Chapter 4

Science: Once Rejected by the Prophet but Now Profiting Adventist Health?

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1. Introduction

According to Butler, "If publishing instigated (Seventh-day Adventist Church) organization, entry into medicine exerted as profound an impact on the nature of that organization as anything in Adventism."[1] As noted by Ferret, "The progression from a counter-establishment health reform movement to accepted mainstream medical institutions has proved decisive in providing overall upward mobility for the movement, while simultaneously diluting its sectarianism."[2] It certainly appears that the embrace of modern medicine, with its scientific underpinning, has profited Adventism in substantial ways.

Today the worldwide Seventh-day Adventist (SDA) Church operates some 175 hospitals/sanitariums, 269 clinics and dispensaries, and some 21 health-food industries, all of which are hugely reliant on sophisticated technology.[3] SDA health facilities are reliant on evidence-based [i.e. scientific] medicine. Our food industries, many of which operate scientific laboratories, produce products reflecting scientific health awareness. Furthermore, we promote dietary practices and lifestyle initiatives, such as The Complete Health Improvement Program (CHIP), which are proudly presented as being soundly based on scientific research. Such statistics invite some explanation, given the staunch stand taken against conventional medical practice, as well as against many emerging areas of science, which characterised Adventism in the mid-1800s.

While the growth of the Adventist medical work has been well documented elsewhere,[4] there appears to have been no attempt to identify and explore changes in its attitude to science over its 150-year history or to identify the reasons behind these changes. This task is

undertaken in this paper. Conclusions about whether any substantive attitudinal change has occurred depend on the definitions of science and medicine employed and even on whether early nineteenth-century "heroic" medicine can be regarded as being in any substantial way scientific. Certainly, both science and medicine have seen considerable development and refinement since the 1860s, as have the conceptions of each in the popular mind.

During this period many sociological changes have also taken place within the Adventist Church as it has grown, and within western society at large. These factors obviously increase both the complexity and the interest of the task. Comparisons between different periods must be made with careful attention to the changing nuances of all participating entities.

In this paper changes in mainstream American medical practice over this period are examined first. Then the Adventist health journey is traced and those factors within the church and in society which have influenced its attitude to science are investigated.

2. Medicine in the Nineteenth Century and Onwards

The Health Reformers

The sad state of allopathic medicine in early nineteenth-century America has been documented in a preceding paper (Chapter1). The first challenge to this regime came at the hands of a series of home-grown health reformers. Although some of these figures were also introduced in the earlier paper, principally in connection with the water-cure, wider issues are addressed in this brief review.

Sylvester Graham was a Presbyterian minister and temperance lecturer who became a leading health crusader in the 1830s, particularly in the area of diet. He urged abstinence from alcoholic and narcotic liquors, flesh foods, tea, coffee, dairy products and stimulating substances. In their place he encouraged the use of pure water, vegetables and whole meal bread. In addition he stressed the importance of rest, exercise and personal cleanliness. Graham was also strongly against masturbation and advocated that married couples not engage in

marital sex more than once a month. Such practices were seen as dangerously squandering precious vitality. Although he had undoubtedly read in the area of health reform, Graham claimed originality for his ideas, refusing to acknowledge any debts to other lecturers and writers.

In contrast to Graham, William Alcott was a Yale-trained physician. He became one of the most widely read authors of his day, his eighty-five books covering much of the material presented by Graham. Although he may have made no blanket denial of indebtedness to others for his ideas he certainly denied any reliance on Graham. This reluctance to acknowledge sources appears to have been widespread among American health reformers of this period.

Russell T. Trall, another follower of Graham, was also vegetarian, assigning much of the blame for prevailing poor dietary practices to the medical practitioners of the day. He wrote that, with the encouragement of the latter,

> … the whole world has gone to hunting and fishing, and fattening and butchering, and salting and pickling, and smoking and broiling ... until they have become filled with (morbid humours) scrofula, canker, erysipelas, gout, rheumatism, biliousness, and putrid fevers ... [5]

Trall also opposed the taking of "drugs", urging instead the value of the "water-cure", as discussed in Chapter 1. He was thus one of the first to ally Grahamism with hydropathy.[6] In a famous speech lasting two and one half hours that he delivered to the Smithsonian Institution in 1862 Trall identified three presidents—George Washington, William Harrison and Zachary Taylor—who, in his view, had been killed by the "heroic" allopathic treatments to which they had been exposed.[7] These sentiments echoed those of Oliver Wendell Holmes, who wrote in 1860, "if the whole *materia medica*, as now used, could be sunk to the bottom of the sea, it would be all the better for mankind – and all the worse for the fishes."[8]

