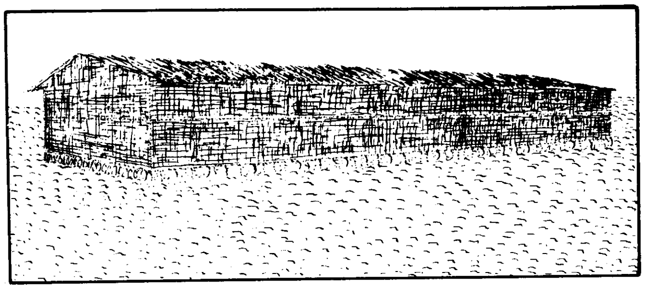

Figure 1. This shows what, it is suggested, the Ark may have looked like.

Figure 1 shows what, it is suggested, the Ark looked like. The appearance, it should be remarked, is something like that which Ben Uri suggested a few years ago.[6]

Figure 2 shows one corner, and some of the detail of the construction.

If the logs were ideally cylindrical and ideally packed, they would have filled $\pi/4 = 78\%$ of the space. The specific gravity of balsa is about 0.15. Thus, the buoyant force would have been about 66% of the weight of a volume of water equal to the all-over volume of the Ark which was submerged. If the four layers of logs, say four metres high, were submerged, the buoyant force might have been about 10^7 kgms., say about 10,000 tons. As already mentioned, several authors have shown that such a capacity would have been adequate for the job for which the Ark was made.

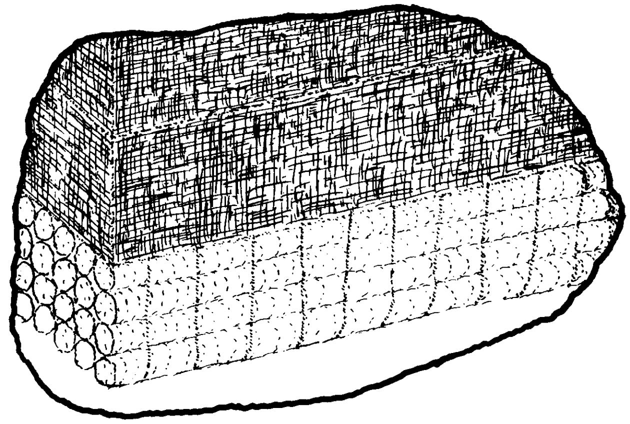

Figure 2. This is an enlarged view of one corner of the Ark, showing the way in which, it is suggested, it was built.

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DEATH AND NICHE LIMITS†

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Some people believe that life will arise spontaneously somehow, somewhere, if conditions are right; and that having arisen it will evolve. But such people neglect to take into account death, which results if a single niche dimension becomes zero, i.e. if a single environmental or other condition does not fall within the range in which it must lie for life to be possible. If such a dimension should become zero, that means death for the individual, and extinction for the species. A few niche parameters, especially some which have a bearing on the question, whether life might exist elsewhere than on Earth, are discussed.

In most evolution-oriented textbooks on biology or ecology, it is tacitly assumed that the term niche or niche space is understood, and that therefore no precise definition is required. However, it is very important that this term be well understood indeed; for it is at the level of the single individual organism that all of the various external, internal, and psychological environmental factors, parameters, or niche dimensions come into play that determine if the individual organism is to live and reproduce. Niche space is the multiplicity of environmental factors (physical, chemical, and biologic) interacting with each other and with the whole organism. For example:

1. Oxygen content—neither too much nor too little.
2. Water—must be a liquid and must be present.
3. Temperature—generally above 0 °C and below 65 °C (some organisms can live in water that is −2 °C and others to about 100 °C).

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†A paper, similar to this article, was given at the 15th Anniversary Convention of the Bible-Science Association, Anaheim, California, 12-15 August, 1979; and a summary is included in *Repossess the Land*, the Proceedings of that Conference. The work is used here by permission.

