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Ellen White, Health, and the Third Angel's Message: Part 2–Minimizing Non-Communicable Diseases

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Introduction

The angel messengers brought to view by the apostle John provide two significant emphases. Acknowledging God's activities and then worshiping the Creator-Saviour is the first response urged. The second follows naturally in that these revelations are to be shared with unwarned members of the human family (Rev 14:6, 7). Readers are also urged to contrast life as originally planned by God following creation and the practices in the unregenerate world (Babylon) and respond to the invitation to make significant life-style changes (Rev 14:8–12). Christ similarly indicated to His disciples that self-indulgence and frivolity would prevail in society near the end of time, just as before the judgment of the universal flood (Matt 24:37, 39).

Ellen White's health vision outline (recorded 1864/5) was set in the context of Eden, the fall, and the contributions of humans to disease and suffering observed as a result of ignorance or disregard for the principles of health.[1] She later indicated that it was the duty of Christians to understand these principles so that mind and body are in the best condition to enable believers to bring glory to God.[2] This is essentially an acknowledgment that

[1] E. G. White, *Selected Messages* (Washington, DC: Review and Herald Publishing Association, 1958), 2: 411.

[2] E. G. White, *Counsels on Diet and Foods* (Washington, DC: Review and Herald Publishing Association, 1946), 18.

Christ designed and then purchased our bodies as His property, hence frustrating the claims of Satan to ownership.[3] Once understood, the principles of health are ours to follow as precious light.

Christians and others have understood something of the principles of health from early times.[4] Daniel and his friends were early exponents of vegetarianism (Dan 1:8, 16). In the United States there were prominent health movements from 1800 to 1870. Many of the themes introduced in Ellen White's health vision had been and were expressed by these movements. The key to the lasting nature of the Adventist emphasis, which only gained momentum after the 1863 vision, was achieved by linking health to spiritual values. Understanding and rendering obedience to the laws of health was regarded as a sacred responsibility.[5] The concept that the principles of health were to be studied and reform effected to enable clear thinking was emphasized by White in 1873. Health reform practiced among believers would enable them to grasp great Bible truths, work to fit them for heaven, and enable them to be good ambassadors of the gospel to others. This work was inseparably connected with the proclamation of the three angels' messages.[6]

To a variable degree Adventist communities have practiced the principles established through God's prophetic agencies. An early American Cancer Society study (1959) showed that the death rate among Adventists was well below the general population in California. Death from heart disease, stroke, cancer, and diabetes was in the range of 45–55 percent of other community members. International studies conducted in the Japan, Netherlands, and Norway confirmed these trends. Life expectancy was improved by exercise and when weight control was given priority. Believers also accepting an essentially vegetarian life-style had a life expectancy in the region of a decade longer than those preferring little exercise and a diet including red meat, fatty foods, eggs, and coffee.[7] The principal reasons for

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[3] E. G. White, *Testimonies for the Church* (Mountain View, CA: Pacific Press Publishing Association, 1948), 9: 369, 370.

[4] C. Spencer, *The Heretic's Feast: A History of Vegetarianism* (London: Fourth Estate, 1994), 108–129, 162–168, 252–294.

[5] G. W. Reid, *A Sound of Trumpets* (Washington, DC: Review and Herald Publishing Association, 1982), 77–110; E. G. White, "Parents their Own Physicians," *Health Reformer* 1(3) (1866): 35–37.

[6] White, *Counsels on Diet*, 69, 70

[7] W. J. Craig, *Nutrition and Wellness* (Berrien Springs, MI: Golden Harvest Books, 1999), 9–11.

increased life expectancy appeared to be the intake of fruits, vegetables, and nuts with their phytochemicals, unsaturated fats, and abundant dietary fiber content. An interesting comment made during a major study on the association between diet and heart disease and cancer was that when poor health began to be experienced, individuals in the Adventist tradition tended to move towards the dietary habits recommended for vegetarians.[8]

When different types of vegetarianism were investigated within Adventism in relation to the incidence of type 2 diabetes, vegans were the least likely to contract the disease followed by lacto ovo vegetarians, and other types of vegetarians (pesco- and semi-vegetarians). The first two types of vegetarian lifestyles were protective against the disease.[9] Moving outside Adventist circles, the consistent results shown by practitioners of a vegetarian lifestyle were lower incidences of hypertension, coronary heart disease, and mortality. Diabetes was less frequent too, as body weight control was more achievable.[10]

In many countries infectious diseases do not pose enormous challenges, contrary to the situation in previous centuries. However, we now see the rise of life-style diseases, which is coincidental with urbanization, globalization, and the adoption of poor Western dietary choices. Uncontrolled appetite and the lack of exercise are the scourges of modern societies.

The sobering reality is that in the year 2017 an estimated 70 percent of the global incidence of disease has been attributed to non-communicable diseases.[11] The most significant are cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes. The risk factors are an unhealthy diet, tobacco use, alcohol abuse, and physical inactivity.[12] Poor health caused by over nutrition and obesity through eating animal products and increased consumption of refined foods and fats contrasts with the continuing

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[8] G. Fraser, "Associations Between Diet and Cancer, Ischemic Heart Disease, and All-cause Mortality in Non-Hispanic White California Seventh-day Adventists," *American Journal of Clinical Nutrition* 70(3) (1999): 532s–538s.

[9] S. Tonstad, K. Stewart, K. Oda *et al*.,"Vegetarian Diets and Incidence of Diabetes in the Adventist Health Study–2," *Nutrition, Metabolism and Cardiovascular Diseases* 23 (2013): 292–299.

[10] G. E. Fraser, "Vegetarian Diets: What Do We Know of their Effects on Common Chronic Diseases?" *American Journal of Clinical Nutrition* 89(5) (2009): 16075–16125.

[11] World Health Organization, "Noncommunicable Diseases Progress Monitor 2017." Online: apps.who.int/iris/bitstream/10665/258940/1/9789241513029-eng.pdf(26/06/2018).

[12] World Health Organization, "10 Facts on Noncommunicable Diseases," (2013). Online: http://www.who.int/features/factfiles/noncommunicable_diseases/en/(29/06/2018).

problem of undernutrition in some locations or among disadvantaged groups.[13]

Just as Moses enunciated principles of health for the Israelites during the exodus enabling them to be fit representatives of God's truth, so today additional information has been given fitting believers to be good ambassadors for Christ. This is a necessary prerequisite to enable them to handle the "momentous truths" relevant to the end times (1 Pet 2:9).[14] As a consequence, our understanding and practice of the principles of health should be well in advance of others who do not accept the Bible as their guide, which reveals God's purpose to restore His image in the human race.[15]

The invitation is for the experience of good health to be more widely shown among believers and others willing to embrace the vision and experience the blessings promised by God. The challenge given to those with talents spoken of by Jesus (Matt 25:14–39) comes again to us today. If the usefulness of our talents is blunted or the period of their functionality shortened by practices contrary to the principles of health, then loss will be suffered.

In this paper, I will focus on non-communicable diseases and indicate the biblical standard adopted, Ellen White's expansion on these principles, and the findings of modern science.

Principles of Life/Health

Ellen White spoke often about the laws governing health. At other times she referred to these as rules and principles.[16] By this she meant that informed decisions about maintenance of health could be made by reasoning from cause to effect. From such observations, one is then able to formulate operational principles so as to give optimum health. She identified several of these principles.[17]

Today we tend to avoid the use of the term "laws" because scientists and philosophers often contend that the explanations offered in biology do not indicate causality but rather relate to function. Nevertheless, there are a few well understood laws in genetics and some scaling laws have been

[13] M. Chopra, S. Galbraith and I. Darnton-Hill, "A Global Response to a Global Problem: the Epidemic of Overnutrition," *Bulletin of the WHO* 80(12) (2002): 952–958.

[14] White, *Testimonies*, 9: 158.

[15] White, *Testimonies*, 1: 487.

[16] White, *Counsels on Diet*, 16, 23.

[17] White, *Selected Messages*, 2: 415, 416, 458.

proposed.[18] On account of these understandings, I will speak of operational principles rather than laws.

White took the exodus experience as her reference point in the health vision and Christ's instruction given there for developing an understanding of their significance. These principles are designed to assist in enjoying a pleasant life and a vigorous spiritual experience.[19] The operational principles I have identified during the exodus event in the area of physical health are shown in Table 1.

Table 1. Operational principles identified in the area of physical health in Moses' writings regarding the exodus.

