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From Immortality to Borrowed Time: Correlates and Challenges

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Abstract

The history of the human race is marked by the entrance of corruption, which also represents the loss of immortality. After the Fall, humans, and animals experienced death. By contrast, unfeeling organisms/cells may have several design functions. Plants, for example, photosynthesize and then are eaten and digested; unsuccessful sperm and ova are discarded and decay. These examples were in God's original plan. Following the entrance of sin, adverse events such as environmental, genetic, and ecological changes, alterations in human attitudes, and manipulation of germplasm occurred. The image of God found in humans at the beginning was marred by the Fall and accounts for the adverse human attitude changes noted today. Despite this, God offers all individuals a make-over in their physical, intellectual, emotional, and spiritual/moral domains. Acceptance of the offer in its fullness would result in focused attention to health and efforts to repair and restore the environment, among other valuable outcomes.

Keywords: Immortality, corruption, aging, design function, environmental changes

INTRODUCTION

The idea of corruption is introduced in the third chapter of Genesis. If the usage of the word is considered throughout the Bible (meaning: marring, duplication, fidelity), it seems that it could be considered to refer, in modern terms, to changes in the operational fidelity of the genetic code. We can confidently expect that mutations and other duplication issues leading to poor outcomes will be a thing of the past in the New Earth (Revelation 21:4) and, in those life forms destined to reproduce there, no defective progeny will appear. Genetic fidelity will be assured.

In the Golden Age, the concept of aging and longevity did not exist, for immortality was conditionally given (Gen. 3:2–3). The dying or aging that was spoken of in these verses began after the Fall and represented the ultimate form of corruption. To understand how humanity lost immortality, our initial focus will be on death, but other forms of corruption will be considered.

The human life span has varied greatly during different periods of history. Early estimates of longevity in disadvantaged societies in the Middle Ages placed it in the 20s, whereas today, in industrialized societies, it lies around 75–80 years. Advances in this area are attributable to reduced infant and child mortality, the control of infectious diseases, and reduced death rates of older

individuals. Some cases of extreme longevity have been recorded in recent times, such as 122 years for Jeanne Calment (died 1997). The optimistic non-believers in the biblical statements debate whether there is a biological limit to human life expectancy (Crimmins, 2015; Wilmoth, 2000).

Ancient records place human longevity at extraordinary levels (up to 969 years – Gen 5). However, following the universal Flood, the declaration was given that the life span expected was 120 years, and later, this was reduced to the region of 70–80 years (Gen. 6:3; Ps. 90:10). Needless to say, the majority of individuals seek life and wish to prolong it beyond this.

The search for immortality and the elixir of life is held in myths and legends coming from the Near East, Scandinavia, the Orient, and elsewhere. Weird and wonderful experiments have been tried, and belief systems generated to foster the concept of immortality. In modern society, stem cells and other technologies are being explored. Unfortunately, all that has been achieved is an extension in the life span, and in some life forms, a greater period of decrepitude is an additional outcome (Podshivalova et al., 2017). Through all the experimentation, the key to immortality has not been found (Gollner, 2014, pp. 1–14). If physical immortality cannot be achieved, then immortality of a soul or some related entity has been counted sufficient to take its place. This is where near-death experiences (NDEs) can come into their own: A person can die, yet some claim there is evidence that life continues in some form. In a novel scientific twist, if an immaterial entity is not considered, the cryonics movement promises to take us in the same direction. The plan is to freeze the body now and make an investment in its immortality to be fully realized later as scientists solve the problem of the key to starting the life forces again (Hartman, 2017).

Aging and Longevity

In the present circumstances, all living things age, and this process inevitably terminates in the cessation of life. Even at the cellular level, cells that are defective in the genes controlling cellular activities have a self-elimination system, apoptosis. In some forms of life, the aging process is protracted so that the life span may be measured in thousands of years (e.g., bristlecone pine—up to around 5000 years—Ferguson, 1968; Flanary & Kletetschka, 2005; Petruzzello, n.d.). Other forms of life may have a much more restricted lifespan.

What is death?

How death is defined depends on the organism being discussed. With some of the smallest, single-celled organisms, bacteria, death is defined as "the point where the injury is beyond the ability of the cell to resume growth." It is not particularly easy to determine when this point has been reached (Bogosian & Bourneuf, 2001). When complex biological entities such as humans are being considered, the question of death has its own peculiar problems. The United States Uniform Determination of Death Act indicates that there is either irreversible cessation of the circulatory or respiratory system or irreversible cessation of all functions of the entire brain, including the brain stem and neocortex (characterized by a persistent vegetative state—Uniform Determination of Death Act, 1980). Despite the adoption of this concept of death in all 50 USA states, disputes continue especially connected with organ donation (Nikas et al., 2016).

