundamental properties of human nature as language, reason and identity are doomed to failure. They are exercises in futility as the human mind turns

ever inward and undergoes a kind of mental entropy, decaying to formlessness, ignorance and irrationality.

The issue of origins is not a matter of neutrality or indifference because man is not an indifferent or neutral being. Men make commitments which deeply affect their lives. C. S. Lewis rightly noted that man tends to worship whatever is considered eternal and self-existent.[54] If nature is self-existent and eternal, then nature will be worshipped. If nature requires a Maker, then He will be worshipped. Origins concepts are thus inherently religious for they help determine the object of man's worship. One is either for the Christ of creation or one is most definitely Christ's enemy. The consequences of the commitment are irretrievably permanent. There is no middle ground.

Only by recognizing man's limits and hence his necessary dependence upon something greater than himself can a satisfying and realistic view of life and the natural world be attained. This implies, among other things, the admission that the world is contrived, purposeful, designed and hence must have a Contriver, Purposer, Designer. It is fully reasonable to expect that this same Creator has revealed Himself to man, and for the Christian, this involves recognition of the Word, the Logos, Who in the beginning created and formed all things. He alone is self-existent, self-defining, and without limit;[55] the "Form of Forms." He is the source of the "profoundly informative intervention" which constitutes the very nature of things. A return to such a belief means a return to a theistic and theocentric view in both science and culture generally. If broadly adopted, it would have the profoundest impact on the future of Western society. To lead the way in this direction is the task of the creationist.

Appendix A:
Statistics and Thermodynamics

Richard Weaver once observed that sometimes people outside a discipline are needed to solve its problems. He writes:

> "It requires an unusual degree of humility to see that the solution to our problem may have to come from someone outside our number, perhaps from some naive person whose advantage is that he can see the matter only in broad outline."[56]

Perhaps such an individual brings the "broader issues and concerns" to bear upon the matter, to borrow Weisskopf's wording. An example of this is lawyer Norman MacBeth's recent work in the area of biology and his evaluation of the "Modern Synthetic Theory" which was an attempt at a synthesis of classical and neo-Darwinism. In a similar fashion economist Nicholas Georgescu-Roegen has presented a critical evaluation of the synthesis of classical and statistical thermodynamics.[57] Just as creationists have used Norman Macbeth's work, so too, they may benefit from Georgescu-Roegen's work.

In his analysis Georgescu-Roegen points out that Ludwig Boltzmann, one of the chief architects of statistical mechanics or the kinetic theory of gases, believed in eternal cycles of the universe. This belief did not allow him to accept the implication of classical thermodynamics, namely, that the universe was moving toward a definite end. To circumvent the problem, Boltzmann advocated the stochastic approach, believing that if enough time were available even the impossible would happen sooner or later, including the spontaneous reversal of entropy which would allow universe to retrace its steps in never-ending cycles.[58]

Georgescu-Roegen discusses the mathematical and conceptual problems involved in placing classical thermodynamics on a probabilistic basis. This includes a consideration of the meanings of randomness and order and especially what he believes to be the logical contradictions of the stochastic approach. He argues that statistical mechanics has no empirical basis and that the classical approach is the only legitimate one. He also maintains that the entropy law is not reducible to mere molecular motion and that there is no way to bypass it.

While creationists will not agree with everything he says, the insights should prove helpful in dealing with thermodynamics and origins. Since the Society is dedicated to the task of "re-evaluating science" from a creationist perspective, this could be a fruitful examination by those creationists interested in thermodynamics. This is especially so since evolutionists frequently cite infinitesimally small probabilities as arguments that evolution could have happened by chance.

In addition it should also be observed that statistics and probability theories are idealizations of the real world and therefore depart from reality to some extent. One such departure is the concept of infinity which is a statistical convenience for ease of calculation. No population or sample is *literally* infinitely large. Evolutionists can no more appeal to this than an engineer could hope for a 100% efficient machine by appealing to Carnot's ideal heat engine, or an economist could hope for perfect competition by appealing to some of the idealistic assumptions of a free market. These are mental constructs which are needed to serve as points of departure for analyzing the *real* world but ought not to be confused with it.