As we have seen, another exponent of dietary reform and the water-cure was Caleb Jackson, a farmer who took up lecturing on temperance and abolition in 1834. His strenuous endeavours in support of these causes seriously broke his health, which was only

restored by his taking a harsh water-cure. Understandably, this experience awakened his interest in hydropathy and strengthened his opposition to regular doctors, whom, on one occasion he described as:

> tobacco chewers and smokers, lager-beer and rum and brandy drinkers – mint-julep suckers, 'tea and coffee guzzlers,' pork eaters, poison givers – men whose flesh is foul, whose breath is fetid, whose language is unchaste, whose lives are a burlesque on the profession they have chosen.[9]

Jackson's "Our Home on the Hillside" became very widely known and would significantly influence early Adventist attitudes to health.[10] It is interesting to observe that the home on the hillside functioned as a health/physical culture retreat continuously for 101 years, until 1971, whereupon the buildings became vacant. Somewhat dilapidated and now empty, they still stand today.[11]

It is also interesting to note that among the ideas and practices within the American health reform ensemble of this time was phrenology—the reading of character by an examination of the morphology of the head. Indeed, this popular "science of the human mind" was seen by many as one of the scientifically best-attested ideas associated with health reform. The enormous popularity of phrenology during the 1840s and '50s was largely due to brothers Orson and Lorenzo Fowler, the latter being a lecturer at Trall's college. The Fowlers' *American Phrenological Journal* was one of the most widely read magazines of the period and both Graham and Alcott at various times visited the Fowlers' "phrenological palace" at Clinton Hall.

While the health reformers mentioned above and others of their ilk were encouraging the populace to move away from meat-based diets, tobacco, alcohol, tea, coffee and conventional medicine the latter was facing far-reaching reforms of its own. Owing much to the assimilation of science, conventional medicine would soon abandon heroic measures, overwhelm hydrotherapy as a cure-all, effectively disprove many associated ideas, such as phrenology and the dangers of "excessive" sex, and eventually support much of what the reformers had to say about diet.

The Nineteenth-century Advent of Scientific Medicine

Until the nineteenth century there were very few professional scientists, i.e. those whose livelihoods depended on scientific activity. This changed dramatically during the 1800s with the appearance of "big science," scientific laboratories and scientific equipment.[12] According to Porter, "it was the age post-1800 that bankrolled public science, bringing new manpower, institutions, teaching, training and expectations. The state turned patron; new scientific bodies were founded; and reformers declared science the dynamo of progress."[13] There was also an explosion of significant scientific journals. *Nature*, for example, was founded in 1869. *Science* first appeared in 1880.

It is not surprising, given the poor levels of public health prevailing, that a considerable amount of this scientific development took place in medically related areas. According to Foucault, medicine first made '"its appearance as a clinical science"' with the birth of the clinic in France in 1790. This development began an association between physicians and science whereupon, according to Numbers, "cutting-edge medicine shifted gradually from the domestic bedside to the hospital and the laboratory."[14] Bynum argues that "… science was one of the important influences in shaping the structure of medicine in the nineteenth century." Particularly significant consequences were great advances in diagnostic ability and a major improvement in the public image of medicine. Even those practitioners who were not happy to admit allegiance to scientists such as Lister, Pasteur and Koch "benefited from the status and credibility that science gave them collectively."[15]

A short list of important medical instruments developed or refined during this period is instructive. Technical improvements that reduced distortion in the microscope brought this instrument "from the periphery to the center of medical and biological research." That most valuable diagnostic tool, the stethoscope, was invented by Laennec in 1816. Röntgen discovered X-rays in 1895 and these strange emissions were very soon put to medical use, a radiograph being taken for clinical purposes as early as January, 1896. The rapid development of press networks over this period ensured that the populace was made aware of such developments. [16]

During the 1860s nursing was established as an organised, highly professional occupation through the work of those such as Florence Nightingale and Mrs Bedford Fenwick. It was also during the middle decades of the century that specialisations, such as dentistry, pharmacology, anaesthetics, antisepsis, obstetrics and surgery began to develop.[17]

It was particularly during the last half of the nineteenth century that medicine was accepted as part of the scientific enterprise. The Seventh International Medical Congress held in London during 1881 and opened by the Prince of Wales, later Edward VII, "definitively ushered medical science onto the international public stage". *The Lancet* noted soon after the event that this conference "had demonstrated to the world the progress that medicine has recently made, that it is advancing because it has become more scientific, and that the only great advances yet in store for it must result from the successful application of the same methods."[18] The eminent Canadian physician William Osler wrote in 1897 that "'the physician without physiology and chemistry flounders along in an aimless fashion, never able to gain any accurate conception of disease, practicing a sort of popgun pharmacy.'"[19]

The formation of the Red Cross in 1863 and the signing of the first Geneva Convention in 1864 are also regarded as having provided impetus to the practice and recognition of scientific medicine.[20] By 1901, the year in which the Nobel prizes were first given, the prize in medicine or physiology was widely regarded as being closely associated with those awarded in chemistry and physics.