If we consider plants, which are complex organisms that lack a nervous system, the question of when death is reached has practical significance. A plant may appear to be dead following adverse environmental conditions yet resume growth on the return of more favorable conditions.

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One definition proposed for tree death is the cessation of the "highly complex interaction of its organ subsystems" and, in particular, the "subsystems in xylem and/or phloem transport within a tree" (Anderegg et al., 2012).

Fundamentally, death is the cessation of maintenance, growth, and reproductive activities, which does not leave us in a particularly informed position about how life started or the critical event causing it to cease. The hype following the successful use of a synthetic genome to direct the events in an existing living bacterial cell from which the genetic contents had been removed was posited as the creation of artificial life. In actual fact, this was far from reality. Not all the foundational cell structures were created from simple, non-living components (Douglas et al., 2013). Evolutionary scientists continue to puzzle about how life started from non-living materials or what actually happens at the precise moment of death. The Bible leaves neither of these questions in doubt.

When Did Death Commence?

Death of the world's first human couple had waited for them after their unwise thoughts and the Fall. The eternity of the physical life of humans had come to an end. The first thought might be that death commenced with the slaughter of Abel by Cain (Gen. 4:8). Although this was the first death of a human, the death of an animal(s) seemingly preceded it (Gen. 3:21). These events involved the shedding of blood, which is associated with the meaning of death in the first chapters of the Bible (cf. 4:10). Ultimately, death for humans encompasses the cessation of brain activity. This idea must be contrasted with the situation with other life forms. There, death may represent a point where the initial design function is terminated in order to take on a secondary function. This occurs in the destruction of plant tissues in the digestive tract of animals following eating. We well remember that plants were provided as the general food for God's created life forms (Gen. 1:29–30). It follows naturally that both the structure and substance of the plant tissues were destined for alteration (destruction) through design.

Although humans have attempted to regenerate the plant cell with the totipotence properties through the plant tissue culture methods and generate the whole animal from mammary cells through cloning technology, the fate of these artificial entities cannot change the course of God's law.

Some cells/organisms have multiple functions. If we turn to seeded plants, the process of seed formation commences with fertilization involving lodging of pollen on the stigma. The production of pollen is prodigious, and only a very small fraction is used for its primary design purpose, fertilization (Atluri et al., 2004; Hirst et al., 1967). In addition, in many angiosperms, there are processes that prevent self-fertilization. One consequence of this is that the pollen grains may experience events inhibiting their germination (e.g., crucifers), programmed death of pollen tubes may occur on the stigma surface (e.g., poppy), or germ tube growth is halted through cytotoxic reactions triggered in the pistil involving degradation of pollen tube RNA (Nasrallah, 2005). Again, we take this as the design norm.

At least in some plants, the seed coat cells are subjected to programmed death so that none or few living tissues remain at this site at maturity. Seeds contain subsets of living endosperm cells, and these are significant in perceiving environmental signals. During germination, programmed cell death is featured among endosperm cells. For example, in cereals, the aleurone cells die in order to facilitate nutrient mobilization (Smykal et al., 2014; Yan et al., 2014).

The fate of seeds on germination is taken by us as giving important insights into the situation in paradise. Just as unused sperm of animals perish, so a seed ceases to exist as such upon germination. The food reserves of the endosperm are mobilized and utilized by the emerging embryo. However, some nutrients may be released into the environment on germination (Harmuth-Hoene et al., 1987), and these nutrients and the remnants of the seed coat and associated tissues remain in the soil, stimulating vigorous microbial activity. Elements of this process have been mentioned by several Bible writers (John 12:24; 1 Cor. 15:36).

The concept of multiple design functions can be explored further by reference to the human body. Since diverse members of the animal kingdom were instructed to be "fruitful and multiply" (Gen. 1:22, 28), we reasonably can assume that the unused sperm and ova formed part of the detritus food chain and was the creation norm. Change of destiny occurred elsewhere too. Skin, one of the larger body organs, is so organized that cells in the epidermis (outer layer) progress from dividing cells at the lower levels to non-living cells at the external surface. The external layer, stratum corneum, consists of 15 to 30 rows of non-living cells filled with keratin, and they function in mechanical protection, as a dehydration barrier, and an essential protective hurdle against ingress of microbes (Betts et al., 2013, chap. 5.1). If this scene is hard for some to accept as the creation norm, then the nails and hair could be considered. These are composed of non-living material (Bergman, 2019).