Furthermore, probabilities are validated by empirical observation or as Georgescu-Roegen put it:

> "Only factual evidence can endow a probability computed by a paper-and-pencil operation with physical significance."[59]

For example, it is known that all people die even though the exact time of death or age for any particular individual is unknown, but this can be treated statistically. No one, however, would be justified to conclude that because of the stochastic treatment perhaps people will live forever or that the trend is reversible. Perhaps this is what Dampier had in mind when, speaking of stochastic thermodynamics, he declared that it is a form of "statistical determinism" even though individual uncertainty remains.[60]

Even the choice of a statistical distribution must be done in a non-probabilistic manner. Only after the choice has been validated, can probability statements be made. But the resulting probabilities cannot then be used to validate (or invalidate) the choice of distributions from which they were derived. Probabilities are not self-validating. The specific form of a density function is determined by constants (parameters of the distribution law). In other words the prob-

abilist and the statistician must assume an orderliness in nature before their probability calculations have any meaning. The certainty of the overall trend must be established before probability can be considered. Ultimately disorder and uncertainty are intelligible only in the larger context of order and certainty. Otherwise, the reasoning is circular as Georgescu-Roegen observes:

> "And if we accept the other prevalent view that the Entropy Law means only that 'the higher the entropy, the greater is its probability of occurring' — 'entropy' meaning 'thermodynamic probability' — then instead of a law of nature we hold only a tautological application of the definition of probability."[61]

He later concludes,

> ". . . the irreversibility of the entropic process is not a manifestation of chance."[62]

C. S. Lewis also spoke to this problem in terms of uniformity of nature:

> "Can we say that Uniformity is at any rate very probable? Unfortunately not . . . Unless Nature is uniform, nothing is either probable or improbable. And clearly the assumption which you have to make before there is any such thing as probability cannot itself be probable."[63]

And he adds:

> "Probabilities . . . hold inside the framework of an assumed Uniformity of Nature. . . . No study of probabilities inside a given frame can ever tell us how probable it is that the frame itself can be violated."[64]

What, then is the probability of an event that has never been known to occur, such as a spontaneous decrease in entropy resulting in life? As far as a scientist is concerned, in the absence of any supporting observations, not to mention its inconsistency with what is known about the natural world, the probability is quite literally zero.[65] Until some such event does occur, no matter how long the wait, the calculation of non-nul probabilities is physically meaningless.

Appendix B: The Non-Neutrality of Science

As indicated previously, the scientist is dependent upon language and language is not a neutral system of forms which the positivist can use to evade metaphysical commitment. Language is inherently teleological. The scientist cannot describe all phenomena without using words which imply purpose or have some emotional loading.

Evolutionists Baker and Allen confess as much when they state they must occasionally "slip" and use teleological expressions. For example, a cell takes in glucose "in order to" increase its energy supply.[66] The phrase "in order to" is regrettable to them because it suggests purpose. But the nature of language makes it impossible to completely avoid teleological expressions.

The empirical content of science also makes it difficult to be metaphysically neutral. As indicated above, morphology is the embodiment of function which is the mode for the realization of end (purpose). Morphology can only be explained in terms of purposeful design. As Jaki observes:

> "It is that perspective of [morphological] wholeness which reveals purpose and ultimately permits a genuine reference to the Creator, . . ."[67]

And Polanyi comments that attempts to eliminate the purposive character of physiological functions by considering them mere events that happen to be beneficial to the organism without actually, purposefully serving this benefit, will not work:

> "But the fact remains that a process can be regarded as a biological function only if it does benefit the organism. This remains its essence, as much as it is the essence of a machine to serve a purpose acknowledged by its designer."[68]

As a result of his empirical studies, then, the scientist is driven, sooner or later, to recognize the explanatory value of teleology. But since teleology enjoins from above it is also profoundly metaphysical.

