Theistic Alternative

The belief that God created life is very ancient and is traceable to the Hebrew traditions regarding first origins. In fact the position that God created life on earth was long held by scientists through the centuries until popularization of the philosophy of naturalism. Essentially, the belief in some sub-microscopic coming together of sub-molecular units of matter, or the belief that life came to the earth from space, are *substitute* concepts to the long held belief that God created all life— the idea of the theistic origin of life on the earth.

Actually the theistic concept of the ultimate origin of life, in twentieth century science, is a viable and fully rational belief. How rational is the belief that presently known complex cellular life came into existence, once upon a time, after some chance combination of sub-molecular units of matter as a result of supposed, unknown natural processes?

Thus, science teachers, who are responsibly concerned about the integrity of science teaching, can explain to students that a belief in the Eternal Creator as the source of plant and animal life, including human beings, on the earth is wholly logical, rational and in keeping, in turn, with the cause and effect assumption so fundamental to careful, proper scientific thinking. Many scientists, today, accept that the Creator God was the First Cause. Thus theistic beliefs about the ultimate origin of life on the earth are not in any way anti-scientific.

Students should recognize that modern scientists utilize elemental materials at their disposal to prepare a certain mixture in their experimental equipment. *But whence cometh the elemental materials?* Do reductionist biochemists create elemental matter? No! Do reductionist biochemists create life? No! Pasteur and many leading biologists who founded the biological sciences believed that the Creator God created matter. For them, the Creator God was the First Cause of life on the earth; and this is true, once again, of a minority of theistic biologists.

The Theistic Framework

Furthermore, the instantaneous chemical reactions in the biologists' experimental apparatus (which are *not spontaneous* chemical reactions, since scientists intervene externally to select "ingredients") may properly be associated with the sustaining acts of God, the Almighty. Hence the theistically oriented biologist may most rationally maintain, in candid responsible manner, that the instantaneous chemical reactions detectable in scientific experiments regarding the *synthesis* of amino acids are associated conceivably with on-going, sustaining actions of the Providential God in whom he or she believes. Again, in maintaining the integrity of proper academic freedom of *all* students and *all* teachers, these aspects of creation/evolution discussions should be made evident.

In short, the evidence for God— the Sustainer— is verily all around the theistic biologist. Truly, he or she is without excuse in pointing to possible evidences of the Creator's activity in the chemical reactions that are *not seen* involving the ingredients that are *seen.* Therefore, the scientist who describes regularities of naturally occurring objects and/or events in expressions of various scientific laws, natural laws (or laws of nature), may very well be describing the way God acts as He sustains and maintains His creation.

EXTRAPOLATIONS IMPLICATIONS

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Received 10 October 1984; Revised 12 December 1984

Abstract

Scientific and engineering data are taken within the constraints of physical, biological and chemical systems. The validity of the data is further limited to the adequacy of the sampling regime, and both repeatability and accuracy of the measurement process. Models built from such data ought to be bounded by these conditions and extrapolation from the models should show healthy scientific restraint and reasonable justification. Those which do not, often lead to incorrect decision-making and mislead others either intentionally by disregarding boundary conditions or facts, or unintentionally by carelessness. Evolutionary theorists are guilty on both counts and creationists should learn from this and be critical of their own data extrapolations.

Introduction

Whenever an investigation of a system is undertaken and a researcher begins to select samples for test and data collection, there are several questions that first must be asked. What is the purpose of the experiment? Should I take a stratified sample or a random sample? How much uncertainty can I afford? (That is: how much risk am I willing to take?) Questions like these can lead to a specially planned experimental design rather than haphazard trials which are costly in terms of time, materials, and funding and which may be totally insensitive to critical interactions between factors of interest.[1] Usually, some kind of random sampling and order of testing is set up to ensure that: a) the sample is representative of the population from which it was taken, and b) unforeseen bias such as equipment drift or environmental changes do not unduly affect any one segment of the experiment. A simple example of a nonrepresentative sample would be if a new drug were injected into a group of male pre-medical students to assay its effects on human physiology. Here no account is taken of the restricted age, sex, race, geographic location, or current state of health and therefore any results would hold only for male pre-medical students in the age, health, and geographic range included in the experiment. Another important element is the size of the sample, for this determines the sensitivity of statistical comparisons and the confidence which may be assigned to experimental results.

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Examples

By way of example look at the graphical distribution of weight loss in milligrams between new and old metallic alloy samples in Figure 1a and 1b. In this hypothetical experiment, the researchers were attempting to develop a new plating alloy with increased resistance to chemical etching. Because metals making up the new alloy were expensive the investigators used only a very small number of samples of the new alloy compared with the old; consequently the results from 1a are difficult to interpret and may even lead to the conclusion that the new alloy has more resistance to corrosive chemicals than the old alloy. In 1b however, new results emerge. There appears to be a decrease in the level of resistance to etching in the new alloy (where more of the metal was dissolved in the etching solution). The only difference between the two results is sample size. Due to a smaller sample size used in 1a, chance sampling fluctuations masked the alloy effect. There is more to sound experimentation and analysis than just grabbing a few samples and running a quick statistical test.