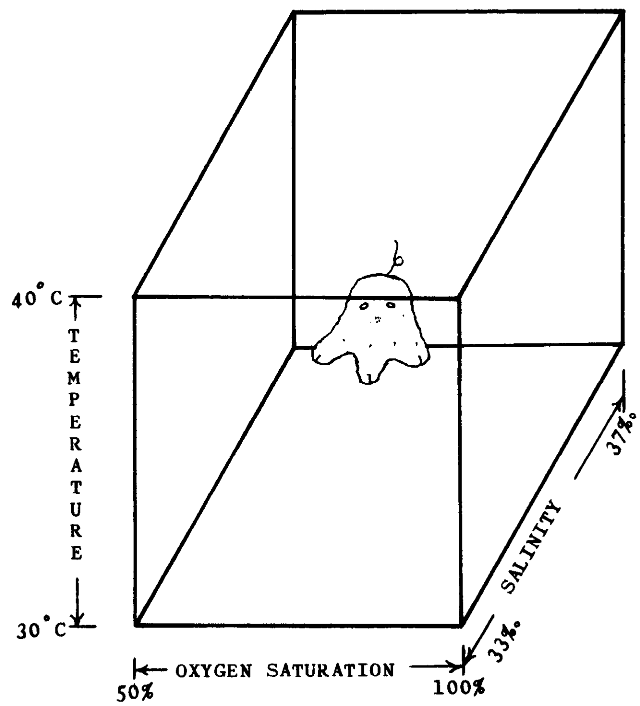

Figure 1. Niche space. This is a representation of what niche space might be like in a hypothetical case in which there were only three niche parameters. Zero niche space exists for this organism if the allowable ranges shown for the parameters are either not reached or exceeded.

4. Pressure—atmospheric or hydraulic, upper and lower limits.
5. Burial—kills the organisms buried; note all the fossils.
6. Food or vital substances—proper quantities and quality—many organisms can't live on only one type of food let alone without it.
7. Chemicals—toxins, acids, caustic substances — air and water pollution, all may make life impossible.
8. Old age.
9. Predators.
10. Accidents and injury—loss of vital substances, parts or organs.
11. Space requirements—crowding and isolation.
12. Radiations—ultraviolet, x-rays, light, gamma rays.
13. Metabolic mistakes, cancer, mutations.
14. Diseases.
15. ...
16. ...
17. ...
    n−1. ...
    n. ...

The total number of dimensions of niche space is likely not known; and they are difficult or impossible to quantify or even to name. Some niche parameters may be more important than others quantitatively; but in the long run all factors are equally important qualitatively; for even the smallest or most subtle factor that can be thought of may be of prime importance during some brief critical time in the life of the organism. The niche space is not just some small, local, close-at-

Let:

W = water	• = •••
T = temperature	• = •••
O_2 = oxygen	• = •••
C = carbon	
N = nitrogen	n = number of days in which
E = energy	the lighted period is less than
S = salinity	14 hours.

Thus: the niche space parameters multiplied together will be the niche space, or, mathematically, hyper-space − N_s. So:

$$W \times T \times O_2 \times C \times N \times E \times S \times \ \ldots \times (n-1) \times n = N_s$$

If, however, even one of the parameters is equal to zero, then the niche space is zero. Say energy E = O. Then:

$$W \times T \times O_2 \times C \times N \times O \times S \times \ \ldots \times (n-1) \times n = 0.$$

Example of how the niche space dimensions multiplied together equal niche space volume (N_s), or, mathematically, hyper-space.

No actual quantities are given here for any of the niche parameters, since the amount of each is likely unknown. Indeed, the total number of parameters is likely also unknown. However, the point is that if only one niche parameter is zero the niche volume or space is also zero, which means death for the organism concerned.

hand volume or piece of landscape but must extend to all parts of the habitat and beyond. Even the whole universe could be included; for instance the sun, moon and stars are used as navigational aids for some birds and the tides influence some sea creatures. According to Miller[1]:

> A niche space . . . is the composite of all the environmental factors acting on an organism in its natural habitat. Each . . . factor, such as temperature, . . . is considered one dimension of the niche (space).

There is even a name given to such space; for mathematicians call the region of space bounded by all the hyper-surfaces a "simplex".[2] The term "hyper" refers to the ideas of more than three dimensions. Often the number is very much greater than three.

Moreover, each is unique and each has a unique total set of niche factors; and therefore each has its own unique niche space to fill.