Baker and Allen confront this problem again when they admit:

> "Most, if not all, animal behavior is goal-oriented."[69]

They add in a footnote, however:

> "Though the statement is not teleological, what it asserts *is*, since teleological means 'goal-oriented.' There is a sticky semantic problem here. Evolution is not teleological, because those organisms that survive, survive, and that's all there is to it. Certain forms of behavior, on the other hand, are teleological because of their goal-oriented nature. . . . In an effort to avoid the connotation that an animal 'knows' that reaching the goal will increase the probability of its own survival and that of its descendants, the term *teleonomical* has been suggested."[70]

Here is a combination of the linguistic and the empirical problems. Linguistically, the scientist cannot find a word which isn't tendentious: "goal-oriented," "teleological," or "teleonomical," all suggest the same thing, namely, purposive action. Empirically, the scientist has observed that animals do indeed behave in purposeful ways. The refusal of the materialistic evolutionist to recognize purposeful activity in nature (without making profuse apologies) is not without its own purpose. The goal is to suggest that man's life is also purposeless. And so the teleological quality of both language and nature forces the natural scientist, one way or another, to ultimately make a non-neutral metaphysical commitment.

Such commitment, of course, can cause divisions among men and the problem becomes how these divisions can be resolved. Weaver indicates two ways: (1) by developing a complacency which makes possible the ignoring of contradictions and (2) by referring to first principles, which finally will remove the difference at the expense of one side.[71]

The creation/evolution debate has forced both sides to refer to basic principles about the nature of science and religion. Each side tries to establish itself at the expense of the other. Even the balanced treatment of the origins problems in the public school science classroom is, in this sense, non-neutral for it requires the admission that evolutionism is not the only valid

frame of reference within which to conduct science. The presentation of both sides can occur only at the expense of the prestige and reputation of evolutionism.

Theistic evolutionists, on the other hand, have sought the first solution, i.e., the establishment of harmony by developing a complacency which makes the ignoring of contradictions possible. They seek the excluded middle ground and are, therefore, not welcomed by either creationists nor atheistic evolutionists. They are doomed to play the role of odd-man-out. But the very complacency over contradictions, theologic or scientific, is a kind of emasculation which renders their position impotent. This means it has the effect of working with atheistic evolutionism. By not opposing it, they promote it, no matter how much intellectual arm-waving they may do.

References

[1]Nagel, Ernest and James R. Newman, 1958. Gödel's proof. New York University Press, New York. All other references to the proof are also taken from this source.

[2]Weisskopf, V. F., 1977. Limits and frontiers of science. *American Scientist* 65(4):411.

[3]Nagel and Newman report that Goedel apparently believes that an adequate definition of mathematical or logical truth can be supplied only by a thoroughgoing philosophical "realism" of the ancient Platonic type. This involves the concept that mathematical objects are disembodied eternal forms which dwell in a realm accessible only to the intellect, i.e., solely to the searching mind of the mathematician. See Nagel and Newman, op. cit., pp. 99-100. Note especially footnote 32.

[4]Polanyi, Michael, 1967. Life transcending physics and chemistry. *Chemical and Engineering News*, August 21, p. 61.

[5]*Ibid.*, p. 59.

[6]*Ibid.*, p. 64.

[7]*Ibid.*, p. 59.

[8]*Ibid.*

[9]Lammerts, Walter (editor), 1970. Is DNA merely a material cause? Why Not Creation?; Baker Book House, Grand Rapids, Michigan, pp. 290-298.

[10]Armstrong, Harold, 1978. Thermodynamics, energy, matter, and form. *Creation Research Society Quarterly* 15(2):119-121. See especially p. 120.