Of course this discussion applies to Creation scientists and evolution scientists alike, and while I am more apt to question assumptions and interpretations of scientists from both camps, rather than their methods or analysis, this reminds me of a very weak case built up by George Gaylord Simpson in his book, *The Major Features of Evolution.*[2] In an attempt to demonstrate the microevolution of certain physical characters of *Kosmoceras* ammonites he took samples from different depths (which he assumed must represent different ages) and measured them. He then used regression analysis to test whether or not the parameter, terminal diameter, changed with depth (age) of the sample. What was amazing was that the coefficient of determination (r^2) for the best case was only 0.22. This roughly indicates that up to 78 percent of the assumed theoretical model was due to something other than the relationship between depth of sample and terminal diameter. Rather than present this interpretation, Simpson merely published that his relationship was significant by plugging the results into the regression routine, calculating the correlation coefficient, r, and looking into a table to see if it was larger than some expected value for the sample size used. He did not publish a more rigorous model analysis such as residual plots or tests for the significance of the slope and intercept, and he did not bother with the fact that r^2 indicated a poor model fit. Confidence envelopes on regression models with such poor model adequacy could be so wide as to prove useless for all practical purposes. Even if the model were a good fit, this would not prove that there was a genetic evolution taking place. A simpler model would state that there was differential sorting of ammonites based on shell diameter, among other things, during the sedimentation process.

Dr. Duane Gish confronted an eminent British evolutionist on a similar issue. This scientist had included in his evolutionary textbook, an alleged example of observed evolution. The example claimed that there was an evolutionary trend in shell coiling from one

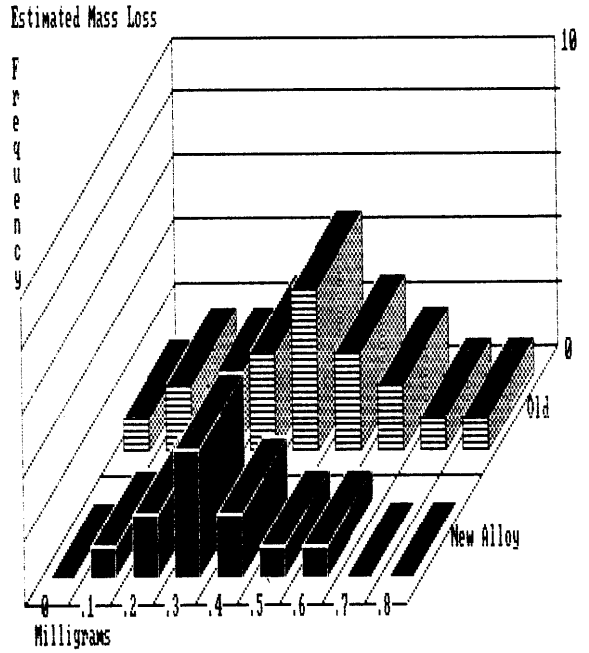
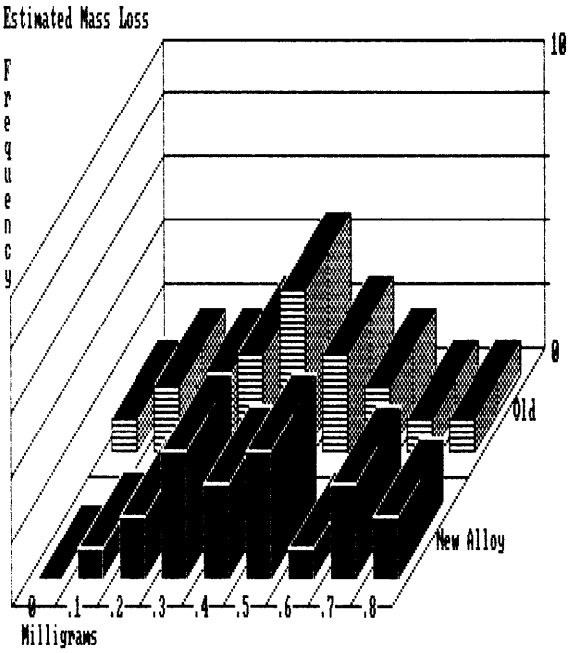


Figure 1(a). Results of a hypothetical experiment in which samples of two different metallic alloys were weighed, immersed in etching solution, and reweighed. Resistance to etching was determined by how much of the alloy was dissolved in solution. The higher the mass loss the less resistant the alloy is to etching. Insufficient sample size in this trial may lead to false conclusions due to "sampling error" (the samples do not adequately represent the true response of the population from which they were taken).



(b). Results of the same alloy experiment as shown in (a), with one notable difference. In this trial equal sample sizes of both alloys were used leading to quite different conclusions than those of the previous trial. Whether or not the new alloy had significantly more metal etched away (as the figure seems to indicate) would have to be determined by an appropriate statistical test since the distribution of mass loss, shown in the figure is not sufficiently different to tell otherwise. However, the total amount of mass loss for all samples (.92 milligrams for the new and .77 milligrams for the old) also support this conclusion.

direction to another and he retained this example in his textbook for college students despite the fact that it had been demonstrated that the coiling was related to the water conditions in which the invertebrate happened to find itself not due to phylogenetic trends. This is similar to the pitfalls outlined by Professor E. H. Andrews in his book *Is Evolution Scientific?*. Dr. Andrews cautions us that we must remember that theory is something other than fact. It is a mental construct, a model used to interpret facts. He gives the following illustration. Heavy smokers have a higher incidence of lung cancer than non-smokers. This leads some to the theory that smoking causes cancer. However a valid alternate theory is that whatever causes a heavy smoker to be dependent on smoking also predisposes them to be more prone to cancer or to the influence of carcinogens. The FACTS are identical for both theories, only the interpretations differ.[3]

Collecting of Data

Of utmost importance to the integrity of an interpretation is the validity of the data gathering process. By this I mean that the measurement process must be demonstrated to be in a state of statistical control.[4] Furthermore accuracy (how close it is to a given value, and precision, how well it repeats the same set of measurements) should be determined and specified, allowing workers to assess the usefulness of results. (The practice of dating events in history to the nearest few million or billion years, after discarding undesirable values, is really stretching credulity.) An acceptable way of demonstrating control, accuracy, and repeatability is to take repeated measurements on a set of items in the range of interest over time and then to plot averages and ranges of each subset of measurements as in Figure 2. An upper control limit and lower control limit are derived statistically from the data set. Points beyond these limits (Figure 3) indicate an out-of-control condition which needs to be corrected and verified before the measuring apparatus can be considered reliable. The conditions under which the data are taken are also very important.