An additional example from the human body worth mentioning is the immune system. This system functions to protect against alien organisms entering the body. Imagining that this never happened under the ideal conditions during the Golden Age is perhaps a misplaced notion. The mere fact that we breathe and chew food ensures that foreign bodies (pollen, spores, microbe cells, etc.) enter the lungs and bloodstream. This means that effective expulsion and defense systems need to be in place. If we focus on just one segment of the defense system, the cell-mediated part, the phagocytic cells that are operating there have the design function of engulfing foreign bodies, including pollen, and disposing of them, among other activities (Champion & Mitragotri, 2006).

High loads of bacteria entering the body cannot be cleared by the limited number of phagocytic cells. The primary disposal function is provided by red blood cells. The bacteria (negative charge) are neutralized by first being attracted through an electric charge (positive) associated with erythrocytes and then typically killed through oxidation following the release of oxygen from the oxyhemoglobin associated with these cells. The dead bacteria are disposed of in the liver and spleen by phagocytic cells (Kupffer cells)—Minasyan (2016). The immune system in animals is exquisitely complex and defies reasonable explanations using an evolutionary approach.

The phagocytic function is an intriguing activity in other areas of the natural world too. Some predatory and herbivorous ciliates (protozoa) may use their phagocytic abilities to capture and engulf their unfeeling food (Coico & Sunshine, 2009, pp. 13–14; Romaino et al., 2012). This ability is also seen among the cellular and acellular slime molds, life forms found in the soil that has the ability to live principally on bacteria (Gilbert, 1928; Hohl & Raper, 1963; Hoppe & Kutschera, 2015). It has clear parallels with the excitatory and inhibitory actions noted when nerves pass signals via neurotransmitter molecules to other cells in mammals. The process involves both exocytosis and endocytosis (Lodish et al., 2000).

The continuance of activity in one section of the ecosystem requires the suppression of activity by another. In terms of the termination of life among the non-feeling members, it may be a matter of semantics whether this should be spoken of as a process by which the energy reserves of one

organism have been efficiently transferred to another as a design function or spoken of as death. The former approach is the one usually accepted by creationists when considering herbivorous life forms. Foliage, seed, fruits, bark, roots, and other plant components are eaten for the sustenance of insects, animals, birds, and other forms of life. Certainly, in human beings, where conditional immortality was promised (Gen. 2:17), we must speak or think in terms different from those applying to much of the remaining natural world. Ultimately, human death is the end result of disobedience. Subsequently, the consequences of human actions were seen throughout all ecosystems. This sequence was spoken of first in God's brief statement in Genesis 3:17–19, and Paul's summary of the consequences of sin is detailed in Romans 8:18–20.

Some Changes Occurring after the Fall

A number of changes followed the Fall, which helps to explain aging. The concept of aging may be thought of as being related to the increase in molecular disorder, ultimately leading to an equilibrium state of total disorder. In today's world, all life forms are subject to increasing levels of molecular disorder (Keil et al., 2015), leading to death in those forms not created to experience a change of function. Other changes can be deduced from the textual evidence, but it is not possible to know the totality of the alterations experienced. We will mention some of the changes for which reasonable support is available.

Environmental, biological, and ecological changes. Climate and other changes appear to have been an immediate post-Fall event. This is perhaps inferred by verses 17 to 19 in Genesis chapter 3, where making a living is said henceforth to induce sweating. This may suggest temperature elevation in the zones around the Garden, although it is possible that low temperatures were being experienced in other world regions. Temperature changes, including thermal extremes, do influence lifespans across animal groups. Invertebrate groups uniformly show the extension of lifespans under lower temperature regimes. In the vertebrates (ectotherms), the tendency is for the organism to live longer at lower temperatures. In homeotherms, the temperature is just one factor contributing to lifespan extension. In humans, lower body temperature is correlated with higher survival rates. However, temperature excursions alone are not the sole reason for life span variations (Keil et al., 2015).

Genetic and ecological changes might also be suggested in the statement that thorns and thistles (they bear prickles) would appear (Gen. 3:17). Thorns and prickles represent two different types of structures. True thorns are modified stems or leaves, whereas prickles arise from single cells on the epidermis (represent a deformation of plant trichomes with a few additional cells associated with them). Prickles could have arisen through mutation events (regulatory or coding genes), as has been recorded experimentally (Feng et al., 2015; Feng et al., 2016; Lester & Daunay, 2001; Pandey et al., 2018). Whether the initial gene pool was manipulated after creation by intelligent, adverse agents (e.g., Job 2:7) is unknown. But this has been postulated by none other than Professor Alvin Plantinga (2011, p. 159) and is well within the thinking pattern in those believing in the great controversy theme.