Adaptation

Adaptation is commonly an undefined term. It is assumed to mean something; in general it is implied that an organism has somehow managed to improve itself so as to be more "fit" in the particular environmental niche space in which it finds itself. Somehow during its life span, when environmental factors have undergone some small change, the organism also underwent some small change in the appropriate direction; and this small change enabled it to survive long enough to have viable offspring which inherited this new small change. Since these offspring now have "better" inheritance than their progenitors thay are better able to survive under changed conditions; and therefore they, in turn, can have more offspring. So evolutionary reasoning goes. This type of thinking has been shown to be incorrect. Most organisms cannot reason regarding chance random events, and so cannot "plan" to avoid or improve their lot. Thus they are unable to cause changes that are ever upward toward increasing complexity. Neither has nature any intellect for selection. True, some organisms are said to be better adapted or less adapted to their environment. Perhaps better adapted means here that the niche space factors or dimensions are greater and so the organisms are wide-ranging or wide-spaced. But it does not follow that some organisms are more perfected than others.

Examples of Niches: Introduction

Every species experiences death of individual members. When this occurs its body begins to disintegrate. The complex molecules tend to simplify and will eventually return to their original less-ordered lower-energy (but higher entropy) state. Unless an individual organism or species is 100% adapted to its environment (i.e. perfect) it will in the long run be 100% assured of dying.

It is this author's thesis that each organism must at all times have niche space (hyper-space) for its functioning. If during its existence some single condition ensues, even for a moment, which zeroes its niche space, that organism dies. It isn't enough for the individual to survive at the 99.999+% rate but it must do so at the 100% rate. There is no such thing as being partly alive and partly dead or in some middle ground. There is no continuum between life and death—it's one or the other. An organism that experiences death does not come back to life. Death of the organism is final for its organic existence as a living being.

The fact of life is unquestioned and it is easy to believe this obvious fact in the world in which we live. Astronauts on the moon and Viking landers to Mars and probes to other solar system bodies have indicated that there what is obvious here on Earth is not to be found. Something is very much different regarding these extraterrestrial bodies. By whatever means life originated and was sustained on Earth, it did not happen on the Moon, Mars or elsewhere. But suppose that life had existed once on the Moon or Mars or elsewhere. What could have happened to cause it to disappear? Or what could have caused it to perish? Have lethal conditions always existed on the Moon or Mars or elsewhere?

Scientists and others speculate regarding the origin of life, and commonly give a number of conditions they believe necessary for life to come into existence. That life originated itself by chance in the dim distant geologic past on Earth or elsewhere is in current vogue, although spontaneous generation was disproved by Louis Pasteur. However, a better question is: "What conditions are lethal for an organism?" If an organism were placed on the surface of the Moon or Mars (or evolved there from the raw non-organic substances) what might cause it to die? The Moon has no atmosphere, and hence no oxygen, nitrogen, water or carbon dioxide as on Earth. No protective shield from solar radiation or cosmic bombardment. Temperatures are extreme. Mars is only slightly less hostile to life.

Dead, non-living materials only live if incorporated into and energized by living organisms. It is a quantum jump of very great magnitude between living or life and non-living or death. Living things move, grow, reproduce and metabolize, whereas dead things do not. The living organism makes use of the dead, non-living substances; but the dead substances have not been observed to come alive of themselves. Life comes from life. Highly complex dynamic chemical activity characterizes living organisms. Simple activity characterizes the non-living realm, for instance stream flow, burning or weathering; but mostly nonactivity is observed. There has been no scientific demonstration that so-called life precursors could eventually form living matter by chance alone. Many and varied have been the experiments in which scientists have spent long hours in the attempt to create prebiotic substances in assumed early-earth environments. It is fair to say that the results have not been impressive.

Death is the antithesis of life. Death indicates that an organism in some way ceased to have niche space and therefore became non-adapted to its environment. Death implies that the organism's niche space became zero because some external or internal condition or niche dimension became zero. Thus the organism's limitations for survival were exceeded, and it died.

The evolution model demands that the individual change and that this change be inherited by its offspring. An organism is fit, in this interpretation, if it can survive long enough to have viable offspring. Adaptation means that the organism that cannot cope with altered conditions does not survive; i.e., death ensues.

An organism inherits 100% of its potential from its progenitors. Changes in this inherited material that occur later are defects, alterations or recombinations. The outworking of the genetic material may change up to a point as the environment changes. However, if the changes that take place in the environment are large enough they can reduce the ecological niche limits to zero for the organism, and the organism dies. If these limits are zeroed for all members of an extant population of an entire species that species becomes extinct.