Dr. Melvin A. Cook criticizes much of the carbon-14 dating work on this count.

> What is the justification for applying highly precise, analytical methods in an environment where contamination (by precisely the same isotope being analyzed) is greater by a factor of more than a hundred than the radioactivity-generated product one wants to determine.[5]

The amount of remaining sample, after preparation of the specimen, also brings these dating methods into question. Measurement errors are far more common than researchers are willing to admit, and when measurements vary greatly, a-priori preferences of the scientist or engineer often influence which data will be used and which ignored. (In 1983 I attended a scientific symposium on extinction at Chicagoś famous Field Museum of Natural History where an eminent leader in the field of human evolution openly admitted this fact.) Engineers are often taught to 'throw out' outlying measurements data that do not fit their models even before good evidence of the cause of such measurements has been identified. Bias in recording data may cause misjudgments. For example in recording the results of 1000 weighings, operators showed a definite favor for either a zero or a five as the last digit in the report. A bias was also seen in favor of even over odd numbers.[6] Even in critical areas, lab to lab variations can be quite substantial. This is well documented for such items as radiometric dates (recall how Richard Leakeyś 1470 man was initially dated 220 million years old by the K-Ar method and was redated to a less unacceptable 2.6 million years old).[7]

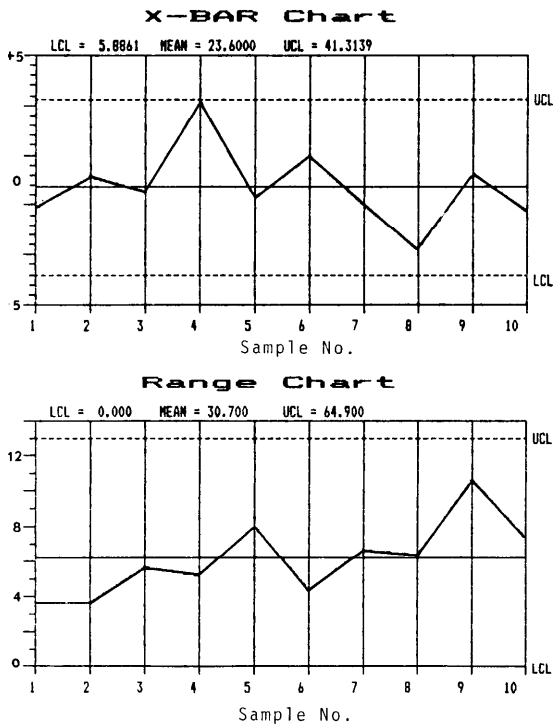


Figure 2. The results of repeated measurements on the same standard materials. Here a sample of five standards in the measurement range of interest were taken and weighed on 10 consecutive occasions (say 30 minutes apart). On each occasion the five readings were averaged, and the range was computed (highest minus lowest). Statistical limits are then computed for variation in averages and ranges using standard formulas. Finally the averages and ranges are plotted on separate charts against these computed limits and against a central line (average of the averages, or average of the ranges). Since all averages and ranges fall within the computed limits we can conclude that the measurement process is under control. (Normally at least 25 consecutive averages and ranges are used to compute statistical control chart limits.)

When all the aforementioned considerations are addressed, we are still left with the task of formulating valid interpretations of the data which means that any extrapolations must be justified within the constraints of the measurement process and the system under study. This is especially true of natural systems which are seldom linear. A recent text in the area of regression analysis puts it this way: "Generally regression equations are valid only over the region of the regressor variables contained in the observed data."[8] The reason for this is that beyond the actually observed levels of each factor— factors being such variables as temperature, pressure, laboratory, etc.— the model, which is only an approximation, may be totally useless. Consider a practical example. An acoustical