Work on true thorned plants is less developed. Thornless *Hippophae* (sea buckthorn) and Acacia *wrightii* plants have been found in natural populations (Bryan et al., 2005; Yao & Tigerstedt, 1994). These and similar observations raise the possibility that at creation, the thornless/prickle-less condition was the normal condition, and change occurred subsequently (means not delineated—Gen. 3:18). Recently, it has been shown in citrus thorn that the formation

can be prevented if thorn stem cells are able to continue growing. This outcome can be induced through mutation of the appropriate regulatory genes to the recessive state. The thorns develop into branches instead (Zhang et al., 2020).

In the plant kingdom, the changes noted were presumably to protect against excessive herbivory (Hanley et al., 2007). It seems likely that the statement about changes in the plant kingdom could also be taken to infer there would be changes to animals. This perhaps is borne out by reference to Genesis 2, verse 14, where it is stated that the effects of the curse on the serpent were more severe than the changes anticipated in other animals. We might take these changes in both the animal and plant kingdom as an indicator that the basic ecological dynamics had changed or were about to change.

Genetic changes and human lifespan have been related to both genetics (includes epigenetics) and environmental factors (includes lifestyle choices—Armstrong, 2019, pp. 229–231). Twin studies suggest that genetics contributes around 20–30% of a person's chances of surviving to 85. Beyond this observation, it is well known that some possess genetic elements that predispose them to certain diseases or confer resistance. Individuals living beyond 100 possess distinctive genetic profiles (Govindaraju et al., 2010).

One of the well-known genetic signs of aging is the fate of telomeres. Telomeres, the protective DNA-protein sequences at the ends of linear chromosomal DNA, are a biomarker that indicates cellular aging and whether an organism has a long or short life span. Studies in the bristlecone pine (*Pinus longaeva*) support the use of the state of telomeres in determining age and longevity in plants (Flanary & Kletetschka, 2005). In mammals and birds, species with shorter lifespans lose more telomeric repeats with age than species with longer lifespans. Telomeric shortening generally occurs as animals age, and it correlates with the lifespan of organisms. Despite the discovery that investigations have shown that, at the cellular level, some telomere lengths of very long-lived organisms (e.g., storm petrel) can escape entirely any telomeric constraint (Haussmann et al., 2003), the contamination of environmental pollutants on Earth and other factors results eventually in mortality of the organism. Microbial infection such as HIV, non-communicable diseases like diabetes, mental health issues like stress in adversity, and lifestyle choices like smoking all have a significant impact on telomere length shortening (Babizhayev & Yegorov, 2016; Coimbra et al., 2017; Sutanto et al., 2019).

Human attitudes changed. One fundamental feature that cannot be ignored is the impact of the human element. In the beginning, humans were given dominion over creation. This has been variously interpreted and misrepresented. A view consistent with the tone developed throughout the Bible is that the instruction "to tend and keep it [the garden]" (Gen. 2:15, NKJV) involved a responsibility described by the two verbs (tend and keep). First, tending means to "serve, minister to, and preserve the earth," and keeping means to "guard, protect and shield the earth from harm" (Tonstad, 2016, p. 192). Attitudes expressed by Christians vary from concern for the environment to a view that the human dominion given is for exploitation and for the purpose of experiencing prosperity. I believe the former view is the one that can be supported in Scripture, for nature is an important source of information about God (Rom. 2:14–16) and for which neglect calls forth His condemnation (Rev. 12:18).

The scriptural record is clear that following the entrance of sin, key interrelationships in the total environment changed. These are illustrated briefly in Table 1. The inter-human and human-nature interactions changed as a consequence of humanity's relationship with God changing at the

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Fall. These have had widespread consequences. Originally, those created in the image of God did His work in the world, fulfilling His ideals (Tonstad, 2016, p. 191).