By the end of the nineteenth century, as a result of scientific investigations into germ theory, the fangs had been drawn from a number of deadly and socially significant diseases including cholera and tuberculosis (Koch), diphtheria (Roux and Behring), hydrophobia and anthrax (Pasteur).

The situation in America reflected this general trend. Bynam noted that it has been argued that the period between the founding of the Smithsonian Institution in 1846 and the opening of Johns Hopkins University in 1876 marked the beginning of modern American science.[21] Although the value of science to medicine was perceived

much more slowly in America than in Europe, this awareness was promoted through large numbers of American physicians travelling to Europe. According to Warner, some one thousand medical students and doctors sailed to Paris between 1815 and 1860, including the young Oliver Wendell Holmes.[22]

During this period another stimulus towards the application of science to public health was provided by the typhoid and dysentery scourges which claimed so many lives during the Civil War of 1861–65. The 1878 yellow fever epidemic which wasted the southern states also helped to persuade "tight-fisted public legislatures to establish boards of health."[23] These regulatory bodies increasingly relied on standards established through scientific research. Helping to staff them were large numbers of those who had studied in Europe. Following the exodus to France that has been noted above, a large number of American doctors headed for Germany. Ronald Numbers estimates that between the end of the Civil War and the beginning of World War 1, fifteen thousand American physicians studied in German medical centres.[24] The appointment of the first scientist as dean of a medical school, at Harvard in 1883, marked another milestone.[25]

In 1887 the first laboratory for disease diagnosis and control was set up in the Staten Island Marine Hospital. This was later transferred to Washington DC and became the Hygienic Laboratory. Soon after, similar laboratories were established in Providence and New York. Thereafter progress was rapid. Porter notes that, "By 1900 diagnostic laboratories had been set up in every state and in most major cities," placing America in front of Europe in this respect. By 1896 the integration of science into medical research and the training of physicians in places such as Johns Hopkins, Harvard, the University of Pennsylvania and the University of Michigan demonstrated that modern scientific medicine was well underway in the United States. [26]

One of the first results of the new scientific emphasis was the increased regulation of medical training and the elimination of poorer training programs, about sixty of which had sprung up prior to 1875. Indeed, one 1895 graduate of the Barnes Medical College in St Louis later recalled that prior to his graduation he "never had the advantage of practicing under a preceptor, never dressed a serious wound, had never given a hypodermic, had never been present when a baby was

born … (and) … had never attended a bedside in a professional capacity". This was rapidly changing! [27]

Although by the year 1900 many second-rate American sources of medical training had already disappeared, the year 1906 saw the USA still with almost half of the world's medical schools. Many of these were small, commercial schools teaching short courses with minimal laboratories and clinical facilities. Almost half of them did not survive the damning 1910 report by Flexner, who was convinced that science was the key to medical education and thus medical progress. This report guided the American Medical Association (AMA, formed in 1847) and the Association of American Medical Colleges (AAMC, formed in 1876), as well as the state examining boards and funding foundations, in quickly eliminating institutions unable or unwilling to conform to rigorous, scientific medicine. The endowment around this time of huge additional philanthropic funding sources for science, such as the Rockefeller Institute for Medical Research (1901), the Carnegie Institute (1902) and the Rockefeller Foundation (1913), accelerated this process.[28] Figure 4.1 shows some of these key, nineteenth-century developments in science and medicine.

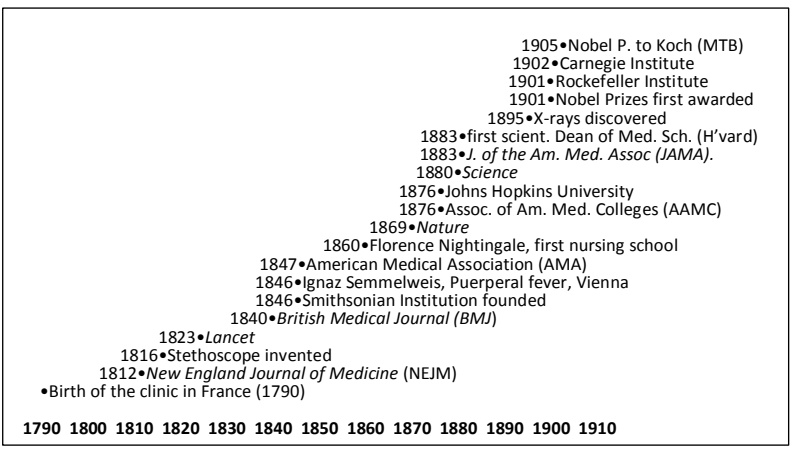


Figure 4.1 Some scientific and medical milestones of the nineteenth century[29]