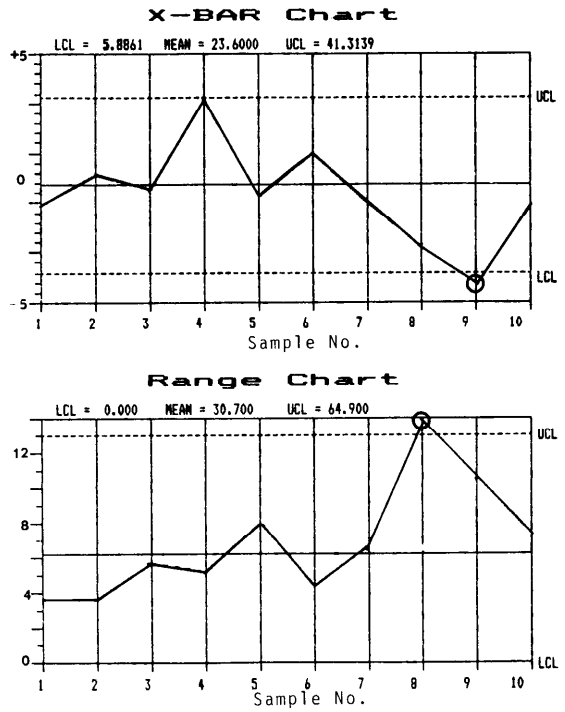


Figure 3. A point is found beyond the UCL (upper control limit) on the range chart for sample number 8. This out of control condition indicates two things: Firstly, that no interpretation of the mean of sample 8 can be made (although it appears to be in control) and secondly, that something has happened to cause an increase in the variability of the measurement process. Until the cause for this is found and eliminated one cannot rely on this process. In sample number 9 the variability is now under control (the equipment had been improperly used), and the level of the results are out of control as indicated by the point below the LCL (lower control limit) of the control chart for averages. This may indicate a drift or improper setting. Whatever the cause, it must be found and identified because the measurement process is unreliable until this is corrected.

engineer takes data on the amplification response of a transducer from 100 Hz to 3000 Hz and plots the data in Figure 4a. If he were to extrapolate this data back to 10 Hz and forward to say 20,000 Hz he might predict unlimited amplification of high frequency signals. Common sense and the laws of physics ought to tell this engineer that unlimited amplification is not probable and that he has not yet reached the limiting frequency level. The actual response curve of the same device from 10 Hz to say 20,000 Hz is seen in Figure 4b.

By the same token Dr. E. H. Andrews charges evolutionary theoreticians (biologians) in this way:

> Secondly, in evolution, one finds the error of extrapolation, and this comes out in two ways. First of all, the observable processes of mutation and natural selection, which can be observed in the laboratory— processes you can actually carry out and see happen and with which there are no real problems or difficulty— have been forced back in time to 'explain' changes of a kind that have never been observed in the laboratory— changes of a magnitude which cannot be envisaged in terms of anything that ever has been observed in the laboratory: . . . The theory of evolution requires the extrapolation of observable things, such as various changes that can be wrought in the fruit fly, on which a tremendous amount of work has been done, to realms and events remote both in time and scale from the area in which the ideas have been validated.[9]

He also charges evolutionists with philosophical extrapolation of the limited biological concept of change to include the whole realm of nature including sociology, and providing extrapolated versions of natural selection to such non-validated areas as chemical evolution.

Another illustration from electronic engineering may provide some clarification, In this case a designed experiment was to be planned and one of the factors to be considered was the magnitude of the current. The preliminary data in Figure 5a indicated that the current could probably be increased until the upper power limit on the instrument was reached (40 watts). However, when more data were taken beyond the 20 amp range a threshold was reached at 30 watts (coded data) which indicated that most of the energy increase due to current increases greater than 20 amps was being dissipated and probably decreasing the life of the instrument. The linear model from 0 to 20 amps was invalid beyond the observed current range as proved experimentally in Figure 5b.

This concept of extrapolation may be the most important objection to the general theory of evolution and to uniformitarian geology voiced by Creation scientists. In other words, where facts are presented, creationists tend to agree with evolutionists (consider microevolutionary changes in gene frequency in the peppered moth *Biston betularia* for instance), but disagree fundamentally in interpretation of these facts, not only because of differences in world view, which creationists tend to admit while evolutionists may try to disguise, but from the scientific view that only models constructed from properly obtained data, not irrationally extrapolated, are valid representations of reality. Dr. Henry M. Morris points out another valid objection to uniformitarianism as does Dr. Andrews. that selecting facts such as measured rates which best suit an apriori model, rather than accepting an overall average or recognizing the existence of other rates, is not objective science.[10] Creationists have also been accused of rejecting all data that indicate an old universe, but it would be more accurate to say that Creation scientists simply emphasize these facts more because they are not aired at all by uniformitarians. Most Creationists with whom I have spoken have indicated that the subject is still open. No evolutionists that I have ever met or read would ever tolerate such openmindedness about chronometric processes!

Let us now turn to a few typical examples from the concepts and models of evolutionary thought which clearly use questionable extrapolations. These will serve to illustrate the kind of objections which Creation scientists are pointing out, but they are not meant to be comprehensive or exhaustive.

CHEMISTRY— The Primitive Atmosphere'

The concept of a primitive reducing atmosphere is not exactly an extrapolation from present data since there is no data from the present atmosphere or geo-

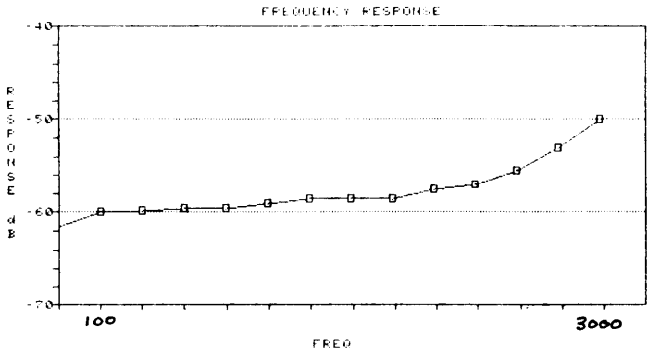
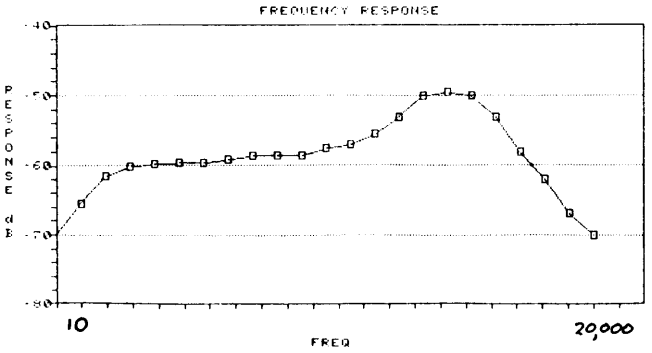


Figure 4(a). The response of an audio transducer to signals of various frequencies is plotted on this graph. Note that the frequency signals chosen range only from 100 Hertz (cycles per second) to 3000 Hertz.