Table 1: Changes in Key Relationships Noted in Scripture Consequential on Human Disobedience

Relationships	Before Fall	During/After Fall
God and humans	Cooperation, personal interchanges, companionship—Gen. 2:19–20	Disobedience, avoidance, fear, banishment—Gen. 3:6–8, 10, 23–24
Inter-human interaction	Companionship, mutual pleasure, joy— Gen. 2:22–25	Disputes, violence, general dysfunction—Gen. 3:12–13, 16, 19; 4:8, 23; 6:2, 5, 6; Job 2:7
Humans and nature	Peaceful interactions, care involving tending and keeping—Gen. 2:15, 19– 20	Animals killed, eaten, fearful of humans, suffering—Gen. 3:21; 4:4; 8:20; 9:2, 4; Rom. 8:22

The agricultural activity appears to have been consequential on human expulsion from the Garden (Gen. 3:17, 19). Further details relating to the development of societies and agricultural activities are limited to the period after the Flood, and this is fragmentary. The record does indicate city building was commenced (Gen. 11:1–4), which indicates reasonably advanced horticultural and animal husbandry practices necessary to support such population concentrations. Issues impacting on longevity in cities would have been problems to do with sanitation and crowding and their effects on the spread of diseases. The post-Flood eating arrangements were liberalized to include meat. No doubt this had consequences on health, as modern science attests (Cancer Council, 2015).

Human attitudes and practices can have marked influences on household arrangements and lifestyle choices (e.g., food, clothing, shelter, landscape, transport, and others) or so-called niche construction, which impacts longevity. As a result of population increase and exploitation of resources, the planet is being polluted, denuded, turned into deserts or cities as humans focus on their own pleasures and pander to their greed. The poor environments created by these excesses have their own ill effects.

In today's advanced societies, lifestyle choices often feature excessive food consumption with an associated reduction in longevity (Govindaraju et al., 2015). Eating patterns that are closer to the Edenic ideal are associated with an increase in life expectancy (Armstrong, 2019, p. 229; Buettner, 2008). Associated with the change in eating behavior after the Flood and the introduction of a meat diet, one can postulate that a less caring attitude towards animals would have developed over time. Rather than as originally designed, animals were not privileged to live in a safe place. They were domesticated and raised for eating and other forms of exploitation. Wild animals were hunted and perhaps even exterminated. The Roman Colosseum events involving animal and

human slaughter indicate the level of depravity that humans have been capable of displaying (O'Keefe Aptowicz, 2016).

Controlling and manipulating nature. It appears that the cultivation of plants was a post-Fall activity. The word rendered "till" in Genesis 2, verse 5, and 3, verse 23, can be variously translated—service, labor, work (Young, 1975, p. 988). There was no logical reason for Adam to work the ground before the Fall; rather, the emphasis seems to be on God's instruction to "tend and keep" His special Garden (Gen. 2:15). The Garden is where the sin problem arose on Earth, and we also deduce that the time in Eden was short, as Eve conceived after their expulsion.

It seems to us that it is entirely feasible to suggest that focussed domestication of plants and animals occurred close to that postulated as occurring in the Fertile Crescent (Preece et al., 2016; Zeder, 2008). This may have represented selecting the most productive and desirable plants taken by Noah into the ark. The basic groups, in turn, were present at creation. However, we note that both a variety of plants and one group of animals were domesticated within several decades of the Fall (Gen. 4:3–5). For us, this means that the hypothesis that domesticated plants arose from wild varieties is not the only possibility. The reverse hypothesis is also equally viable, i.e., some domesticated plants and animals were in the ark. This possibility is made more credible as the location of Eden, and the resting place of the ark is set in the region bordering the Fertile Crescent (Rohl, 1999, pp. 141–149).

Agricultural activity became more significant with the passage of time with the increase in population levels and the movement of people groups to less suitable areas after Babel. The selection of plants more suitable for cultivation and eating was a natural outcome of human dependence on their own efforts at food production. An example might be cited where mutant plants were selected and multiplied by ancient tribes. The teosinte plant, the wild ancestor of maize, looks very different from the modern maize plants. Variants were selected by Mesoamerican farmers that were easier to grow and produced more seed. It is now known that three mutations, when selected for, make the transition to the domestication of a highly productive plant possible (Schaal, 2018).

The domination and conquest of nature for the sake of humanity were foremost in the minds of some during the Renaissance humanistic movement. This sentiment has continued into modern times and often is unencumbered by strong concepts of the value of the natural world, being overpowered by the greed of commercialism and consumerism (Bauckham, 2011, pp. 46–47, 57). In the present way of thinking, humans are directing evolution (Cobb et al., 2013).

Challenges

The expulsion of the human family from the Garden has brought a plethora of challenges, not the least of which has been how to maintain reasonable living conditions (shelter, food) and avoid the depredations of disease. The heartening news is that the Scriptures hold a number of conservation and health principles that can aid in the maintenance of God's creation. At the same time, they point to the need for the image of God to be rehabilitated in humans.