Item no.	Operational Principle	Reference
1	Pure water is the recommended hydration liquid	Exod 15:25, 27; 17:6
2	Water contaminated by unclean animals should be avoided, except where the dilution factor is considerable	Lev 11:36
3	Food choices should be made from items provided or specified by the Creator	Exod 16:4; 23:19; Lev 7:19–21; 16:13; Num 13:23
4	Plant-based dietary choices have advantages over meat-inclusive ones	Num 11:4–6, 31–33
5	Meat preparations from clean animals should exclude blood and fat	Lev 7:22–27
6	Food items, irrespective of their origin, have a limited safe shelf life	Exod 16:18–20; Lev 7:15, 16
7	Cleanliness in person and food handling and waste disposal practices have health consequences	Exod 19:10, 14, Lev 7:18; 11:32, 36, 38: Deut 23:9–14
8	Moderation in food intake ensures the best health outcome	Num 11:31–34; cf. Exod 16:16, 22

[18] J. P. Raerinne and M. I. Eronen. "Multiple Realizability and Biological Laws," *History and Philosophy of Life Sciences* 34 (2012): 521–538; A. Rosenberg, *The Structure of Biological Science* (Cambridge: University of Cambridge Press, 1985), 30–34; G. B. West and J. H. Brown "Life's Universal Scaling Laws," *Physics Today* September, 2004, 36–42.

[19] White, *Counsels on Diet*, 121.

By constructing this table, I am in no way suggesting that physical health is not impacted by the mental state, the social surroundings, or the spiritual state. The vision of 1863 (1865 statements) affirmed the above principles with the exception of items 2 and 6. The last principle was supported later (1887) by Ellen White.[20] We might assume tacit acceptance of principle 2 by her as she traveled. The reasoning is that where ever municipal water supplies are used for domestic purposes, it is inevitable that contamination occurs for the catchment area will always contain some unclean animals. Nevertheless, at the same time as this dynamic was playing out, she spoke frequently of the use of pure water in such places; I assume that tank water or clean well water was not always available.

White also expanded readers understanding of some of these principles and gave other helpful ones as the years passed. I will expand on the recommendations she made under number 4 later.

Diet Chosen May Predispose to Disease

Warning against the use of animal-based foods arguably carries with it the message that dietary items may predispose to disease or carry disease agents. Unless specific statements are made, it is difficult to attribute emphasis. It seems that Ellen White's frequent emphasis was on meat carrying disease causing agents, but occasionally she used language that indicated that predisposition occurred through food choices. Several examples of the latter are as follows:

> Indulgence in eating is too frequent. . . . The blood becomes impure, and then diseases of various kinds occur.[21] 1864

> If parents and children eat frequently, irregularly, and in too great quantities, even of the most healthful food, it will injure the constitution; but in addition to this, if the food is of an improper quality, and prepared with grease and indigestible spices, the result will be far more injurious.[22] 1865

[20] *Ibid*., 309.

[21] E. G. White, *Spiritual Gifts* (Washington, DC: Review and Herald Publishing Association, 1945), 4a: 133.

[22] White, *Selected Messages*, 2: 427.

> The liability to disease is increased by flesh-eating.[23] 1890

> They [those who have adopted health reform] will realize that the use of food which they formerly regarded as harmless, was slowly but surely laying the foundation for dyspepsia and other diseases.[24] 1909

Two questions need to be asked. Did her statements represent ideas in advance of their times and are they correct? First, we can appreciate that the idea of dietary habits contributing to cancer and other disease development was a rather natural outcome of the "humor theory" of disease. In an attempt to get the humors back into balance, diet was one of the mechanisms used.[25] Added to this, forms of quackery involving dietary supplementation were practiced in Ellen White's time.[26] One of the prominent and more reasonable health exponents of the early nineteenth century, Sylvester Graham (1794–1851), was explicit about moderation, vegetarianism, and the use of natural food items rather than refined foods. He was against the use of condiments and pastries too. He contended that vegetarianism was well suited to meet human needs, because the Creator had arranged the body for that purpose.[27] This means that no particular priority claim can be attributed to White and of course there are insufficient details to allow us to analyze all the factors involved.

Today we recognize rather well that dietary choices predispose to disease. The influence of diet on the incidence of disease was highlighted before the end of the nineteenth century, although writers did not nominate the level of contribution made by dietary predisposition as against any other factor.[28] While some of the studies may not have passed modern scrutiny, it is the suggestion that interests us here. It remained for latter generations

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[23] E. G. White, *Christian Temperance and Bible Hygiene* (Battle Creek, MI: Good Health Publishing Co., 1890), 47; E. G. White, "Those Things Ought Not So To Be," *Pacific Recorder* 2(5) (1902):12–14.

[24] White, *Counsels on Diet*, 127.

[25] W. Norford, *An Essay on the General Method of Treating Cancerous Tumors* (London: J. Noon, 1753), 135–136.

[26] W. Gratzer, *Terrors of the Table: The Curious History of Nutrition* (New York: Oxford University Press Inc., 2005), chapter 10.

[27] S. Graham, *Science of Human Life* (Battle Creek, MI: Office of the Health Reformer, 1872), 71, 77, 82, 83, 180; Reid, *Sound of Trumpets*, 40, 41.

[28] J. H. Kellogg, "The Progress of Medical Knowledge," *Good Health* 34(8) (1899): 441–445; D. J. Th. Wagener, *The History of Oncology* (Houten, The Netherlands: Springer, 2009), 39.

of scientists to show the relationship among host, pathogen, and environmental influences. Not only the components involved in food intake, but also the quantity has a bearing on disease incidence.[29]

Heart Disease

Today we understand something about heart disease and that the risk is increased through excessive fat intake, use of animal fats, and high sodium intake. On the other hand, the risk is diminished by whole grains, nuts, fruit, vegetables, and fish.[30] All this is not without controversy, as we might imagine.

Diet and Disease Risk Discovered. The association of lesions in the arteries and cholesterol was understood in the West by 1946, but most considered this a normal associate of ageing. This concept was so rigidly held that clear experiments completed in Russia in 1913 establishing a link were ignored. The role of diet in reducing the risk of coronary heart disease came in the 1960s, although again there was evidence of its effectiveness as early as 1916-1922. These and other studies to follow were not well known, not fully appreciated, or rejected vigorously. Even in the 60s controversy dogged the idea that attention should be given to lowering the cholesterol level through dietary avenues in order to reduce cardiovascular disease.[31]

The early clues to the influence of diet on disease came from comparisons of disease incidences in those on simple diets that were essentially vegetarian.[32] The historical records contain a rather extensive account of suggestions that diet and disease were connected, but the evidence featuring in its support was often rather tenuous. Against this background, the following statement was penned by White in 1896, which indicates she gave Moses' writings priority and God the credit.

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[29] T. C. Campbell and T. M. Campbell, *The China Study* (Dallas, TX: Benbella Books, 2006), 99–108; Gross, 1997, *op. cit*., 4238.

[30] World Heart Federation. "Diet, Overweight, and Obesity," (2017). Online: https://www.world-heart-federation.org/news/?cats=29 (25/06/2018).

[31] H. Blackburn, "20th-century 'Medical Marco Polos' in the Origin of Preventive Cardiology and Cardiovascular Disease Epidemiology," *American Journal of Cardiology* 109(5) (2012): 756–767; D. Steinberg, "Thematic Review Series: the Pathogenesis of Atherosclerosis. An Interpretive History of the Cholesterol Controversy: Part 1," *Journal of Lipid Research* 45 (2004): 1583–1593.

[32] Blackburn, *op. cit*.

> The meat is served reeking with fat, because it suits the perverted taste. Both the blood and the fat of animals is consumed as a luxury. But the Lord has given special directions that these should not be eaten. Why?—Because their use would make a diseased current of blood in the human system. Disregard of the Lord's special directions has brought a variety of difficulties and diseases upon human beings…. If they introduce into their system that which cannot make good flesh and blood, they must endure the results of the disregard of God's word.[33]

A large intake of fatty foods is not a good choice. This was understood by one people group anciently (Jewish) where the advice was given to avoid eating animal fat (Lev 7:23). At a rather later time (600 BC), the Indian physician Charaka specifically noted the link between heart disease, overeating, lack of exercise, and stress.[34]

Heart Disease Today. The relationship between heart disease and fat intake is not free from dispute in scientific circles. A number of studies have shown that the risk of heart disease is reduced by limiting the intake of fatty foods containing saturated fats and replacing them with unsaturated fats and at the same time taking on a diet high in fiber and micronutrients from fruit and vegetables. And it is not only heart disease that is affected by fat intake, obesity and colorectal cancer risks may be increased too.[35] In terms of general health, White gave advice along these lines too. She advised using an abundance of fresh fruit and vegetables and abstaining from fat-ladened items of food.[36]

Particular classes of saturated fatty acids have different effects, so that sweeping statements can no longer be made about saturated versus unsaturated fats. The jury is still out on the intake of coconut and palm

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[33] White, *Counsels on Diet*, 393.