[11]Boylan gives another example of the logical difficulty evolutionists face in accounting for the origin of living forms or "systems" in terms of themselves. Such scenarios usually include the very components or processes which need explanation, e.g., photosynthesis: "Obviously, a *necessary* component of a system cannot be called upon to initiate the system itself. The development of order by photosynthesis using energy from the sun is circular reasoning because it assumes the desired result. To develop complexity in terms of living, functional systems of complex molecules requires . . . a source of ordered energy NOT resident in the system itself." See Williams, Emmett L. (editor), 1981. The development of order. Thermodynamics and the development of order. Creation Research Society Books; Norcross, Georgia, p. 44.

[12]Weaver, Richard M., 1953. The ethics of rhetoric. Henry Regnery Co., Chicago, p. 31.

[13]*Ibid.*, p. 193.

[14]Weaver points out that Socrates, the great dialectician (logician), was brought to trial to justify his dialectics. Socrates, however, presented his usual arguments to the Athenians, i.e., he tried to validate his dialectics by using dialectics. Something more was needed: "Unless [the dialectician] is sustained by faith at one end or the other – unless he embraced something before he began the dialectical process or unless he embraces it afterward – he remains an unassimilable social agnostic." See Weaver, Richard M. Visions of order, 1964. Louisiana State University Press, Baton Rouge, (in) *Omnibus* Volume 6; Conservative Book Club, New Rochelle, New York, p. 225.

[15]Lewis, C. S., 1947. Miracles: a preliminary study. Macmillan Publishing Co., Inc., New York, p. 23.

[16]Or, to use Gilson's expression, one must recognize "the paradoxical experience of the unintelligibility of intelligibility." See Jaki, Stanley I., 1978. The road of science and the ways to God. University of Chicago Press, Chicago and London, p. 259.

[17]Bass notes there is evidence suggesting that consciousness, while real, is nevertheless non-physical. He also states von Neumann's proved and accepted theorem shows that the " 'hidden variables in quantum mechanics can never be measured'." Would this not suggest that the human mind studying itself can never fully comprehend itself? See Bass, Robert W., 1976. Quantum psycho-physics. *Creation Research Society Quarterly* 12(4):215-216.

[18]Lewis, *op. cit.*, pp. 27-29.

[19]*Ibid.*, p. 7.

[20]Wilhelmsen, Frederick D., 1980. Modern man's myth of self-identity. *Modern Age* 24(1):44.

[21]*Ibid.*

[22]*Ibid.*, p. 46.

[23]Williams, Thermodynamics, *op. cit.*, pp. 23, 29.

[24]Wightman, William P. D., 1953. The growth of scientific ideas. Yale University Press, New Haven, p. 430.

[25]Georgescu-Roegen gives the following interesting observation: "And even the founder of cybernetics protested that 'information is information, not matter or energy' . . ." See Georgescu-Roegen, Nicholas, 1971. The entropy law and the economic process. Harvard University Press; Cambridge, Massachusetts; p. 406.

[26]Armstrong seems to suggest something similar in his paper on form and thermodynamics. See Armstrong, *op. cit.*, p. 121.

[27]This qualitative, macroscopic dimension of entropy may be the reason that an entropy flow meter has not been forthcoming. How can the loss of form or order be measured over time (ds/dt) as "flowing"? Both Williams and Georgescu-Roegen comment on the non-existence of any "entropometer." (The latter compares it with the inability of physicists to give pointer-readings to the quality of "hardness".) See Williams, Thermodynamics, *op. cit.*, pp. 91-92, 95, 98, and Georgescu-Roegen, Entropy law, *op. cit.*, p. 101.

[28]Williams, *op. cit.*, p. 94.

[29]Lewis, *op. cit.*, p. 157.

[30]Georgescu-Roegen, *op. cit.*, p. 202.

[31]Jeans, Sir James, 1930. The mysterious universe. The Macmillan Company, New York, p. 154.

[32]Lewis also implies the necessity of a beginning when order was impressed upon nature when he writes: ". . . A Nature which is 'running down' cannot be the whole story. . . . If a Nature which disintegrates order were the whole of reality, where would she find any order to disintegrate?" See Lewis, *op. cit.*, p. 157.