Health Awareness

The Christian view of the conservation of health is broad (Shipton, 2016). It cannot be restricted to just the physical domain, and nevertheless, here we will focus on this aspect. A commitment to preventive medicine and the conservation of health are essential components, for

these are part of the program of restoration of the image of God central to the gospel message. In order to understand the scope of the task, the principles of human physiology and nutrition need first to be appreciated.

The precipitous decline in longevity noted in the biblical record (Gen. 9:28–29; 11:10–26) perhaps points to fundamental changes occurring in the world at that time. Undoubtedly, both infectious and non-communicable, environmental diseases were involved. Sadly, non-communicable diseases (NCDs) kill 41 million people, which accounts for 71% of death globally (WHO, 2021). 23% of deaths worldwide involve environmental factors (WHO, 2006). These are all preventable causes if we live and practice in our lives the way God told us to do.

Infectious Diseases

Predisposition to infectious diseases is influenced by a number of population characteristics as follows: genetic background, general health, age, gender, immunity to the pathogen, and religious and cultural practices (Nester et al., 2004, p. 492). Perhaps the emergence of *infectious microbial diseases* (Deut. 28:60; Job 2:7) exerted profound effects on life span expectations. The disease tends to sweep away those members of the population that are genetically most susceptible (Burgner et al., 2006). A variable proportion of the human population would have been eliminated at an early age. The *genotype* of the population would itself have been changed by the continual presence of disease leading to genetic abnormalities and peculiarities. Such a scenario has been observed in animal and human populations in response to selected diseases (Miller, 1994; Williams et al., 1990). The selective pressure of disease and other factors has led to genetic differences being found in the susceptibility of individuals and human populations to disease (Ghodke et al., 2005; Weinstein, 2007; Wright & Hastie, 2007, pp. 142– 271).

Adhering to the Ten Commandments has spared countless generations from diseases and premature death. As an example, the seventh commandment in Exodus 20:14 states, “You must not commit adultery,” and is a warning from God to keep our lives pure. This prevents the transmission of viral infections through sexual interaction as a result of promiscuity. Other diseases associated with a proclivity for licentious behavior would also decline. For example, human papillomavirus infection shown to be responsible for more than 95% of cervical cancer cases in women (Ngoma & Autier, 2019), which can be avoided by vaccination, is better prevented by keeping the seventh commandment.

We can alter our immunity to various disease agents through vaccination. In this era of the COVID-19 pandemic, vaccination has been shown to help lessen the disease burden by strengthening the human immune system. Adopting NEWSTART practices is key to maintaining healthy immune function. This is confirmed by studies that showed we could influence our immune health positively through diet, exercise, sleep regimes, and by the emotional attitude adopted (Barak, 2006; Nester et al., 2004, p. 492; Venkatraman & Fernandes, 1997). Non-immune individuals are at greater risk of contracting an infectious disease, and they can also act as reservoirs of disease for others, which can be viewed as not representing a particularly responsible position if the capacity to change the dynamics exists.

This brings us to our last point that relates to *religious and cultural* practices. Christians are committed to the conservation of health because they believe in the sanctity of the body. The apostle Paul teaches (1 Cor. 3:16–17, 31) that the extent of our concern reaches to “whatsoever you do, eating or drinking or anything else, and everything should be done to bring glory to God”

(v. 31, Phillips). It is more difficult for Christians to understand or fulfill their duties fully when they possess a diseased mind in a decrepit body (readers should not apply this to diseases with genetic origins or to incapacities due to misadventure).

Lifestyle Diseases

Nutrition. One of God's last messages of warning to the world directs readers to the creation and, by inference, to the Edenic plant-based diet (Rev. 14:6–7). Adding animal-based foods to the diet would have conceivably introduced comprehensive nutritional changes impacting longevity (Gen. 9:3–5; Campbell, & Campbell, 2004, pp. 69–108; Craig, 1999, pp. 7–15). The factors involved with such a decline may have been several, such as the carriage of disease-causing microbes in meat on the one hand and the occurrence of food components predisposing to the disease on the other. In addition, it is conceivable that after the Flood, the nutritional adequacy of many foods was compromised on account of the gross disturbance of the Earth's surface and associated mineral unavailability and loss, leading to nutritional deficiencies appearing among animal and plant populations. Then again, changes in the genetic composition of plant varieties may have led to a decline in nutritional adequacy, as has been seen in recent times in the United States (Davis et al., 2004). As part of the postulated changes, it is also possible that specific dietary components able to quench the damaging effects of reactive oxygen species were reduced with knock-on effects for longevity. Reducing the impact of reactive oxygen species (quenching) can occur in the presence of plant vitamins E and C. Their presence impacts longevity positively (Armstrong, 2019, pp. 20–37; Gilbert, 2000, pp. 587–589).