[34] J. Mann, "Complex Dietary Patterns (Mediterranean Diet, Vegetarian/Vegan Dietary Models): Impact on Carbohydrate and Lipid Metabolism," in *Nutritional and Metabolic Bases of Cardiovascular Disease*, eds. M. Mancini, J. M. Ordovas and P. Strazzullo (Chichester, West Sussex: John Wiley & Sons, 2011), 119–123; F. P. Mancini and M. Mancini, "Optimal Nutrition for Health and Longevity, 77–88, in *Bases of Cardiovascular Disease*, *op. cit*.; R. B. Singh, F. DeMeester and A. Wilczynska, "The Tsim Tsoum Approaches for Prevention of Cardiovascular Disease," *Cardiology Research and Practice*, 2010, Article ID 824938. doi: 10;4061/2010/824938.

[35] World Cancer Research Fund/American Institute for Cancer Research. *Food Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective* (Washington, DC: AICR, 2007). Chap. 4.3.

[36] E. G. White, "Exercise and Diet," *Signs of the Times* 23(38) (1897): 3, 4; *Counsels on Diet*, 321.

products, which are exceptional in the plant kingdom in that they contain a high proportion of saturated fats.[37] The following information should help readers to form an opinion.

The richest source of saturated fats is the oil from these plants. The composition of palm oil differs considerably from coconut oil.[38] The latter oil has a high percentage of fatty acids that increase good cholesterol (high density lipoproteins), although some fatty acids it contains raise levels of low density lipoproteins. The overall effect in populations eating significant amounts of coconut products differ depending on the other components of their diet. For example, the Kitavans (Melanesia) have a low incidence of coronary heart disease whereas groups from Sri Lanka have a relatively high incidence. The difference between the populations is thought to be attributable to the high fish, fruit, vegetables, and the traditional absence of processed foods among the Melanesians. Complex interactions occur among nutrient components and sociological factors also come into play. This means that combining a Western diet with the intake of all but small quantities of coconut products could be problematic, especially if coconut oil is chosen as the primary food item. Coconut oil is to be preferred over butter but it does not compare favourably with vegetable oils.[39]

The risks of consuming palm oil with its high levels of saturated fatty acid has not been fully assessed, but it appears to be relatively risk free as long as there is not an excess level of dietary cholesterol present in the diet.[40] The oil when freshly prepared contains powerful antioxidants, which gives a clue to its relatively neutral impact on heart disease. However, when the oil is repeatedly reheated (a common practice in Asia) some of the beneficial properties are lost allowing its use to increase the risk of heart

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[37] C. S. Dayrit, "Coconut Oil: Atherogenic or Not?" *Philippine Journal of Cardiology* 31(3) (2003): 97–104; F. B. Hu, J. E. Manson, W. C. Willett, "Types of Dietary Fat and Risk of Coronary Heart Disease: a Critical Review," *Journal of the American College of Nutrition* 20(1) (2001): 5–19; P. W. Siri-Tarino, Q. Sun, F. B. Hu *et al*., "Meta-analysis of Prospective Cohort Studies Evaluating the Association of Saturated Fat with Cardiovascular Disease," *American Journal of Clinical Nutrition* 91(3) (2010): 535–546.

[38] F. M. Goh, "Formulation of Lauric Oil-containing Food Products and their Performance," *Proceedings of the World Conference on Lauric Oils: Sources, Processing, and Applications*, ed. T. H. Applewhite (Boulder, IL: AOCS Press, 1994), 98–103.

[39] L. Eyres, "Coconut Oil and the Heart," Heart Foundation Evidence Paper, 2014. Online: http://www.heartfoundation.org.nz/uploads/evidence_paper_coconut_August_2014.pdf (25/06/2018).

[40] S. Mukherjee and A. Mitra, "Health Effects of Palm Oil," *Journal of Human Ecology* 26(3) (2009): 197–203.

disease, at least in animal models.[41] When all the data are considered, there are perhaps better options than using palm oil, as demonstrated in animal experiments. Extra virgin olive oil actually decreased disease lesions when fed to mice (diet mimicked Western) whereas palm oil fed animals showed accelerated lesion formation.[42]

If we are in a position to lower our cholesterol levels, this will be beneficial in reducing the risk of vascular and heart disease. The heart damage risk marker cholesterol (some is needed by the body) can be lowered by reducing the intake of eggs, meat, and full fat dairy products (includes cheese). Fish is exceptional in that it contains beneficial omega-3 polyunsaturated fatty acids (good plant sources are found in nuts and beans) but on the other hand it still contains cholesterol in reasonable quantities.[43] When we speak of reducing the level of one risk factor in the diet, careful readers will be aware that substitutes should contribute towards healthful eating. For example, reduction in saturated fats should not be associated with a compensatory increase in refined carbohydrates.[44]

While talking about meat in the diet, it recently has been suggested that the tendency for red meat to increase the risk of heart disease may be due to additional substances found in abundance in this food item. The first of these is carnitine. It is in relatively high concentrations in red meat, especially lamb (also in dairy products). This substance is changed by microbes in the body. Such changes tend to become an issue in those individuals with a low fiber intake, for metabolites are produced that increase the risk of certain heart diseases. The body normally produces all the carnitine it needs to carry out its functions of transporting fatty acids, so

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[41] T. K. Xian, N. A. Omar, L. W. Ying *et al*., "Reheated Palm Oil Consumption and Risk of Atherosclerosis: Evidence at Ultrastructural Level," *Evidence Based Complementary and Alternative Medicine*, 2012: 828170. Online: http://dx.doi.org/10.1155/2012/828170 (25/06/2018).

[42] J. M. Arbonés-Mainar, M. A. Navarro, R. Carnicer *et al.*, "Accelerated Atherosclerosis in Apolipoprotein Deficient Mice Fed Western Diets Containing Palm Oil Compared with Extra Virgin Olive Oils: a Role for Small, Dense High-density Lipoproteins," *Atherosclerosis* 194(2) (2007): 372–382.

[43] Craig, *Nutrition and Wellness*, 60–64, 76–77, 96–97; D. J. Pehowich, A. V. Gomes and J. A. Barnes "Fatty Acid Composition and Health Effects of Coconut Constituents," *West Indian Medical Journal* 49 (2000): 128–133.

[44] R. R. S. Packard and P. Libby, "Inflammation in Atherosclerosis: from Vascular Biology to Biomarker Discovery and Risk Reduction," *Clinical Chemistry* 54(1) (2008): 24–38.

we do not need to worry about including it in the diet.[45] Then there are the advanced glycation end products formed through reactions between protein and sugar groups during metabolism in the body or in highly heated, processed foods (browning during baking, grilling, barbecuing, etc). The components are abundance in foods rich in protein and fats, especially those of animal origin. Their presence has been associated with diseases such as atherosclerosis and chronic kidney disease. These findings constitute additional incentive to reduce one's dependence on animal-based foods.[46]

Other dietary components contribute to heart-health. An important component of the Mediterranean diet is olive oil. White gave this food item a good report sheet.[47] It is the main fatty acid component of a Mediterranean diet. This monounsaturated fatty acid (major component is oleic acid) exerts a number of health benefits and some of these are on account of the presence of antioxidant agents (polyphenols). Olive oil decreases the levels of low density lipoproteins and total cholesterol. High density lipoproteins (good ones) and cholesterol levels remain unchanged.[48] Many benefits have been attributed to including this oil (particularly high quality lines) in the diet. These include decreasing the risk of atherosclerosis and the risk of contracting certain cancers. Additional benefits have been claimed for those who have diabetes, rheumatoid arthritis, gastric ulcers, and gall bladder problems.[49]

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[45] A. Ghonimy, D. M. Zhang, M. H. Farouk et al., "The Impact of Carnitine on Dietary Fibre and Gut Bacteria Metabolism and Their Mutual Interaction in Monogastrics," *International Journal of Molecular Sciences* 19(4) (2018), 1008. doi: 10.3390/ijms19041008; R. A. Koeth, Z. Wang, B. S. Levison *et al*., "Intestinal Microbiota metabolism of L-carnitine, a Nutrient in Red Meat, Promotes Atherosclerosis," *Nature Medicine* 19 (2013): 576–585. doi:10.1038/nm.3145; Mancini and Mancini, in *Bases of Cardiovascular Disease*, *op. cit*., 78–79.

[46] N. J. Kellow and G. S. Savige, "Dietary Advanced Glycation End-Product Restriction for the Attenuation of Insulin Resistance, Oxidative Stress and Endothelial Dysfunction: a Systematic Review," *Journal of Clinical Nutrition* 67 (2013): 239–248; J. Uribarri, "Advanced Glycation End Products," in *Handbook of Chronic Kidney Disease Management*, ed. J. T. Daugirdas, (Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins Health, 2011), 152–158.

[47] E. G. White, *The Ministry of Healing* (Mountain View, CA: Pacific Press Publishing Association, 1942), 298.

[48] Craig, *Nutrition and Wellness*, 85.