Life exists and death occurs. Why should this be? If evolution really happened then evolutionary processes should have produced organisms having broader and broader niche parameters and hence longer and longer life spans, and eventually have led to life spans that would last forever. If evolution were getting rid of all the unfits, misfits, and partly fits, and only the fittest were the survivors, then the absolutely fittest individuals would remain, i.e. ones that are perfect (infinite niche parameters); and therefore they would not die. However, this effect—not dying—is not observed. There are, it may be, more diseases, more misery, more want, more aging and a host of other things that are zeroing niche paramaters and causing organisms to die now than in the past. Death is all around because niche boundaries are being zeroed, not extended or expanded.

Water

Most organisms on Earth require liquid water in their environment in order to live. Some live in it, others drink it, more plants take it from the soil, some from mists or fogs. Other creatures like the kangaroo rat, metabolize it from the food they eat. Regardless of the mechanism by which living things acquire their necessary liquid water, each and every one requires liquid water as part of its cellular make-up. The cellular chemistry is conducted only in the aqueous medium. If the environment is too cold and this water freezes, functions necessary for living cannot be carried out, including reproduction. Eventually the organism will die, because its life cycle cannot be completed if there is no liquid water.

One of the prime reasons for the Viking and Mariner probes to Mars was to determine if life exists and/or had evolved on Mars, which was believed to be most closely earth-like of all the planets. The temperature was known to rise above freezing during the Martian summer in favorable places; and Mars does have an atmosphere. However, the surface atmospheric pressure on Mars is only about 1/200th of the sea-level pressure on Earth. This precludes any possibility of liquid water on Mars, regardless of the temperature. The only stable forms of water on Mars are either ice (a solid) or water vapor (a gas). Horowitz[3] states that:

> the vapor pressure of water at the surface of Mars in the northern hemisphere is at most 0.05 millibars, even if all the vapor is concentrated in the lower atmosphere. The phase rule states that for liquid water to exist on the surface of a planet the pressure of the water vapor in the atmosphere must at some times and in some places be at least 6.1 millibars, the triple-point pressure. Below that pressure water cannot remain in the liquid phase: depending on the temperature it must either freeze or evaporate.

The atmosphere of Mars contains enough moisture that the air is sometimes near the saturation point; and as a result there can be at times clouds formed. These clouds however, cannot be like many of the clouds seen on a warm summer day on Earth. The temperature is so low that the only possibilities are tenuous ice clouds or ice fogs. This is indicated by the fuzzy edges they exhibit. According to Arvidson[4]:

> If all of the water vapor in the atmosphere of Mars (not including the polar ice caps) could be condensed in one place it would form a body of water no larger than Waldon Pond and further makes rain an impossibility.

Mars has water (as a vapor in its atmosphere); water (as ice) in its polar ice caps and water (chemically combined) in some of the surface minerals—up to 1% by weight[5]: and it is possible there may be frozen water locked up much like permafrost just below the surface. In many places on Mars there are channels much like erosional ones in desert regions on Earth. Many think that they were made by melting "permafrost" at some time in the planet's past. At the present time there is no proof that this, in fact, took place.

Would it be possible for some organisms from Earth to survive in the cold, dry air or on the surface of Mars? Was the decontamination of the Martian Landers necessary? In 1977, Horowitz[6] made the following statement:

> Liquid water is essential for life on the Earth. All terrestrial species have high and apparently irreducible requirement for water: *none could live on Mars.* (emphasis added)

So far as is known, Mars is sterile. It has not a single living organism anywhere in its air, on the surface, or under some rock. The basic need of living things is liquid water. Without water there can be no evolution, no survival—only death for any organism that happens along regardless of origin. Sagan[7] puts it this way:

> All that is known now is that the Earth supports life and that its life depends on the continuous existence of liquid water.

The other planets of the solar system are even worse off than is Mars as to the availability of liquid water for living organisms. This author sees, for instance, no possibility of living organisms in the atmosphere of Jupiter—too much electrical activity, ionization, turbulence, pressure, and deadly chemistry.