In segments of today's world, the most serious issue influencing longevity is *over-nutrition,* especially where manufactured foods form a major dietary component. This can lead to a poor intake of essential nutrients, obesity, and a spectrum of non-communicable diseases. The consistent evidence from epidemiological studies is that the intake of fruit and vegetables is inversely related to the risk of chronic diseases. Populations renowned for their longevity are characterized by their focus on plant-based diets rich in fruit, vegetables, whole grains, and legumes. They also lead active lives with community involvement (Buettner, 2008; Shao et al., 2017).

Pollution. In our changing world with its burgeoning population, where the pursuit of wealth is paramount among large segments and the struggle with poverty among others, environmental pollution is a growing reality that affects all. Pollutants, toxins, pesticides (potentially present in food items as residues) can affect genetic expression through activating chemical switches in epigenetic mechanisms. On the other hand, a carefully selected diet can have a positive influence on health outcomes (Zhang & Kutateladze, 2018).

Environmental Predisposition to Disease. City living is becoming the norm for an increasing proportion of the world population. Air, water, and organic pollution are issues of considerable concern in many locations (World Health Organization, 2010, 2018a & b, 2019; Wu et al., 2017). Substandard, damp living conditions also give rise to their own health challenges (European Environment and Health Information System, 2009). However, air pollution (outdoors and indoors) is not an issue, just confined to cities. Exposure to dust, smoke, and chemical residues are potent predisposing agents for respiratory diseases in rural areas (Listorti & Doumani, 2001, pp. 107–110). World leaders struggle to cope with the problems created by human activity.

Repair and Restoration of the Environment

The effects of human activities on the ecosystem are profound, leading some to believe that we will end up destroying the Earth. The web of life is intricate and delicate, as indicated by examples taken from the contemporary world (Chapin et al., 2011, pp. 17–22; Zari, 2014). Before repair of the environment can be contemplated realistically, some understanding of ecosystem functioning and dynamics must be appreciated (see Table 2). While a detailed explanation is beyond the scope of this article, there are a number of key supporting concepts we will comment upon.

Table 2: General Ecological Management Principles Pertaining to Ecosystems Maintenance

Principle No.	Nature of Principle
1	Protection of all species and their subdivisions will conserve genetic diversity
2	Maintaining habitat is foundational to conserving species
3	Large areas often contain more species than smaller areas of a similar habitat type
4	Interactions among species are fundamental, varied, and at the same time complex
5	Disturbances shape the nature of populations found in ecosystems
6	Climate has a dominant effect on ecosystems

Source: Vold & Buffett, 2008, pp. 14–17

Genetic diversity. An important conservation principle identified is the need to maintain genetic diversity and avoid founder effects. Recognition of this principle requires a little background reasoning. Over a period of approximately 500 years in early human history, significant longevity changes began to occur in the human population (Gen. 11:10–25), causing God to instruct the race that inbreeding among closely related humans now was a restricted activity (Lev. 18:6–14). Operational deficiencies no doubt had begun or were about to develop among the human population, and reasonable changes needed to be introduced in breeding arrangements. The poor result of ignoring the principles highlighted is all too evident in certain areas of the world (Bayoumi, 2006).

The genetic resources held by the people surviving the Flood were less than those available in the entire population destroyed (the same applies to all the animal groups taken into the ark). Interbreeding was inevitable on account of the small numbers of humans and animals saved. In addition, a genetic defect arising soon after the Flood would have been amplified by the close interbreeding activities in the surviving community leading to a similar overall result (Eldridge et al., 1999; Frankham, 1977). The idea of defect amplification arising in populations coming from a small number of founders is amply supported by studies such as those involving the Ashkenazi Jews, the Amish, and the Newfoundland population (McKusick et al., 1964; Weinstein, 2007; Young et al., 1999). A pertinent example is the founder population of Jews associated with the

Babylonian captivity of the sixth century before Christ. The X-linked glucose-6-phosphate dehydrogenase disorder (important in red blood cell metabolism) present among them was accentuated by restrictions on intermarriage with non-Hebrews (Stine, 1977, p. 388). Many other conditions are known that are prone to increase through close intermarriages (World Health Organization, 2018c).