[49] C. Alarcón de la Lastra, M. D. Barranco, V. Motilva *et al.*, "Mediterranean Diet and Health Biological Importance of Olive Oil," *Current Pharmaceutical Design* 7(10) (2001): 933–950.

The good news is that the effects of our poor choices can be reversed through exercise, stress management, and dietary decisions that reduce fats. We might consider the use of polyunsaturated fats (e.g., corn, safflower and soy) or monounsaturated oils (e.g., canola, olive, and peanut). If we include foods rich in vitamin E (seeds, nuts, and vegetable oils), carotenoids (organic pigments) and flavonoids (compounds that exert oestrogenic actions on animals), then we reduce the formation of dangerous types of low density lipoproteins. Flavonoids are present particularly in fresh, ripe plant foods and berries and there are more present in the peel than the pulp. The yellow, orange, and red pigments associated with fruit and vegetables are carotenoid pigments. This means we are advised to eat plenty of fresh fruit and vegetables and regularly use nuts if we wish to lower our risk of heart disease. The soybean and its products are especially valuable in lowering blood cholesterol levels.[50]

Maintaining cardiovascular health is not only about diet. Exercise and other forms of physical activity are also significant. It has been estimated that about half of the population in industrialized countries place themselves at increased risk of premature death from heart and other diseases on account of lack of physical activity. Health benefits are to be reaped through moderate levels of physical activity undertaken on a regular basis. The death rate drops if we undertake to walk 1.6 kilometers (one mile) per day. Further benefit is not observed after 4.8 kilometers (three miles). Recommendations other than walking involve participating in moderate or vigorous activity 3 to 5 days per week.[51]

Diabetes

Diabetes is of ancient origin and attempts to treat it by imposing dietary regimes began more than two centuries ago. The variations in suggested solutions were wide, but one common element was the belief that restricting the quantity of food taken was the key to curing the disease. Exercise was also found as useful in its treatment.[52] White never mentioned diabetes by name but may have treated it under the title of dyspepsia as some others

[50] Craig, *Nutrition and Wellness*, 62–77; L. A. Smolin and M. B. Grosvenor, *Nutrition: Science and Applications*, fourth edition (New Jersey: John Wiley & Sons, Inc., 2003), 343–345.

[51] E. Farinaro, E. Della Valle and R. Grimaldi, "Physical Activity and Risk of Cardiovascular Diseases," in *Bases of Cardiovascular Disease*, *op. cit*., 124–128.

[52] F. Allen, E. Stillman and R. Fitz. *Total Dietary Regulation in the Treatment of Diabetes*. (New York: Rockefeller Institute of Medical Research, 1919), 19–26, 37–46, 491.

did.[53] Nevertheless, she often spoke against some of the root causes of the disease—gluttony, cakes, and other rich foods with their load of sugar.[54]

Diabetes Today. Diabetes increases the risk of heart disease, kidney dysfunction, blindness, nerve disease, and limb amputation. In type 2 diabetes, blood glucose levels are elevated because the body cells do not respond normally to insulin. This hormone allows cells to use glucose to obtain their energy, but in diabetes type 2 glucose is not absorbed properly by the cells.[55]

The disease is both a significant and of growing public health interest in many places particularly Western nations, but the trend is seen in the Asia-Pacific region as well. There is a veritable epidemic in China and India. Diabetes (especially type 2 or non-insulin dependent diabetes) can be prevented or delayed through managing the risk factors. Keeping the body fat down and being physically active are the key strategies to adopt in order to prevent its development and to successfully treat it. Evidence suggests, too, that the intake of high levels of saturated fats during pregnancy compromises the future health of the baby. Avoiding excessive levels of saturated fats, highly refined foods, and realizing the value of grains and vegetables are important parts of any successful strategy.[56] God's initial plans for the human race included both participating in regular exercise and eating exclusively of fresh foods. Refined foods were not available (Gen 1:29; 2:15; 3:18–19), making us certain that diabetes was unknown to early humans. White's advice was for the underactive to exercise in fresh air, for

[53] *Ibid*., 19.

[54] White, *Counsels on Diet*, 132, 133, 135; 327–329; 332, 333.

[55] International Diabetes Federation, "Diabetes Complications," and "About Diabetes," (2015). Online: https://www.idf.org/aboutdiabetes/what-is-diabetes/complications.html, http://www.idf.org/about-diabetes (25/06/2018).

[56] L. G. Carter, K. L. K. Tamashiro and K. J. Pearson, "Maternal Diet and Exercise: Influences on Obesity and Insulin Resistance," *Nutrition and Epigenetics* eds. E. Ho and F. Domann (Boca Raton, FL: CRC Press, 2015), 53-86;.Craig, *Nutrition and Wellness*, 147149; Expert Committee on the Diagnosis and Classification of Diabetes Mellitus, "American Diabetes Association: Clinical Practice Recommendations," *Diabetes Care* 25(Suppl. 1) (2002): S1–147; G. L. Khor, "Dietary fat quality: a nutritional epidemiologist's view," *Asia Pacific Journal of Clinical Nutrition* 13(Suppl.) (2004): S22; S. Mathur, I. Gajanayake and G. Hodgson, *Diabetes as a Cause of Death, Australia, 1997 and 1998* (Canberra: Australian Institute of Health and Welfare, 2000), ix, xi, 1; V. Messier, A-S. Brazeau, R. Rabasa-Lhoret *et al*., "Physical Exercise in the Prevention and Treatment of Obesity, Diabetes, and Metabolic Syndrome, in *Bases of Cardiovascular Disease*, *op. cit*., 129–137.

the excessively active to be more moderate, and to follow God's initial dietary plan for the race.[57]

Blood glucose control is made simpler by eating starchy, high fiber carbohydrates. Simple carbohydrates found in honey, soft drinks, sweets, biscuits, fruit drinks, and the like are best avoided or taken in small quantities. We do well not to overload on proteins and definitely we need to keep fats under control. It is wise to eat less and not to eat in front of the television. The advice is to reduce fatty and sugary foods and second helpings. In other words, we need to take control of our eating.[58]

Vegetarians are at less risk of developing diabetes in contrast to meat eaters. In fact, there is a positive relationship between how much red meat and processed meat that is eaten and diabetes.[59] The suspect compounds are called advanced glycation end products (formed from interactions between sugars and amino groups on proteins and the like). These are found naturally in some foods, especially those high in protein and fats of animal origin. Cooking at high temperatures and dry heat ensures they are present in especially high amounts. There is also a gentle warning that caffeine intake in the form of coffee, tea, and cola drinks is a risk factor for diabetes type 2 and could exacerbate it in those already showing symptoms of the disease.[60]

The key to understanding blood glucose levels resides in understanding the glycemic index. This index is a system of classifying carbohydrates in terms of how quickly and strongly they cause blood sugar to rise. The higher the index value, the more care we need to exercise in the use of the food item, for regular strong blood glucose spikes are bad for our health. The glycaemic index is raised by eating highly processed products. The more finely ground a product, the higher its value on the index. The good news is that we can choose our foods wisely by consulting the index on the

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[57] White, *Signs of the Times* (1897), *op. cit*.

[58] D. Buettner, *The Blue Zones* (Washington, DC: National Geographic, 2008), 227–234; R. Hillson, *Diabetes: A New Guide* (London: Positive Health Guide, 1993), 56–67.

[59] W. J. Craig and A. R. Mangels, "Position of the American Dietetic Association: Vegetarian Diets," *Journal of the American Dietetic Association* 109(7) (2009): 1266–1282; J. S. Gear, J. I. Mann, M. Thorogood, *et al*.., Biochemical and Hematological Variables in Vegetarians," *British Medical Journal* 280(6229) (1980): 1415; D. Snowdon and R. Phillips, "Does a Vegetarian Diet Reduce the Occurrence of Diabetes?" *American Journal of Public Health* 75 (1985): 507–512.

[60] Uribarri, *Chronic Kidney Disease Management*, 152–158; J. D. Lane, "Pilot Study of Caffeine Abstinence for control of Chronic Glucose in Type 2 Diabetes," *Journal of Caffeine Research*, 1(1) (2011): 23–28.

Internet.[61] The general advice for those without this facility is to use minimally processed foods and largely avoid sugar and soft drinks. We might carefully note that some fruits are rich in natural sugars but do not raise blood sugar levels as strongly as some starchy foods. How the sugar is packaged in the food is thus important. Dietary fiber (soluble and insoluble forms) play important functions in human health. Soluble fiber particularly appears to convert carbohydrates into a slow release form that lowers the insulin required for uptake into tissues. This and other factors contribute to reducing the risk of diabetes and other diseases.[62]

I mention a simple but important fact here. We should not fall into a common trap and think that simple sugars such as fructose and glucose found in honey are any less damaging than cane sugar (sucrose) or other simple sugars when taken in excess. All simple sugars are problematic when taken in excess. The scientific community understands that there is a tendency to overweight and other problems through eating food and drink loaded with simple sugars.