[33]Durbin, Bill, 1982. A scientist caught between two faiths. *Christianity Today* xxvi(13):15.

[34]Timmerman, John H., 1980. The making and meaning of myth. *Modern Age* 24(2):182-183.

[35]Jeans, *op. cit.*, p. 155.

[36]Jaki, Road of science, *op. cit.*, p. 296.

[37]Williams, *op. cit.*, pp. 99-100.

[38]*Ibid.*, p. 94.

[39]Weaver, *op. cit.*, p. 190.

[40]Weaver, Richard M., 1948. Ideas have consequences, University of Chicago Press, Chicago. Pp. 158-159.

[41]*Ibid.*, p. 165.

[42]Weaver also considers the use of ultimate and uncontested terms in modern society. One important category of such words he calls "god terms," i.e., words which evoke high emotions and serve to validate all other things. In this secular age the god term is "progress": "This seems to be the ultimate generator of force flowing down through many links of ancillary terms. If one can 'make it stick,' it will validate almost anything." Weaver. Ethics of rhetoric, *op. cit.*, p. 212.

[43]Oller, John W., 1981. Words: Genetic and Linguistic Problems for Evolution. *Impact* (#92, February), p. IV.

[44]Jaki, *op. cit.*, p. 226.

[45]Weaver, Ethics of rhetoric, *op. cit.*, p. 190.

[46]Weaver, Ideas have consequences, *op. cit.*, p. 157.

[47]Scripture indicates that God, by means of His Word, produced and sustains the material world (John 1:1-3; Heb. 1:3). In this connection Sir James Jeans offers an interesting comment: "If the universe is a universe of thought, then its creation must have been an act of thought. Indeed the finiteness of time and space almost compel us, of themselves, to picture the

creation as an act of thought. . . . And yet, so little do we understand time that perhaps we ought to compare the whole of time to the act of creation, the materialisation of thought." Jeans, Sir James, 1930. The mysterious universe. The Macmillan Company, New York, pp. 154-155.

[48]Weaver, Visions of order, *op. cit.*, p. 228.

[49]Weaver, Ideas have consequences, *op. cit.*, p. 25.

[50]Regarding the notion that human language originated or evolved from animal "language" Noam Chomsky remarks: ". . . a careful look at recent studies of animal communication seems to me to provide little support for these assumptions. Rather, these studies simply bring out even more clearly the extent to which human language appears to be a unique phenomenon, without a significant analogue in the animal world. . . . "In fact, the processes by which the human mind achieved its present stage of complexity and its particular form of innate organization are a total mystery . . ." Thompson, William Irwin, 1971. At the edge of history. Harper and Row Publishers, New York, p. 188. Subsequent research underscores the above statement.

[51]Lewis, *op. cit.*, p. 21. He concludes: "Hence every theory of the universe which makes the human mind a result of irrational causes is inadmissable, for it would be a proof that there are no such things as proofs. Which is nonsense."

[52]Elsewhere, he also notes the limitations of science: "Christian theology can fit in science, art, morality, and the sub-Christian religions. The scientific point of view cannot fit in any of these things, not even science itself." Lewis, C. S., 1980. The weight of glory. Macmillan Publishing Company, Inc., New York, p. 92. (Original copyright 1949.) Revised and expanded edition.

[53]Another illustration of how the evolutionist invalidates his own argument comes from his view of reason and logic. Evolutionary economist Ludwig von Mises writes: "Nothing suggests that logic as we know it is the last and final stage of intellectual evolution. Human logic is a historical phase between prehuman nonlogic on the one hand and superhuman logic on the other hand. Reason and mind, the human beings' most efficacious equipment in their struggle for survival, are embedded in the continuous flow of zoological events. They are neither eternal nor unchangeable. They are transitory." von Mises, L. 1949. Human action. Henry Regnery Company, Chicago, pp. 33-34. But if reason is so ephemeral, is there any realistic hope of knowing the truth? For example, how can an evolutionist know that his present evolutionary view is valid or that it will not be invalidated in the future? He thereby undermines his own case.