Chemistry, or, Life As We Know It

Science fiction writers and others entertain the idea that life, perhaps abundant life, even intelligent life, is scattered throughout the universe on "Earth-like" planets and that this extraterrestrial life is not like the life which we know, having a chemistry different from that of life on Earth. However, this cannot be the case, for Horowitz[8] says:

> The connection between life and organic chemistry (that is, the chemistry of carbon) rests on the fact that the attributes by which we identify living things—their capacity to replicate themselves, to repair themselves, to evolve and to adapt—originate in the properties that are unique to large organic molecules. It is the highly complex information-rich proteins and nucleic acids that endow all the living things we know, even "simple" ones such as bacteria and viruses, with their essential nature. No other element . . . has the capacity carbon has to form large and complex structures that are so stable. It is *no accident* that even though silicon is far more abundant than carbon on Earth, it has only minor and nonessential roles in biochemistry . . . Such fundamental facts lead to the conclusion that wherever life arises in the universe it will most likely be based on carbon chemistry (emphasis added)

In other words, life is based, and can indeed only be based, on the element carbon. This fact puts severe limits on any postulated life on other worlds.

One limitation arises from temperature. Amino acids, the basic building block of proteins, break down spontaneously at a rate dependent directly on the ambient temperature.[9] The higher the temperature the greater the rate. Amino acids will not wait for several million years spontaneously to form protein.

Another is the chemistry of the environment. The chemistry of Venus is such that organic molecules, let alone living organisms, could not exist; for the atmosphere contains sulphuric acid and even the strongest of all simple acids: fluorosulphuric acid. No living thing could survive where acids are strong enough to dissolve most common minerals, sulphur, mercury, lead, tin and most rocks; and these acids are indeed highly corrosive.[10] Such highly active chemicals would stop the life chemistry of the cell; and so some internal niche space dimension is zeroed. Again we find an environment that is deadly.

Light: the Energizer

Light from the sun is necessary for the growth of green plants; and green plants are necessary for all other forms of living things. They are the primary producers. Organisms that live upon them or their products are consumers. However, if the amount and composition of sunlight reaching the surface of a planet are not right the effect produced is deleterious. The most significant energetic radiation reaching the Earth's surface is ultraviolet light. It is this radiation that causes a person to get a sunburn. Ultraviolet radiation is also used as a germicidal agent in health facilities. The amount of ultraviolet reaching the Earth is greatly reduced by the density of the Earth's atmosphere and especially by the ozone layer at high altitude. The concern regarding the release of fluorocarbons and possible consequent reduction of the ozone layer is well known. On Mars there is no layer to be destroyed; for the air there is very thin with practically no oxygen content. so the amount of ozone produced is next to nothing, and, hence, there is no ozone-layer shielding effect. This ultraviolet radiation apparently energizes atomic and molecular oxygen to combine through a series of reactions to produce hydrogen peroxide (H_2O_2), a powerful oxidizer, which may have an important influence on the chemistry of the Martian soil.[11] If living cells were present this hydrogen peroxide would have a detrimental effect—probably lethal. Further, according to Horowitz[12]:

> the most surprising finding of the life-seeking experiments is the extraordinary chemical reactivity of the Martian soil: its oxidizing capacity, its lack of organic matter down to the level of several parts per billion and its capacity to fix atmospheric carbon (presumably into organic molecules) at a still lower level.

Ultraviolet radiation has a disruptive effect upon living tissue and cells, and so the high reactivity of the Martian soil would seem to preclude any chance of finding life on Mars. The radiation and chemistry are just wrong. Horowitz[13] also suggests that organic compounds are probably actively destroyed by the strong ultraviolet radiation from the sun.

Atmospheres

The gases in the atmosphere of Mars and the Earth are of the same kinds. However, the percentages are quite different, being 96% carbon dioxide, 2.5% nitrogen, 1.4% argon, and 0.1% oxygen on Mars. The Earth's atmospheric gases respectively are: 0.03%, 78%, 1%, and 21%. The water vapor content in both planets' atmospheres varies from season to season, time of day and from place to place. On Earth the water vapor concentration can be as much as 4 or 5% when the air is saturated.

The great bulk of living substance is composed from compounds of just four elements: carbon, oxygen, nitrogen, and hydrogen, all of which are found in the atmospheric gases of both planets. Could these gases be synthesized into organic compounds as prebiotic precursors to life on Mars? Apparently not; for Gish[14] states:

> the amount of radiation available from the sun at the wave lengths at which (atmospheric) gases absorb (below 1500 Angstroms), and thus available for synthesis, is less than one-thousandth of the light (up to 3500 Angstroms) absorbed by the products, and thus available for destruction. Hence destruction is 10,000 to 100,000 times more effective than production.

No wonder the Viking landers didn't find organic molecules—they would have been actively destroyed if ever produced!