Gastric Upset, Ulcers, and Cancer

One of the most common nineteenth century conditions was dyspepsia (bad digestion). In its severest form it was manifested as gastric or duodenal ulcer.[63] Dyspepsia of the stomach, intestines and liver were diagnosed. As early as 1866, one medico (Austin Flint) indicated that a proper diet, regularity in eating and avoiding excesses, together with psychological support would go a long way towards overcoming it.[64] He may have been influenced in his writing by William Beaumont's prior reports on his

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[61] GI Website. Online: http://www.glycemicindex.com/ (25/06/2018).

[62] Craig, *Nutrition and Wellness,* 151; J. M, Hannan, L, Ali, B, Rokeya *et al*., "Soluble Dietary Fibre Fraction of *Trigonella foenum-graecum* (Fenugreek) Seed Improves Glucose Homeostasis in Animal Models of Type 1 and Type 2 Diabetes by Delaying Carbohydrate Digestion and Absorption, and Enhancing Insulin Action," *British Journal of Nutrition* 97(3) (2007): 514–521; D. J. A. Jenkins, A. L. Jenkins, C. W. C. Kendall et al., "Dietary Fibre, Carbohydrate Metabolism and Chronic Disease," *Advanced Dietary Fibre Technology*, eds. B. McCleary and L. Prosky.(London: Blackwell Science Ltd., 2001), 162–167; A. A. Rivellese and R. Giacco, "Dietary Carbohydrates, Overweight and Metabolic Syndrome: the Role of Glycemic Index in a Healthy Diet," in *Bases of Cardiovascular Disease*, *op. cit*., 105–111.

[63] Reid, *Sound of Trumpets*, 78, 79.

[64] F. Delafield. "Some Forms of Dyspepsia," *Medical America in the Nineteenth Century: Readings from the Literature*, ed. G. H. Brieger (Baltimore, MD: John Hopkins University Press, 2009).

famous experiments performed on the gun-shot victim Alexis St. Martin. Through a fistula into Alexis' stomach, Beaumont was able to observe the effects of various food items on the activities of the stomach. He observed that particularly spicy condiments, tea, coffee, and alcohol debilitated it. He declared that dyspepsia was often caused by overeating and drinking.[65]

Similar advice appeared in Ellen White's writings,[66] although I am not claiming she used similar sources for her statements. It is undeniable that parallel thoughts were circulating at the time she wrote, but on balance a lot of unusual and useless advice was being promoted too.

Dyspepsia and Associated Conditions Today. Dyspepsia was one of the great scourges of the nineteenth century. Today, it is estimated that 30 to 40 percent of adults (US) experience upper abdominal pain or discomfit. Such pain may be associated with acid reflux, peptic ulcers, malignancy, or other causes.[67] Many experience acid reflux. This is where the gastric contents are released into the oesophagus, leading to discomfit. The release is caused by impaired function of the special muscle at the lower end of the oesophagus that is meant to prevent escape of gastric juices. Not surprisingly, this release of acid into unprotected tissues, damages them. The experience is more common in the West than other regions of the world. The life-style risk factors involved appear to be obesity, smoking, alcohol, fatty and fried foods, tomato sauce, mint, garlic, onion, coffee, and chocolate. Large meals eaten less than three hours before lying down are an invitation to experience reflux. Tight fitting clothes should be exchanged for more loose fitting gear to lessen the risk. If the condition is neglected, then ulcers and oesophageal cancer development can be anticipated in some individuals. One line of advice is to effect life-style changes, but the sad truth is that most do not respond positively to this sane advice and require more heroic measures to be adopted.[68] One practical option adopted by the author with success was to eat the evening meal early and make it light. Avoiding acid foods,

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[65] W. Beaumont, *Experiments and Observations on the Gastric Juice, and the Physiology of Digestion* (Edinburgh: Maclachlan & Stewart, 1838), 36–42.

[66] White, *Counsels on Diet*, 132, 133, 135; 339, 341.

[67] R. C. Harmon and D. A. Peura, "Evaluation and Management of Dyspepsia," *Therapeutic Advances in Gastroenterology* 3(2) (2010): 87–98.

[68] R. S. Holmes and T. L. Vaughan, "Epidemiology and Pathogenesis of Esophageal Cancer," *Seminars in Radiation Oncology* 17(1) (2007: 2–9; P. Moayyedi and N. J. Talley, "Gastro-oesophageal Reflux Disease," *Lancet* 367(9528) (2006): 2086–2100; Mayo Clinic, "Gastroesophageal Reflux Disease (GERD)," Online: https://www.mayoclinic.org/diseases-conditions/gerd/diagnosis-treatment/drc-20361959 (25/06/2018).

including those containing vinegar (acetic acid), also helped. This, on reflection, was essentially White's advice as well as that of experts,[69] and would have prevented considerable discomfit if I had taken notice earlier. Simpler acids delay stomach emptying and in some individuals their intake appears to be connected with increased risk of acid reflux.[70]

Gastric Ulcers and Cancer. The question sometimes arises: Do fiery spices harm the body? Beaumont had shown at an early date that they debilitated the stomach. White indicated that spices irritate the stomach lining,[71] which is not a particularly radical idea as experience shows that when these spices contact the mouth and other such delicate tissues then irritation/inflammation occurs. Many spices are irritants according to common experience, a feature recognized by White,[72] and this is substantiated by detailed scientific evidence. Spices such as pepper, chili, mustard, and cinnamon irritate the stomach or in other words make it difficult for the cells to operate in a balanced manner. When we combine irritation through this means with a stressful lifestyle, then the way is opened to damaging the mucosal lining in the stomach. This makes the organ susceptible to ulcer formation. Scientific research suggests that eating highly seasoned food (e.g., high consumption of chili and other hot spices) on a regular basis is not a wise choice. Too many associations have been found between the incidence of different kinds of cancer and the intake of very spicy foods to make their consumption advisable, although it is fair to say that not all studies support this line of thought.[73]

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[69] J. Kaufman, J. Stern and M. Bauer, *Dropping Acid: The Reflux Diet Cookbook & Cure* (Elmwood Park, NJ: G. & H. Soho, Ltd, 2010); White, *Counsels on Diet*, 181, 345.

[70] M. Asunción Recasens, C. Puig and V. Ortiz-Santamaria, "Nutrition in Systemic Sclerosis," *Reumatología Clínica* 8(3) (2012: 135–140; S. Emerenziani and D. Sifrim, "Gastroesophageal Reflux and Gastric Emptying, Revisisted," *Current Gastroenterology Reports* 7(3) (2005): 190–195; A. Paradkar and S. Baklival, *A Textbook of Biopharmaceutics and Pharmacokinetics*, third edition (Pune: Nirali Prakashan, 2008), 2.16; C. A. Pellegrini, "Delayed Gastric Emptying in Patients with Abnormal Gastroesophageal Reflux," *Annals of Surgery* 234(2) (2001): 147, 148.

[71] *Ibid*., 341.

[72] White, *Ministry of Healing*, 326.

[73] V. E. Archer and D. W. Jones, "Capsaicin Pepper, Cancer and Ethnicity," *Medical Hypotheses* 59(2) (2002): 450–457; R. P. Dikshit, G. Mathur, S. Mhatre *et al*., "Epidemiological Review of Gastric Cancer in India," *Indian Journal of Medical and Paediatric Oncology* 32(1) (2011): 3–11; L. Li, S-P. H and S-J. F, "A Case-control Study on the Risk Factors of Gastric Cancer in Xuzhou City," *Modern Preventive Medicine*, 36(17) (2009): 3209–3211; I. Serra, M. Yamamoto, A. Calvo *et al*., "Association of Chili Pepper Consumption, Low Socioeconomic Status and Longstanding Gallstones with Bladder Cancer

Another association of interest is the consumption of Cantonese style salted fish. Fish are prepared by placing crude dry salt or concentrated brine in contact with the meat; the meat may be left to decompose slightly before salting occurs. In various geographical regions, where consumption of this product is traditional, unusual occurrence of cancer of the upper respiratory tract is noted. This has been related to the volatile N-nitrosamine compounds identified in the product. Eating such food, especially during and after the weaning stage, is associated with a high incidence of disease. Hence, Cantonese salted fish are classified as a Group 1 carcinogen (highest level). The risk for stomach cancer is increased through eating such highly salted food.[74]

On a more general level, it has been found that increasing the amount of fruit and vitamin C and decreasing the intake of salt and salted foods had a positive influence on the prevention of gastric cancer. Salt is known to enhance the effects of known gastric carcinogens, and destroys the protective barrier of mucus on the stomach wall making the association very plausible.[75] This, interestingly, was the advice given by White. While she advised not to eat largely of salt, she recognized the need for some.[76] By mentioning this advice, I am in no way claiming hidden knowledge or claims of priority.