[54]Lewis, *op. cit.*, p. 66.

[55]The existence of non-self-validating entities logically requires the existence of a self-validating entity. It is in the one unlimited, uncreated Being that the limited and created world has any meaning. Jaki writes: "The metaphysician knows, of course, that the totality of perfections, which entails the exclusion of all singularities, is reserved for the noncreated Being for whom the capability of creating things, that is, concrete singularities, is exclusively reserved. The only being he cannot create is his infinitely perfect being with no trace of those singularities which are always signs of existential limitations that in him alone find their ultimate explanation." See Jaki, *op. cit.*, p. 273.

[56]Weaver, Ethics of rhetoric, *op. cit.*, p. 207.

[57]See reference 25.

[58]Speaking of statistical thermodynamics, Jaki summarizes Max Planck's view: "True, the theory permitted Boltzmann to conjure up cosmic processes running backward, but as Planck pointed out, they were not scientifically meaningful because they could not refer to *our* universe taken as a whole and in the broadest sense." He also presents Eddington's view of the matter: ". . . Eddington made shambles of the major counter-argument based on the idea of statistical fluctuations. He termed it a blind alley to assume that since there is an infinite time ahead, very rare but sufficiently large reversals in the increase of entropy should take place with the result . . . that the present meeting of the Mathematical Society should occur by chance an infinite number of times while time flows on endlessly." See Jaki, *op. cit.*, p. 176. And, respectively, Jaki, Stanley L., 1974. Science and creation. Science History Publications, New York, p. 339.

[59]Georgescu-Roegen, *op. cit.*, p. 165.

[60]Dampier, Sir William Cecil, 1948. A history of science and its relation with philosophy and religion. Cambridge University Press (4th edition), Cambridge, England, p. 230.

[61]Georgescu-Roegen, *op. cit.*, p. 166.

[62]*Ibid.*, p. 169.

[63]Lewis, Miracles, *op. cit.*, pp. 105-106.

[64]*Ibid*, p. 106.

[65]Nobel Laureate E. P. Wigner does present a calculation from group theory to show that the probability of a self-reproducing system occurring by chance is indeed zero. See Wigner, Eugene P., 1967. Symmetries and reflections. Indiana University Press, Bloomington, pp. 203-206.

[66]Baker, Jeffrey J. W. and Garland E. Allen, 1971. The study of biology. Addison-Wesley Publishing Company, Reading, Massachusetts, p. 729.

[67]Jaki, Road of science, *op. cit.*, p. 286.

[68]Polanyi, *op. cit.*, p. 59.

[69]Baker and Allen, *op. cit.*, p. 746.

[70]*Ibid.*

[71]Weaver, Ideas have consequences, *op. cit.*, p. 154.

WHAT IS SCIENCE?

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The nature of science is investigated. It is concluded that science is a tool, a means of learning about reality. Any pretensions beyond this, made in the name of science, should be discounted.

The word "science" is used for many reasons and purposes. Among these are to imply an idea is proven, a concept is based upon empirical data, or a conclusion is based upon objective observation. The word is also often currently used as a catchword to lend credibility and authority to some conclusion. In advertising, statements such as "our brand has been scientifically proven to be superior to brand y" or "in a recent scientific study, more people preferred Mitz milk than ordinary milk," are often heard.

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So-called "religion-science" conflicts, such as the recent "creation-evolution" controversy, often include claims that evolution is "science" and therefore the implications are that evolution is more true and valid than the "non-scientific" theories, being supported by the facts and empirical data. The other side, or "creationism," it is claimed, is "religion" and therefore not supported or supportable by testable empirical data, etc. As to this problem Hardin notes:

> The polarization "science versus religion" is largely in the eyes of the beholder. Unfortunately a perceived polarization can breed a real one. By