(b). The same audio transducer is tested as before, only this time over a wider range of frequencies from 10 Hertz to 20,000 Hertz. Notice how different the response actually is at the high and low ends (beyond 100 and 3000 Hertz) than we would have predicted by extrapolation from (a).

logical samples which support the idea of extrapolation. An example of extrapolation would be assuming that our present oxidizing atmosphere can be postdicted back in time. There is evidence in the form of 'old' oxidized rocks to support this. To postulate a reducing atmosphere falls more into the realm of wishful speculation or pipedreams than valid or invalid extrapolation. Nevertheless, the chemical evolutionist will devise a clever laboratory synthesis requiring teleonomy (thoughtful planning involving a kind of know-how), specific precursors, controlled conditions, and traps. He will obtain a few small polyaminoacids or perhaps some nucleotides by protecting them from the very conditions that produced them.

He will go on to extrapolate to an unknown primordial soup of his own invention, where his polyaminoacids and other products are now in concentrations sufficient to drive the necessary chemical reactions in the right direction. These concentrations being extrapolated from the tiny yields obtained from the planned experiment. The energy source is also extrapolated from a controlled electric discharge inside glassware apparatus to gigantic lightning bolts containing enough energy to start the desired reactions, but not sufficient enough to damage the products just fractions of a second later! Concerning optically active levo (l-form) amino acids, these researchers are willing to obtain a yield, unstable as it may be, which is insignificantly biased in the favor of the l-form, or not biased at all, and by methods unknown to the laws of chemistry, extrapolate back in time to a soup containing conveniently isolated regions of just the compounds needed in biomolecular syntheses, despite the fact that from a purely chemical point of view there is no selectivity between the two forms (l- and d-) for they are chemically alike. The method of isolation of the l-form is extrapolated from the man-made glass trap or bentonite filter, to natural segregation on a scale unknown to the laboratory chemist. We could show how there is almost no information contained in these laboratory products, yet the evolutionist extrapolates the auto-genesis of information many magnitudes greater without a chemist to plan, guide or control the synthesis.

Probably the most horrendous extrapolation of all is from unstable, physico-chemical, soap-like blobs of compounds with comparatively minute molecular weights and trivial primary structure, which were delicately manufactured in the laboratory, to the incomprehensibly complex biological molecules, (containing not only primary, but also secondary and tertiary structure with coded recognition sites) organelles, membranes, hereditary systems and codes. All this occurs in the absence of enzymatic stepwise, cell-mediated, reactions without the extracellular influences of hormones and other compounds.

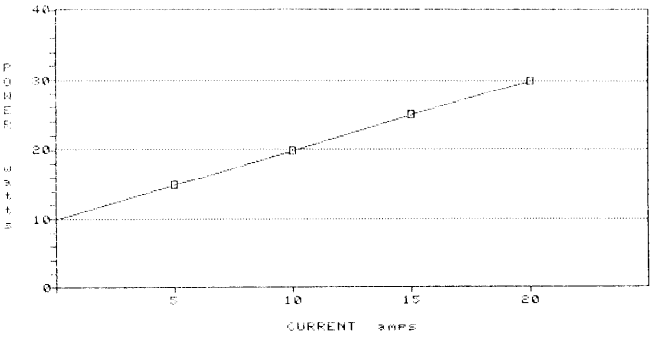
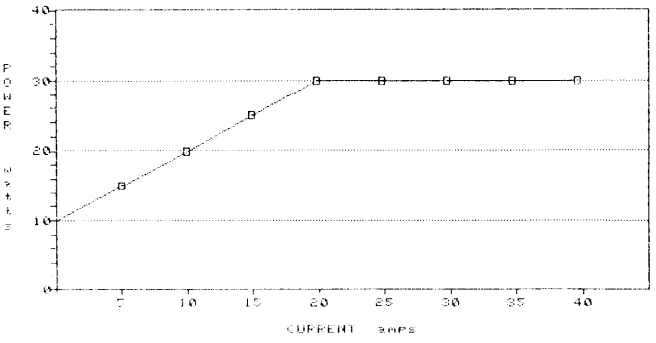


Figure 5(a). An electronic device [power output (Watts)] was chosen for use in an experiment. Since the amount of current (amps) through the device affected the power output, the machine was set at several different current levels (0-20 amps) and the output measured and plotted.



(b). When the same electronic device was actually measured over a wider range of current (0 to 40 amps), the observed power output was very different than predicted by extrapolation from (a). No higher output was measured from 25 to 40 amps than was obtained at 20 amps, and yet a much higher output (50 Watts) would be expected based on the limited results of the preceding plot.

Creationists stagger at this level of extrapolation, recognizing that it is tantamount to nothing short of blind illogical faith when it is realized that the fundamental laws of chemistry taught to college students, such as: mass action, stoichiometry and equilibrium, all preclude such events in the first place in much the same way that the laws of physics precluded unlimited amplification of high frequency inputs by the audio device shown earlier.