Cancer Latency Broken

There is another insidious side to cancer development. Referring to the indoor life style and personal habits particularly of females in her day, Ellen White said: "Cancerous humor, which would lay dormant in the system their life-time, is inflamed, and commences its eating, destructive work."[77] It is my intention to pen a few words on the concept of dormancy or latency of cancerous agents that White alluded to.

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in a Chilean Population," *International Journal of Cancer* 102(4) (2002): 407–411; World Cancer Research Fund/American Institute for Cancer Research, *op. cit*., 113.

[74] World Health Organization, *Personal Habits and Indoor Combustions*. "Chinese-Style Salted Fish," IARC Monograph 100E (Geneva, Switzerland: WHO Press, 2012), 501–514.

[75] S. Tsugane and S. Sasazuki, "Diet and the Risk of Gastric Cancer: Review of Epidemiological Evidence," *Gastric Cancer* 10 (2007): 75–83.

[76] White, *Counsels on Diet*, 207, 420.

[77] E. G. White, *An Appeal to Mothers* (Battle Creek, MI: Seventh-day Adventist Publishing Association, 1864), 27.

Virus Latency. The latency of viruses was recognized in the 1950s when experiments with mouse leukaemia virus were carried out involving selected inbred strains of mice. The virus was shown to be transmitted to the offspring, so that the pups were prone to develop the disease when the appropriate trigger occurred. However, activation of the virus did not always occur during the life span of the parents, so that these animals could remain in good health. The inactivation process could be followed for several successive generations until the virus was activated in the progeny.[78] It is now understood that some cancers of humans can also remain latent in the system until exposed to an activating agent.[79] Even where a virus aetiology has not been proven, as in human breast cancer, it is known that tumour cells can remain dormant for years or even decades. These cells may, however, lose their dormancy when new blood vessels arise in their vicinity and grow.[80]

Now there is a fascinating link between diet and cancer. Diet apparently may influence the period of latency. This link has been summarized in a well-known book, *The China Study*, written by Drs. Campbell. The issue they were investigating was the ability of a group of class 1 carcinogens, the aflatoxins (generated by fungi growing on plant food materials), to cause cancer. The initial enquiry commenced in the Philippines where it was observed that the better fed people experienced a greater incidence of liver cancer. The clue to this dilemma came when they discovered in their test animals that a high risk factor was an abundant intake of protein (casein).[81] In subsequent studies, this food item stimulated the growth of cancer cells, which would otherwise have lain dormant or progressed very slowly. Plant

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[78] L. Gross, "Facts and Theories on Viruses Causing Cancer and Leukemia," *Proceedings of the National Academy of Sciences USA* 71(5) (1974): 2013–2017.

[79] J. Countryman and G. Miller, "Activation of Expression of Latent Epstein-Barr HerpesVirus after Gene Transfer with a Small Cloned Subfragment of Heterogeneous Viral DNA," *Proceedings of the National Academy of Sciences USA* 82(12) (1985): 4085–4089; S. Matsumura, Y. Fujita and A. C. Wilson, "Activation of the Kaposi's Sarcoma-associated Herpesvirus Major Latency Locus by the Lytic Switch Protein RTA(ORF50)," *Journal of Virology* 79(13) (2005): 8493–8505.

[80] C. M. Ghajar, H. Peinado, H. Mori *et al*., "The Perivascular Niche Regulates Breast Tumour Dormancy," *Nature Cell Biology* 15(7) (2013): 807–817.

[81] L. D. Youngman and T. C. Campbell, "Inhibition of Aflatoxin B_1-Induced Gamma-Glutamyltranspeptidase Positive (GGT^+) Hepatic Preneoplastic Foci and Tumors by Low Protein Diets: Evidence that Altered GGT^+ Foci Indicate Neoplasic Potential," *Carcinogenesis* 13(9) (1992): 1607–1613.

proteins tested (gluten, soy) did not have stimulatory effects even at high levels.[82]

Risk Factors for Some Cancers. The observation by the Campbells can be supplemented by additional information on risk factors for colorectal cancer. The World Health Organization recently has classified red meats as possibly carcinogenic (group 2A) and processed meats as carcinogenic (group 1).[83] This represents the resurrection of an old idea mentioned by Moses regarding health outcomes as recorded in the Pentateuch (Lev 3:17; 7:26; 19:26; cf. Acts 15:29).

Meat eating is associated with an increased risk of colorectal cancer. Those who reduce meat intake generally increase the intake of plant-derived food components (with their protective chemicals), which accounts in part for protection. However, more specific information has come from a number of studies and most recently from human volunteers. Red meat has a rich supply of blood proteins and haem (myoglobin—muscles and hemoglobin—blood) associated with it. One suggestion is that these proteins react with other chemicals present in the digestive tract that are formed under the conditions normally present there and further that haem stimulates the formation of cancer-producing substances. As a result, carcinogens such as nitrosamines are made. Red meat is a much richer source of iron containing proteins (particularly myoglobin) than white meat, thus potentially explaining its strong association with increased cancer risk. Processed meats also fit into the same risk category as red meats. It has been estimated by one group of researchers that the risk of contracting colorectal cancer is increased by 12 to 17 percent per 100 gram of all meat or red meat consumed per day; the risk is much higher for processed meats.[84] While these estimates have been questioned, The World Cancer Research Fund recommends that those eating red meat should restrict intake

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[82] Campbell and Campbell, *China Study*, 33–41, 54–65.

[83] World Health Organization, "IARC Monographs Evaluate Consumption of Red Meat and Processed Meat," (2015). Online: https://www.iarc.fr/en/media-centre/pr/2015/pdfs/pr240_E.pdf (25/06/2018).

[84] American Association for Cancer Research. "2 Components of Red Meat Combined with Alteration in DNA Repair Increase Risk for Bladder Cancer," 7 October 2012. Online: http://www.eurekalert.org/pub_releases/2012-10/aafc-tco101112.php (25/06/2018); S. A. Bingham, R. Hughes and A. J. Cross, " Effect of White vs Red Meat on Endogenous N-nitrosation in the Human Colon and Further Evidence of a Dose Response," *Journal of Nutrition* 132(11) (2002): 3522S–3525S; A. Turbic, J. T. Ahokas and C. A. Haskard, "Selective In Vitro Binding of Dietary Mutagens, Individually or in Combination, by Lactic Acid Bacteria," *Food Additives and Contaminants A* 19(2) (2002): 144–152.

to less than 500 grams per week. They noted that an individual eating a serving of red or processed meat daily for 40 years had a 20 percent increased risk of developing colon cancer. Individuals prone to eating meats cooked at high temperatures (grilling, frying, and barbecuing) increase their exposure to substances that are cancer producing, as do those who eat meats that are salted, smoked, and treated with nitrous compounds.[85] The American College of Nutrition recently recommended that avoiding red meat has advantages beyond cancer risk reduction and encompasses diabetes, hypertension, and cardiovascular disease. They went on to observe that all the nutrients contained in these products could be gained from plant-based diets.[86]

Nitroso-compounds interfere with cellular stability and cause stress. In practical terms this means that these dangerous compounds are able to cause a lesion in the genetic material (DNA) injuring it and its ability to operate with fidelity. As a consequence, the cell's physiological stability is lost and cancer may develop. Such compounds are most abundant in dietary sources such as cured meats, seafood, and smoked cheeses.[87]

Those in some ancient societies who took the advice of their prophets seriously and restricted the intake of blood through eating kosher or similarly killed meat (some still do this—Jewish, Islamic, and some Christian groups) reaped health advantages, although they did not understand the reason (Lev 7:26).[88] The Bible is very clear about the inadvisability of eating foods containing blood. It is significant to note that this advice has come to us again from the first church Council held in the Christian era (Acts 15:20). The shedding of blood, whether of humans or animals, is a result of the entrance of sin into the world (Gen 3:21; 4:8–12). It should not stretch our imagination to think that the continual shedding of blood is not in God's plan.

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[85] Mancini and Mancini, in *Bases of Cardiovascular Disease*, *op. cit*., 81; T. Norat, D. Chan, R. Lau *et al*., "The Associations Between Food, Nutrition and Physical Activity and the Risk of Colorectal Cancer," WCRF/AICR Systematic Literature Review Continuous Update Project Report, October 2010, 102–103, 124–126.

[86] J. F. Gonzales, N. D. Barnard, D. J. Jenkins *et al*. "Applying the Precautionary Principle to Nutrition and Cancer," *Journal of the American College of Nutrition* 33(3) (2014): 239–246.

[87] J. Wang and Y. Wang, "Carboxymethylation of DNA Induced by N-nitroso Compounds and its Biological Implications." In *Advances in Molecular Toxicology*, ed. J. C. Fishbein (Oxford: Elsevier, 2011), 5: 219–244.