Similar precautions need to be exercised among other members of the animal kingdom. With the increase in the human population, pressures are exerted on animal habitats leading to a reduction in population sizes and a reduction in genetic diversity. Even in agricultural systems, the genetic diversity of domestic animals requires preservation in order for new lines to be bred so as to cope with changes wrought through climate change (Anya & Ayuk, 2011; Lees & Wilcken, 2009).

Maintaining habitat. Human population growth is an indirect driver responsible for the crisis in which we find ourselves today (Gaffikin, 2009). The impact of human disobedience on creation was noted by the apostle Paul under inspiration, "For we know that the whole creation groans and labors with birth pangs together until now" (Rom. 8:22, NKJV). The psalmist, too, reminds us that heaven and earth "will all grow old like a garment" (Ps. 102:26, NKJV). And in Isaiah 24, we have a prophetic vision of the consequences of human folly on the Earth (verses 3–12). The Earth lies polluted under its inhabitants because "they have broken the laws, disobeyed the statutes, and violated the eternal covenant" (v. 5, NEB). The prophet goes on to describe the utter destruction of the world (vs. 19–20). This could mean that God's judgments will destroy the Earth and its inhabitants or that humans, through their activities under the guidance of Satan, will bring about their own destruction (and God will not intervene to prevent it).

Climate change accountability? Much debate has centered on the question of climate change and the contribution of human activity to its emergence. While we do not intend to join with the contentious aspects of the debate about human contribution, the reality is that climate changes are occurring that are affecting the dynamics of ecosystems. This is impacting biodiversity to the extent that the areas suitable for some species have changed and may even have led to the extinction of others. Those in a position of responsibility can contribute to the debate on conservation practices that will aid the preservation of diversity (Heller & Zavaleta, 2009).

The response to global warming has been mixed. Those in land management have a range of options available to slow the progress of climate change (Lal et al., 2011). For many individuals, the contribution will be low-key, but it is still significant. Some suggestions with a high priority might be: individuals commit to zero population growth (replacement only), reduce energy usage, waste less and recycle materials, keep toxic chemicals out of waterways and the soil, and limit the use of non-biodegradable plastics and other materials. A range of other options has been suggested for the more developed countries (Australian Psychological Society, n.d.). This means that all can contribute something to preserving the planet we have been given to live on. Our responsibilities to care for God's creation, which includes our fellow human beings, become clearer as we accept God's salvation make-over invitation (2 Cor. 3:18; 4:6) and understand that God's redemptive act was to rescue all of creation (Rom. 8:19–21).

Stewards Still

Humans continue to be stewards of God's creation despite Adam giving dominion of the Earth to Satan (Christ's sacrifice has enlightened human minds, sensitized them to the suffering of all

creation, and given humankind the responsibility to alleviate this misery—Rom. 8:22; 2 Cor. 4:4; Rev. 11:18). The delicate structure of the natural world and the value of its preservation and study are recognized in Scripture. A clear statement regarding the necessity for conservation is given in Deuteronomy 22:6–7. The bird breeding stock was to be preserved, although the young could be taken. The Scriptures clearly recognize the need to act wisely to control wild animals, which may have increased to the point where they endanger agriculture and life itself (Exod. 23:29; Lev. 26:6). Such activities are to be done humanely, for we learn a principle of action in Proverbs 12:10 that the righteous care for animals in contrast to the cruel actions of those deemed wicked. The Jews were committed to the conservation of the productivity of agricultural lands and to the maintenance of tree resources. They practiced the spelling of agricultural lands every seventh year (Exod. 23:11), which served to control diseases and increase productivity in the initial years of the next cycle. This practice also impressed upon them continually that they were not to exhaust the land. Resources were to be valued and used judiciously (Richter, 2012). Their concern for fruit tree resources is shown by the strict instructions given to conquering armies. They were not to destroy them, "for the tree of the field is man's life" (Deut. 20:19, NKJV). The children of Israel were also taught to value natural resources, and they were not to view them as inexhaustible. This is clearly illustrated by reference to Isaiah 9:9–10 (NEB), where the Lord, in His anger with the Jews, threatened to destroy them because, among other things, "in their pride and arrogance they say, the bricks are fallen, but we will build in hewn stone; the sycamores are hacked down, but we will use cedars instead." We can gain a brief glimpse of God's attitude towards the restoration of the environment from Ezekiel chapter 47. If His representatives had followed His principles, then lush pastures, forests, and teeming multitudes of animals would have replaced deserts and sparsely populated regions at His command.

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