Biology

Creationist biologists Lane Lester, Gary Parker,[11] Frank Marsh,[12] and William Tinkle have argued that there exist tremendous amounts of variation in the plant and animal kingdoms, as well as among bacteria and protists. These are recognized by the evolutionist. However the Creationist recognizes that while variability and flexibility exist in the organisms, at the same time a discontinuity exists between fundamentally basic kinds, and this is true from the fossil record of life also. These boundaries are maintained by such mechanisms as reproductive and behavioral isolation including genetic incompatibility and temporal isolation. In both field and laboratory studies these facts are well substantiated.

For example, breeders of livestock and crops have been able to select pre-existing traits such as short sheep legs or high sugar content in beets by continued breeding and separation, much as one would separate all the kings and aces from a deck of cards by continued shuffling and separation. In the laboratory similar work was done by great geneticists like Morgan, and Goldschmidt who worked with fruit flies. What linked all these accomplishments together was an emerging fact that all the traits in question would be selected only so far, i.e., variability could be carried to a point, and then there would be no change just as if a limiting condition had been reached such as that illustrated in Figure 5b. This held for thorax bristles on fruit flies as well as sugar content in beets and a host of other phenotypes. As a matter of fact, artificial selection can actually lead to a weaker genetic system for both organisms and breeder. With wheat, for instance, men have been selecting and screening phenotypes (and therefore genotypes) for so long that a recent article in *Scientific American* explained that modern breeding methods have reduced genetic variability in cultivated wheats and that the best hope for crop improvements is backcrossing with the wild type in order to protect the now impoverished crops from diseases and climatic changes, and to increase the possibility of effecting more improvements in these crops. As the authors state: ", . . the genetic material of the cultivated wheats has already been exploited for breeding purposes almost to its full capacity."[13]

The charge against evolutionists who formulate their elaborate scenarios, is that they failed to halt when obvious natural system constraints or limits were met. Evolutionary scientists postulated unlimited variability and directional natural selection by extrapolating from the limited within-kind variation and directed artificial selection despite biological constraints. This is analogous to an engineer promising unlimited amplification after having seen Figure 4b in the transducer example. In addition evolutionists extrapolated vastly the rate of generation of beneficial mutations from a data set which indicates that while mutation rates may fluctuate they tend towards degradation not integration and creation. In fact Goldschmidt abandoned the concept of gradual evolution caused by induced slightly beneficial mutation guided by natural selection after spending the better part of his scientific career trying to prove it. Running up against the system constraints, Goldschmidt admitted that extrapolation of microevolutionary variation to the gigantic changes required to support macroevolution was inappropriate. (Of course what he offered in return was no better— the 'hopeful monster' route to crossing systematic kind boundaries, which had only contrary evidence from field and lab.)

Dr. Walter Lammerts also demonstrated definite limits to variability in the plant kingdom even when the mutation rates of roses were accelerated in a classic creation science research project.[14] Dr. William Tinkle reminds us that the laws of Mendel and Hardy-Weinberg equilibrium tend to maintain the status quo regarding the gene pool within kinds.[15]

Other areas of illogical evolutionary extrapolation include the concepts of 'protective' and 'warning' colorations which are derived from the observation that some species appear to 'mimic' the patterns and/or colors of others, (In many cases even 'mimicry' is just assumed because it presupposes that the 'model' existed prior to the alleged 'mimic.') It all started when some reports were published that indicated that certain pattern configurations and colors on the wings of *Lepidopterans* (butterflies and moths) protected them in the wild by decreasing predation from birds and other insects. This was developed to the point that biologists had an apriori expectation that certain colors and patterns served functional purposes directly traceable to natural selection and that both 'mimic' and 'model' were to be found in every instance. Unfortunately for these theorists, the situation proved to be much more complex than expected and genetic evidence tended to refute rather than support the idea that such relationships were the result of evolution as pointed out by Dr. Lane Lester.[16]

Wolfgang Wickler showed that some of the components of a pattern were independently controlled by different genes and insisted that this kind of mechanism could only lead to the conclusion that the entire system of genes had to originate SIMULTANEOUSLY in order for the patterns and colorations to be effective. He also stated that in many forms, only one of the sexes will either 'mimic' or 'model' which calls into question the role of natural selection because it apparently works against the males in the cited cases. His most stunning contribution regarding extrapolation is found in the section dealing with the distribution of the 'coral color pattern' in snakes. We find that it bears absolutely no resemblance to the family tree of snakes and is distributed among snakes with different kinds of venom and non-poisonous snakes as well. It is found in noctural and diurnal forms. The distribution of coral type color bands in snakes appears to be a mosaic. Clearly then, indiscriminate extrapolation to warning, protective, cryptic and other functional roles for all these patterns is unwarranted. In fact Wickler states that any attempt at a neat explanation

is doomed to failure.[17] Silberglied, Aiello and Windsor of the Smithsonian Tropical Research Institute demonstrated experimentally that so called protective coloration patterns in *Anartia fatima* — a tropical butterfly served no such function.[18]

An interesting observation regarding the extrapolation of mimicry and homology is that it has caused most biologists to overlook what may prove to be a fascinating research program (the possible verification of a mosaic distribution of traits throughout the biosphere), which is of interest to Creation scientists.[19,20] G. Evelyn Hutchinson, one of Americaś great ecologists, wrote an article in which he recognized the ćmosaic nature'of the environment. This may or may not prove to be related to trait distribution.[21]