[88] E. G. White, *The Acts of the Apostles* (Mountain View, CA: Pacific Press Publishing Association, 1911), 191.

In the Jewish economy, God's advice about the eating of blood was followed rather scrupulously and today we are familiar with kosher meats. The process of producing kosher meats involves draining the carcass of blood, removing prohibited fats and certain veins, arteries, and nerves. In order to remove the blood still in the meat, it is soaked in salted water.[89] It is interesting to note that the carcass of animals such as sheep, pigs, and cattle, when slaughtered by traditional methods, actually contains around 50 percent of the original blood, with different muscles retaining more or less.[90] Hence, the process of preparing kosher meat is rather detailed.

Prenatal Influences and Epigenetics

The influence of the diet of the mother on the child's health has a biblical basis. Samson's mother was instructed by God to use clean foods and drink non-alcoholic beverages during her pregnancy (Judges 13:3, 4, 7). White applied this advice to all mothers.[91] Today, it is well-known that, at least for alcoholic beverages, the advice is accurate. This was not the only ancient association of foetal damage with drinking. The Greeks and Romans associated intoxication of the parents at conception to subsequent damage observed in the child. Much later observations (1700s) in Europe indicated that alcoholism in the mother affected foetal development adversely. However, clinical alcoholic syndrome was not recognised medically until 1968.[92]

Wider Applicability Suggested. White took the argument further and asserted that:

> Nor does it [transgression of nature's laws] end with the transgressor; the effects of his indulgence are seen in his offspring, and thus the evil is passed down from generation to generation.[93] 1890

> Many suffer in consequence of the transgression [laws of health] of their parents. While they are not responsible for what their parents have done, it is nevertheless their duty to ascertain what are and what are not

[89] New South Wales Jewish Board of Deputies, "Kosher Food," (2009). Online: http://www.nswjbd.org/Kosher-Food/default.aspx (25/06/2018).

[90] R. A. Laurie, *Meat Science* (Oxford: Pergamon Press, 1968), 123.

[91] E. G. White, *Temperance* (Mountain View, CA: Pacific Press Publishing Association, 1949), 171.

[92] F. Cahoun and K. Warren, "Fetal Alcohol Syndrome: Historical Perspectives," *Neuroscience and Biobehavioral Reviews* 31(2) (2007): 168–171.

[93] White, *Counsels on Diet*, 120.

> violations of the laws of health. They should avoid the wrong habits of their parents and, by correct living, place themselves in better conditions.[94]
> 1905

Foods Modify Us Genetically. Foods can modify the expression of our genes and influences how we respond to environmental risk factors. The chemical substances that surround our heritable material (DNA) are able to modify the expression of genes in a cell. These substances are contributed to by our diet. And the modifications made may be inherited. The research on epigenetics suggests that obesity, diabetes, cancer, and some immune disorders are influenced by the prenatal diet. The heartening news is that some of these inherited tendencies can be modified by subsequent dietary choices.[95] This means that what we eat, we are, and what our mothers ate influences our subsequent life history.

Foods of particular interest are folic acid, vitamin B_{12}, and some bioactive substances from plants—garlic, broccoli, soybeans, and others. Making sure that there are adequate supplies of these chemicals can improve health outcomes because diet has an indirect effect on gene expression. The development of the early embryo can be adversely affected by high fat diets and alcohol consumption. This field of endeavour is relatively new and is based on animal studies, so that knowledge applicable to humans is limited. However, it is beyond dispute that the bodily functions of animals and how an animal responds to risk factors or assaults by disease organisms is influenced by what they eat. Poor choices early in the life of an individual appear to predispose them to disease susceptibility later in life.[96] This means that we and also our progeny are affected by our dietary choices.

Mycotoxins Present in Foods Eaten

Today the scientific world and variable proportions of other groups are aware that molds are capable of producing toxins under ideal environmental conditions. These are capable of causing illness and death.

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[94] White, *Ministry of Healing*, 234.

[95] S. W. Choi and S. Friso, "Epigenetics: A New Bridge Between Nutrition and Health," *Advances in Nutrition* 1 (2010): 8–16.

[96] Choi and Friso, *op. cit.*; H. Jang and C. Serra, "Nutrition, Epigenetics, and Diseases," *Clinical Nutrition Research* 3(1) (2014): 1–8; M. D. Niculescu, "Nutritional Epigenetics," *ILAR Journal* 53(3/4) (2012): 270–278.

Food Poisoning. The health reformers had some awareness of the dangers associated with eating decaying foods,[97] for numerous cases of poisoning through consumption of moldy bread had been reported during the period 1826 to 1888 and deaths had been noted from eating moldy cornmeal from 1906 and 1909.[98] The scientific evidence supporting such associations was not particularly sound. For example, Carl L. Alsberg and Otis F. Black stated in a 1913 United States Agriculture Department bulletin, "Whether molds or the products of their growth have an injurious effect on animals is a question which has not yet been conclusively settled."[99] This element of uncertainty remained in 1944, when Professor Fred Wilbur Tanner stated, "There is very little evidence that moldy food causes illness."[100]

Against this background, the following statement was made in 1885 by Ellen White:

> Cider and wine may be canned when fresh and kept sweet a long time, and if used in an unfermented state they will not dethrone reason. But those who manufacture apples into cider for the market are not careful as to the condition of the fruit used, and in many cases the juice of decayed apples is expressed. Those who would not think of using the poisonous rotten apples in any other way will drink the cider made from them and call it a luxury; but the microscope would reveal the fact that this pleasant beverage is often unfit for the human stomach, even when fresh from the press. If it is boiled, and care is taken to remove the impurities, it is less objectionable.[101]

Two years later she advised that fruit and vegetables showing any signs of decay should be avoided as follows:

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[97] Home Hand-Book, "Dangers from Decomposing Vegetation," *Good Health* 17 (1882): 225-228.

[98] L. Stoloff, "Occurrence of Mycotoxins in Foods and Feeds," in J. V. Rodricks ed. *Mycotoxins and Other Fungal Related Food Problems*. Advances in Chemistry Series 149 (Washington, DC: American Chemical Society, 1976), 23.

[99] C. L. Alsberg and F. Black, "Contribution to the Study of Maize Deterioration; Biochemical and Toxicological Investigations of *Penicillium Puberulum* and *Penicillium Stoloniferum*," *U S Department of Agriculture, Bureau Plant Industry Bulletin 270 (1913): 1–47*.

[100] F. W. Tanner, *The Microbiology of Foods* (Champaign, IL: Garrard Press, 1944), 128.

[101] White, *Testimonies*, 5: 356.

> Nicely prepared vegetables and fruits in their season will be beneficial, if they are of the best quality, not showing the slightest sign of decay, but are sound and unaffected by any disease or decay. More die by eating decayed fruit and decayed vegetables which ferment in the stomach and result in blood poisoning, than we have any idea of.[102]

Food poisoning at this time was attributed to poisons called ptomaines. Although this theory later proved incorrect, the principal items involved were known to be stable under boiling conditions.[103] Commencing with the first statement, the presence of toxins in apples rotted by mold were not recognized until 1956 and the toxin was found in sweat cider some years later.[104] During the nineteenth century people did not commonly boil food to render it safe. In fact, a number of years after 1885, when pasteurization was introduced, a lively debate arose as to whether pasteurized milk led to human disease because it was boiled.[105] We now know that some mold-produced toxins remain very stable when heated.[106]

Hence, it is difficult to sustain the claim that Ellen White's statement came from scientifically-based ideas of her day. Although it was known that apples were decayed by a specific fungus, the toxin produced (patulin) was not discovered until many years later (1943).[107] In 1968 investigations revealed that heating canned apple juice at 80°C. (176°F.) for ten minutes removed 40 to 50 percent of the toxin. The content continued to drop with prolonged treatment.[108] This information coincides broadly with that indicated by White.

An entirely satisfactory explanation for the second statement is still being developed. However, it is known that common fungal disease organisms found on a range of plant products elaborate a number of toxins

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[102] White, *Counsels on Diet*, 309.

[103] W. G. Savage, *Food Poisoning and Food Infections* (Cambridge: The University Press, 1920), 6, 7.

[104] P. M. Scott, W. F. Miles, P. Toft *et al*., "Occurrence of Patulin in Apple Juice," *Journal of Agricultural and Food Chemistry* 20(2) (1972): 450–451.

[105] W. G. Savage, *Milk and the Public Health* (London: Macmillan and Co., Ltd., 1912), 375.

[106] N. G. Heatley and F. J. Philpot, "The Routine Examination for Antibiotics Produced by Moulds," *Journal of General Microbiology* 1(2) (1947): 232–237.