Light and Darkness

As if that isn't deadly enough for living things consider the amount of solar radiation that reaches the surface of Mars. It varies by more than 44% depending upon Mars' orbital position. This is not a season effect of the slant of the axis but depends upon the distance Mars is from the sun. The corresponding variation for the Earth is about 7%.[15] If we look to Venus on the other hand, we find that the amount of sunlight that finally filters through the clouded toxic atmosphere is about equal to the amount that the Earth's surface receives on a very dark, rainy day—about 1% of normal daylight.[16] Again, could plants survive in a night that is 120 days long (about half of Venus' period of rotation)? Light is very important for the growth of green plants, and it must be in the correct amounts as to energy content and duration. It would appear that the niche space dimension for the correct amount of light in the proper wave lengths is zeroed on Mars and Venus. Thus the niche space must be zero; and so there can be no organisms on either of these planets.

Wind

Strong winds, such as at high altitudes or along exposed coasts, tend to stunt vegetation, because of the higher evapo-transpiration rates and the abrading effect of blowing dust and sand. The wind speed necessary just to begin to move sand-sized particles on Earth is about 10-12 mph. Natural sandblasting in places where sand blows, tends to remove the bark, leaves, and soft tissues from the windward side of plants while the lee side is protected.

Suppose on Mars there were vegetation such as lichens, bushes or trees. Since the atmosphere of Mars is only about 1/200th as dense as the air on Earth the wind velocity necessary to move sand-sized particles must be on the order of 10 times greater.[17] In 1975, Pollack[18] stated:

> When Martian wind velocities exceed 100 mph, small dust particles are set in motion. Particles larger than a thousandth of an inch saltate, that is, travel a small distance through the atmosphere, hit the surface and bounce back into the atmosphere. Smaller particles settle out of the atmosphere so slowly that they tend to stay in suspension and to

travel great distances before they sink to the ground.

It is even believed that on occasion that Martian winds can blow at as much as half the speed of sound.[19] Sagan estimates that the rate of sandblasting to be on the order of 10,000 times as great as on Earth since the average velocity of the saltated and suspended grains must approach the speed of the wind.[20] Therefore, (even for a postulated plant) the sandblast effect would break into cells and allow for their contents to spill and thus the niche space requirement of entire cells is zeroed.

Evolution: Can It Happen?

The notion that organisms somehow by chance evolved from simple to complex, from unordered to ordered, from less perfect to more perfect, from lower to higher, from non-living inorganic to living organic forms has been believed by many for more than 100 years. However, this evolutionary change has not been observed or documented in a single case. All that is known now is that the Earth supports life and that its life depends on (among other things) the continuous existence of liquid water.[21] The Earth is obviously designed to be the home of living beings. It is correct in such respects as chemical composition, the presence of water, the temperature, the lengths of day and night, and of the year, and in many other features. About hypothetical Earths which would have been suitable for living beings we know nothing. But we do know that this Earth which is inhabited is suitable.[22] Even those that believe in evolution admit that if life evolved elsewhere than on Earth, it would have to be on a planet not drastically different from the Earth in its temperature and composition.[23] There is however no evidence for extraterrestrial living beings, intelligent or otherwise, within reach of man's abilities to search. Sagan[24] does some wishful hoping (thinking) when he states:

> The Martian environment is by no means so hostile as to exclude life, but we do not know enough about the origin and evolution of life to guarantee its presence there—or anywhere else.

Living organisms just do not survive, let alone originate, live or evolve, when conditions are not only hostile, but lethal. The Martian temperature remains below freezing most of the time, there is practically no oxygen, no liquid water, intense ultraviolet radiation, very high winds with sandblasting, very low atmospheric pressure, etc. and etc. . . .

Even small environmental changes in the Earth's ecology may have a detrimental effect on the organisms around which these changes occur. If their external or internal niche space dimensions (such as light, temperature, moisture) are altered, especially if it is zeroed, the result is not evolution but degeneration and eventually individual or species death (extinction). These changes do not increase the complexity of the environment but degrade it to a simpler, less complex, less diverse condition.[25]

Evolutionists would have us believe that organisms are "preadapted" to this changing environment and therefore would be able to cope as the environment changes. But Morris[26] says:

> It would seem therefore that anything that would change the environment today (for example, by altering the chemical components of the atmosphere and hydrosphere through pollution), decrease populations (perhaps by war, famine, or pestilence), or increase the mutational pressures (such as by increasing the radioactive component of the biosphere through nuclear testing), would contribute positively to further evolution and therefore should be encouraged, at least if evolutionists are correct in their understanding of evolutionary mechanisms. In other words, the very processes which modern ecologists most deplore today are those which they believe to have been the cause of the upward evolution of the biosphere in the past.