Evolutionists assume that single-celled life forms are so simple that multicellular forms evolved from them. As research has advanced in the past 50 years or so, one fact is clear, single celled organisms are anything but simple. They are complex and there is no logical reason to suggest that many-celled organisms evolved from them except that many is a larger quantity than one! The Evolution Protest Movement published a favorite quote of mine concerning this form of extrapolation which reads:

> With the fullest confidence it may be affirmed that the more anything— or any part of anything— is examined, the more complex it turns out to be: there is always a beyond. Nothing is simple. Nothing ever was simple— not even Simple Simon. Simple things did not come first, for the śimple' reason that simple things never existed, except in the imagination of simpletons, wrongly and perversely conditioned.[22]

Consider this quote from within the evolutionary camp:

> Criticism is frequently leveled at biological scientists of all types that they are extending their hypotheses far beyond the point permitted by their data. If one wishes to compile the largest book in biology, it could well be a collection of these accusations, each asserting that such-and-such an author is indulging in śpeculation' or ģuesswork.' Probing into the dark, however, is one of the most important features of the scientific method.[23]

I can add this article to his "largest book in biology" and while science may advance from time to time by speculation, letś not peddle those speculations as facts to be force-fed to undergraduate biology majors!

Geochronology

I will discuss just two areas where extrapolations would appear to be valid, and yet are not carried out by evolutionary geologists. The first deals with the amount of sediment, or dust, found at present, and the rate at which it is known to deposit. One of the most famous is the moon dust. Here meteoric dust is settling at a known rate on the surface of the moon. If we measure the depth of this dust on the surface of the moon and extrapolate the present rate of influx of this dust back in time we could estimate or place an upper limit on the age of the moon. Evolutionists are unwilling to perform this task, at least publicly, because this leads to an embarrassingly young age for the moon which is more consistent with Creationism. An interesting interchange on this subject was recently printed.[24] Estimates of earth sedimentation might have been similarly extrapolated but were not.

Professor Andrews indicates that if present rates of terrestrial sedimentation are extrapolated back, that the depth of sediment that would be expected, if the earth were billions of years old, would be about 500,000 feet. Yet the observed depth is only 1/10th of this. To circumvent this evolutionists extrapolate present erosion rates millions of years back in time attempting to ėxplain'the missing 9/10 of the earthś sediment. This Andrews points out is extrapolation with a vengeance! Since sedimentation is a process, Dr. Andrews questions whether it might not be more appropriate to select some kind of average rate rather than ignoring all rapid rates.

> My argument is, however, that the accepted geological time scale was originally fixed by just such crude assumptions and has not been recalculated to take account of the complexity of the sedimentation process. Indeed, it is doubtful whether any age estimate based upon sedimentation rates would be accepted today if it were advanced for the first time![25]

A second area where some extrapolation may appear to be valid, but is not recognized by most geologists is the rate of certain electromagnetic decay phenomena. Two that come to mind are the speed of light pursued by Barry Setterfield[26-28] and Dr. Tom Barnes' work with the earthś electromagnetic dipole moment. An acceptance of the speed of light decay as a real phenomenon, rather than just an anomaly or simply a trend towards increasing accuracy in the measurement process, is actually quite new and there is not yet agreement even within the Creationist camp. The point to remember is that it is being given serious consideration even by Creationists who have objections to it, but evolutionists are ignoring the data altogether.[29-32]

Dr. Barnes'very painstakingly collected data from studies of the overall dipole moment of the entire earth. When extrapolated backward in time this suggests an upper age limit for the earth in thousands of years rather than millions.[33,34] Since in Barnes' work the data are gathered over a period of about 150 years and extrapolated backwards to only a few thousand years, this would appear to be more valid than extrapolations from radioisotope dating methods where measurements taking only hours are extrapolated out to billions of years. Some examples of this have already been discussed.

One which is of interest to many, is the Grand Canyon area where uniformitarian geologists claim that the Colorado river began carving out this massive canyon 1.8 million years ago and subsequently eroded away the strata, thus exposing the ǒlder' rocks. All this, they claim took place at the slow pace of known river-erosion today. If the river has not been eroding for 2 billion years, and we will never prove it one way or the other— then the Canyon must have been formed quickly. Creationists, of course point to evidence of a rapid cutting of the canyon probably caused by a massive flooding and runoff in a relatively short time. They remind evolutionists that the ćissing' strata from

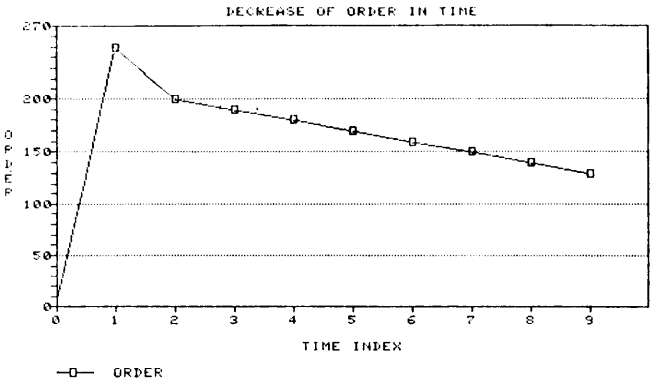
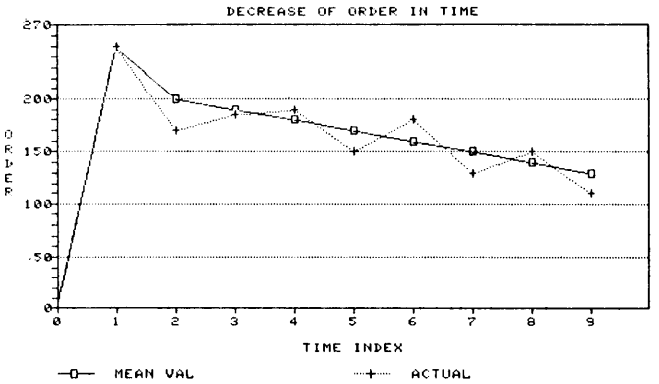