[107] O. Puel, P. Galtier and I. P. Oswald, "Biosynthesis and Toxicological Effects of Patulin," *Toxins* 2(4) (2010): 613–631.

[108] P. M. Scott and E. Somers, "Stability of Patulin and Penicillic Acid in Fruit Juices and Flour," *Journal of Agriculture and Food Chemistry* 16(3) (1968): 483–485.

(i.e., *Alternaria* mycotoxins) in food items including citrus, tomatoes, nuts, oil seeds, and grains, with high levels of some toxins found in apples, tomatoes, and tomato paste. The toxicity of some of these fractions has been established in animals (toxic to cells, interfere with embryo development, tumor forming, interfere with hormone balance), but the overall effect of them on animal and human health is still being assessed.[109] This appears to be the only group of toxins currently known that would fit White's description of decay organisms producing toxins in a variety of fruit and vegetables.

The Modern Era Begins. Even though the patulin story was unfolding around fifty years ago, the dramatic significance of toxins produced by fungi was not recognized in the West until the 1960 following the death of 100,000 turkey poults. A year later it was discovered that rats fed peanut meal developed liver tumors and that the toxic substances involved (aflatoxins) were associated with fungi.[110] It was evident that this was not a time for complacency as peanuts were commonly used in certain parts of the world as an important human food item. Since that time various toxins generated by fungi have been shown particularly in cereal products. Some are highly carcinogenic and have been associated with liver cancer development in humans. Fungal toxins present in food items are of considerable significance to human health, particularly in the tropics where conditions favor growth of the organisms on grains, nuts, and even processed materials.[111]

The toxin of particular interest raised in White's first statement is patulin. This toxin can cause subacute effects in animals such as tremors, convulsions, ulceration, distension, bleeding of the gastro-intestinal tract. The toxin is harmful to the immune system at doses deemed equivalent to human exposure levels and it may be deleterious to neurological health.

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[109] M. Weidenbörner, *Encyclopedia of Food Mycotoxins* (Berlin: Springer-Verlag, 2001), 19–21; K. Zhao, B. Shao, D. Yang *et al*., "Natural Occurrence of *Alternaria* Toxins in Wheat-based Products and their Dietary Exposure in China," *PLoS One* 2015, 10(6): e0132019.

[110] F. Dickens and H. E. H. Jones, "Carcinogenic Activity of a Series of Reactive Lactones and Related Substances," *British Journal of Cancer* 15 (1961): 85–100; M. C. Lancaster, E. P. Jenkins, and J. M. Philp, "Toxicity Associated with Certain Samples of Groundnuts," *Nature* 192(4807) (1961): 1095–1096; K. Sargeant, A. Sheridan, J. O'Kelly *et al*., "Toxicity Associated with Certain Samples of Groundnuts," *Nature* 192(4807) (1961): 1096–1097.

[111] W. A. Shipton, *The Biology of Fungi Impacting Human Health* (Singapore: Partridge, 2014), 44–53.

Chromosome aberrations and mutations have been demonstrated in some animals, but there is no evidence of carcinogenicity. For these reasons and owing to the fact that patulin levels remain high in apple products, there are concerns about the effect of fruit juice (particularly apple juice) intake on human health. These concerns have led to recommended limits in a number of countries.[112]

The second statement that I have highlighted may refer to *Alternaria* toxins. These can interfere with reproductive and development in animals and some may develop tissue changes associated with cancer expression. In selected populations in China, where high levels of esophageal cancer are noted, there is a higher rate of contamination by various fungi capable of producing toxins. The initial suggestion made by Chinese researchers was that this might be attributable to *Alternaria* toxins. However, the more likely explanation is that complex interactions occurred among the toxins from *Alternaria* and/or from other fungi.[113] This may mean that similar situations of multiple interactions in many parts of the world give us an insight into White's 1897 warning. At this time, ignorance about such toxins was almost absolute in the West. In Japan a disease referred to as acute beri beri was first recognized in the last half of the nineteenth century. A variety of symptoms from mild breathing difficulties and nausea to paralysis and death were associated with the consumption of discolored rice. The first experimental determination of a link between illness in animals and consumption of damaged rice came in 1891. It took another 20 years for regulatory action to be taken by the Japanese government to protect human health.[114]

Indeed, more study is required on the general question of the effects of disease in vegetables and fruit on human health, but the wise would avoid eating fruit, vegetables, nuts, grains, and derivative products containing diseased items, which is the main point of White's advice. In practical

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[112] Puel, *et al*., *op. cit.*

[113] European Food Safety Authority, "Scientific Opinion on the Risks for Animal and Public Health Related to the Presence of *Alternaria* Toxins in Feed and Food," *EFSA Journal* 9/10 (2011): 2407. Online: http://www.efsa.europa.eu/sites/default/files/scientific_output/files/main_documents/2407.pdf (25/06/2018); Zhou et al., *op. cit*.

[114] Shipton, *Biology of Fungi*, 20; S. Udagawa and T. Tatsuno, "Safety of Rice Grains and Mycotoxins—A Historical Review of Yellow Rice Mycotoxicosis," *Yakushigaku Zasshi* 39(2) (2004): 321–342.

terms, this also means avoiding discolored and broken nuts, which in peanuts carry a class 1 carcinogen elaborated by a group of fungi.[115]

Health Principles Highlighted

Ellen White believed that the principles of health could be understood and that it was the duty of Christ's followers to seek a thorough understanding of them. If advances in knowledge were followed, she held that practitioners could be respected leaders in their communities.[116] Today we can rejoice in the clarity brought by science to many health issues. White advised us to listen to sources of instruction.[117] Those who treat the human body as an edifice designed by God do well to respect this expert information and practice the principles of health daily.

The main ideas identified here as relating to risk minimization of acquiring non-communicable diseases are as follows:

• Moderation in eating is the key to achieving good health and longevity.

• Foods chosen for regular use influence the susceptibility of the body to non-transmissible diseases.

• Prenatal dietary choices influence the later health history of the child.

• Animal fats and red meats are prejudicial to health when eaten in quantity and frequently.

• Vegetable oils are not all equal in their health benefits. Those containing saturated oils should be used sparingly in most societies.

• A vegetarian life-style, where variety is the norm, is beneficial to health and promotes longevity.

• Highly refined foods and those with high sugar content predispose to obesity and various avoidable diseases.

• Food laced with fiery spices damage delicate tissues and predispose to disease.

• Salt-ladened food poses its own health risk.

• Colonization of food items by fungi frequently leads to the formation of mycotoxins, many of which have long term and serious health impacts.

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[115] Shipton, *Biology of Fungi*, 45, 194–195.

[116] White, *Counsels on Diet*, 24.

[117] E. G. White, *Counsels on Health* (Mountain View, CA: Pacific Press Publishing Association, 1951), 566.

Concluding Remarks

There have been remarkable changes in causes of human diseases identified in the last 150 years. Following the discovery of antibiotics and their widespread adoption since mid-last century and other advances in the field of microbiology, the incidence of contagious diseases has declined. Now the world is facing the danger of epidemics of non-communicable diseases that are related to life-style choices. Societies have invited and experienced these diseases for a long time, but they are now ravaging our health. In the times when Ellen White wrote, she laid a firm foundation for maintenance of physical health by anchoring her advice to that of the Scriptures. She spoke about diet and the predisposition to disease when such ideas were not popular in society or medical circles. Her statements about cancer latency have been confirmed by modern science and we now know that diet can be a factor in cancer development. The sagacity of her early warnings against the use of foods invaded by microbes have been amply demonstrated by science, which has given some of the fungal toxins a category 1 rating as far as carcinogenicity is concerned. Her general advice to avoid the excess use of sugar, fats, blood (meat), fiery spices, and excess salt have been shown to be sound. The adoption of an ovo-lacto-vegetarian diet (or similar) and eating in moderation, will protected those who follow her advice against the diseases of this age—cancer, heart disease, and diabetes. While she knew little in terms of medical science, her advice has remained relevant while that of many of her contemporaries has faded into oblivion and sometimes disgrace.

Christians might seriously consider her urging to understand and follow the principles of health. In the world in which we live, these can be derived from the biblical and scientific information available.[118] Adhering to the best advice will give vibrant health, clear thinking, and an ability to understand the great truths revealed in Scripture. Following the principles of physical health prepares practitioners to recognize the great principles relating to social, mental, and spiritual health revealed in the Bible. This constitutes the urgent call given in Revelation 14—God wishes hearers to come out of the confusion and self-indulgence practiced in the present world. He wishes those who are honest seekers for truth to enjoy the benefit of these principles now and to prepare for the hereafter. The cry is, "Prepare to meet your God" (Amos 4:12).

[118] W. A. Shipton, *The Distant Sound of Wisdom: Biblical Perspectives on Health* (Ringgold, GA: Teach Services, Inc., 2015).

In part 3, I will look at White's comments on environmental influences on health.

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