It is strange that modern scientists who believe evolution to be the answer to where the world originated and life is heading are in reality, by their actions, creationists at heart, "knowing" that environmental changes tend to be harmful and often deadly, not leading to higher beings. Creationists, for their part, are convinced that unplanned, chance, perturbations in the environment have detrimental effects on the ecosystem.

Under normal, environmental conditions, organisms live, grow, reproduce, and have variations. These changes, though, are conservative, not creative or evolutionary effects. Things tend to remain the same under suitable living conditions. Complexity of the ecosystem is not increased unless there is some informational input from the outside. If the fossil record means anything, the ecosystem is less diverse now than in the past. Williams[27] speaking to this issue states:

> Conservation processes operate more efficiently under conditions suitable to living organisms . . . Degeneration processes prevail under conditions unsuitable to living organisms, . . . Which organisms survive? Those that are able to utilize the conservation processes available to them. Those that cannot utilize them cannot cope with the degeneration processes and consequently . . . suffer, die and even become extinct. Struggle does not improve organisms. The less the struggle, the more improved the organisms. Struggle weakens organisms. . . . Even conservation processes are inefficient. This inefficiency results in a slow deterioration of living organisms.

The environment appears to remain stable, but it is in reality slowly undergoing changes which bring about a deterioration, i.e. some niche space is being eliminated. This is not evolution in the sense that things, by chance, are being improved, but rather it is "devolution". Regardless of what is done, the energy expended, and the time spent, the Earth and its environment are slowly decaying and cannot continue indefinitely. It will die. Morris[28] puts it this way:

> Eventually, however, if the present world (no matter how carefully its resources were guarded) were to continue indefinitely operating under present laws of nature, it would die.

It is implied in Scripture that this is what would happen if God doesn't change the present conditions of the Earth. See, for instance, Romans 8:20-22 (The Living Bible):

For on that day thorns and thistle, sin, death, and decay—the things that overcame the world against its will at God's command—will all disappear, and the world around us will share in the glorious freedom from sin which God's children enjoy. For we know that even the things of nature like animals and plants, suffer in sickness and death as they await this great event.

Conclusion

In the ecology of living organisms, each species has its environmental niche space. Each niche space is bounded by a number of dimensions (some known, others not known) that define where organisms experience their life cycles. If just one niche dimension is zeroed the organism dies. Each niche space is different for each species, so are the niche dimensions; and lethal conditions can be different. But some conditions are clearly lethal. Even if a "Noah's Ark" of animals with the necessary vegetation were transported to Mars, most would survive for no more than a few minutes; and none would go through a single life cycle under the prevailing surface conditions. Even if the dimensions of an organism's niche space were known exactly and that space could be duplicated, still the probability that that organism—or any other kind of life—would arise by chance alone is zero, even under those ideal conditions. If, on the other hand, the living organism were placed in that niche, still the probability of its eventual death is 100%.

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ON THE STAR OF BETHLEHEM

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It is shown that, while a star really appeared to herald Our Lord's birth, all the proposed naturalistic explanations of the star are inadequate. Hence the star was a supernatural sign. In the course of the investigation, evidence is adduced to show that Our Lord's birth was in the year 2 B.C.

Introduction

Attempting to decisively date the birth of Christ or His crucifixion is a formidable task for any chronologist; and trying to ascertain the nature of the so-called Christmas Star is an even more formidable task for the astronomer. This paper reviews the current ideas surrounding the Star of Bethlehem and it also attempts to date the birth of the Lord Jesus Christ using a variety of evidence.

To avoid confusion from the outset, it will be noted that all dates given in this paper will not include the mythical year zero. Many modern commmentators to the contrary, there properly should not be a zero year in a calendrical system referring to any historical event. The first year of Christ's stay on earth would, by definition, be the year A.D. 1; the year before his birth would by the same definition be the year 1 B.C. Hence there is no room for a year zero.

Naturalistic explanations for the Star of Bethlehem abound; and most of them can be summarily dismissed. In order then, to ascertain the validity of any and all naturalistic attempts at explaining the star, we need to

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