Figure 6(a). Both the order and time scales are arbitrary and no actual measurements were taken. Nevertheless, the model of decreasing order in the cosmos is accepted by both evolutionists and creationists. The line from time 0 to time 1 (the beginning) is extrapolated by either model. In fact, the vast majority of the graph is extrapolated since by either model, measurements are only taken over a very small time range. (Of course for young age creationists, that portion of the line is relatively large in proportion to the rest of the line when compared with the long age supporters, and is therefore 'more' valid.)



(b). This is identical to (a) except that a hypothetical— actual value— line is added to represent local fluctuations in order about the original— mean value— line.

the canyon walls are not missing because there is no evidence that they were ever there! This does away with 200 to 300 million years of uniformitarian time.

Dr. Henry Morris has pointed out that most of the assumptions of uniformitarian dating methods are wildly extrapolated. These include a) closed system— despite evidence that leaching contamination and mixing take place in most systems, b) constant rate— again, despite experimental evidence that rate is affected by environmental factors, c) initial concentration of daughter and parent ratios— regardless of the scientific fact that such an extrapolated determination is impossible to make.

It should be noted that much of the above cited work by Creationists, and other items such as the shrinking sun, earth's heat dissipation, rates of elemental influx/efflux, also represent extrapolations and therefore are subject to the same constraints mentioned at the outset of this paper. Whenever possible, Creation scientists ought to take care to clearly explain any limitations in their models as to both system boundaries and data collection schemes.

A conceptual example is given in Figure 6a where background fluctuations are shown in Figure 6b (i.e.: local increases in order).[35] This kind of a model of order decreasing with time from index one to nine is an acceptable model for both creationists and evolutionists. Both are responsible for telling readers exactly how much of the model is the range of data, such as observed measurements between say four and five, and how much is extrapolated in either a valid or invalid way. The limitation here is the line drawn between index-time zero to one. Incidentally since this figure is only for illustration, neither scale is meaningful, just conceptual. Therefore the slope of the line between zero and one is not meant to represent the process of the beginning of the universe, only that there was such a beginning (increase in order). This is because a relative increase in order or information of this nature has never been observed, so that the origin of that line is clearly not derived from even an extrapolated model. For evolutionists, if they were to deal openly with the issue, they would not postulate the Big Bang 'as if it were a proven fact rather than a derived hypothesis from one interpretation of astronomical data. They do this despite valid alternate interpretations of that data,[36-39] and the inadequacy of the explanation under cause and effect evaluation. The problem is that such a line viewed by most readers, especially students, implies something much more substantial than in fact exists without proper explanations pertaining to its actual origin.

Creationists postulate scientifically that since the system is running down it must have started up 'and since no known mechanism exists that could start it up, according to thermodynamics, that it must have been started up from outside itself by a cause greater than the system. The cause, being outside the system is not measureable, although the nature of the cause can certainly be inferred from the effects (complexity, etc.). Nevertheless, the only way to present the data is to explain that the line from zero to one is inferred not observed, and that it is inferred on a scientific basis from valid laws of physics, although even that is a limited inference since the laws do not tell us about a period preceding them. This is much like the audio transducer response example except that we cannot scientifically extend our model backward beyond one or forward beyond nine by taking more data.

I agree with the British, Australian and some American Creationists, who at this juncture have no reservations about describing the origin of the line up to one as being taken on good authority from revelation rather than human observation. To those who accept it, revelation is fact and it is a far sight better than materialistic guesswork.

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ARCHAEOLOGY AND THE ANTIQUITY OF ANCIENT CIVILIZATION: A CONFLICT WITH BIBLICAL CHRONOLOGY? — PART I

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Received 30 July 1984; Revised 3 December 1984

Abstract

Near the end of the 19th century, A.D., White made the claim that historical and scientific evidence regarding the antiquity of ancient civilizations proved that the Biblical chronology was impossibly short and of no historical value. During the course of the 20th century, historians have been steadily decreasing their estimate of when ancient civilization began. In recent years, several scholars have been working on a radical revision of ancient history which reduces the antiquity of ancient civilization even further. These recent revisions of ancient history may very well prove to eliminate entirely any supposed conflict between Biblical chronology and the antiquity of human civilization.

Introduction

One of the issues in the Creation/evolution controversy is the antiquity of man, both primitive man and civilized man. In this article, we will be concerned primarily with the issue of the antiquity of the ancient civilizations.

The publication of Darwin's book, *Origin of Species,* in 1859 produced an upheaval in the history of human thinking, but not because evolution was a new idea. The concept of an evolutionary development of life forms had been around since the time of the ancient philosophers, more than 500 years B.C., and was in fact popular among many intellectuals for a century before the publication of Darwin's book. But the appearance of *Origin of Species,* whatever the reason, sparked a new interest in this ancient concept that swept over the entire globe like a tidal wave and caught the imagination of people of every station and walk.

One of the most enthusiastic supporters of evolution in the early days after the publication of Darwin's book was Andrew Dixon White. In 1896, after years of diligent research, White published a large two-volume

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