In fact, by the end of the nineteenth century the domination of medicine by science was such that, as noted by Numbers, a number of alternative, sectarian systems of healing which had arisen or become

popular during those years—hydropathy, eclecticism, Christian Science, osteopathy and chiropractic—all "cloaked themselves in the mantle of science."[30] This resulted in muddied scientific waters.

3. The Adventist Health Journey

Ellen White: Agent of Adventist Health Reform

Captain Joseph Bates, who retired from the sea in 1828 at the age of 35, may be regarded as the father of Adventist health reform. By the time he embraced the Millerite message in 1839 he had given up all alcoholic beverages as well as tea and coffee. In addition, it seems that by 1843 he had become a vegetarian and had also eliminated rich foods and cheese from his diet.[31] Apparently he made these decisions more on the basis of his personal observations than because of anything he had read or heard. In 1846 he joined the much younger James and Ellen White in promoting key teachings of what would become the Seventh-day Adventist message, including the Sabbath.

From time to time over the next decade some zealous early believers urged health reforms such as abstinence from swine's flesh. These moves were sometimes countered by the Whites, who at that time not only felt no burden for their adoption but also regarded them as dangerous distractions from the message, in that they were not part of "present truth".[32] Bates himself was not polemic on these issues, although consistently abstinent in his personal practice. Even in the case of tobacco, despite Ellen White's growing awareness of its ills, no article against its use appeared in church papers until 1853,[33] following which both theological and health objections to this vice were stated strongly. By then reformed dietary and health practices were seen as promoting a stronger spiritual life in the context of the end time, providing a healthy and vigorous physical existence and preventing disease. They were not so much advocated for the purpose of healing those already sick.

It was the diphtheria epidemic of 1862–63 that provided Ellen White with possibly her first exposure to the treatment of serious disease by what Robinson, following usage of the period, described as "rational methods."[34] When their boys began displaying alarming symptoms the Whites were fortunate to be directed to a letter in the *Yates Country Chronicle* written by Dr Jackson of Dansville, in which he

recommended hot baths, cooling packs, feeding moderate quantities of liquid food, plenty of water, rest and good ventilation instead of the drugs and medicines of the day. When these remedies apparently restored the health of the boys, the Whites reprinted the article in *The Review and Herald*.[35] It is interesting to note that the health reforms in question were obviously regarded by their practitioners as more "rational" than conventional dietary practice and medicines. In this sense the Adventist pioneers were paying at least some service to scientific reasoning.

At Otsego, Michigan, on June 5, 1863, only a fortnight after the Seventh-day Adventist Church was first organised, the young Ellen White experienced a visionary trance which focused her attention on diet, temperance and other medical issues and marked the beginning of a slow reform in Adventist attitudes to health throughout New England.[36] Material based on this revelation was first published in August, 1864, in *Spiritual Gifts IV*.[37] In that same month the Whites arranged to spend three weeks with Jackson at "Our Home on the Hillside" to observe his methods, hear lectures by him and others on his staff and enjoy the natural beauty of the surrounds. They came away with largely favourable impressions, although the Whites did not approve of the amusements of that place, which included card-playing and dancing.[38]

Soon after this visit a series of six pamphlets was published under the title of *Health or How to Live*. These contained pieces by Ellen White as well as re-printed articles by health authorities such as Graham, Trall and Jackson which were deemed to be both valuable and accessible to church members. In August, 1865, a sustained bout of illness and severe paralysis afflicted James White, most likely due to the stresses associated with his intemperate workload. The symptoms became so serious that the Whites returned to Our Home on the Hillside. Although less so, Elders Smith and Loughborough were also sick at this time, probably for similar reasons, and they accompanied the Whites. James and Ellen spent three months with Dr Jackson, during which time James slowly improved although Ellen's own health suffered as she cared for her husband. However, during this sustained period of residence near Our Home on the Hillside the worldly amusements of that place, together with Dr Jackson's policy

of enforced inactivity, caused the Whites' anxiety to increase to a point at which they felt it best to leave that institution.

It was soon after this experience, on Christmas Day, 1865, that Ellen White had another visionary interlude at Rochester, New York. After this experience she perceived more strongly that good health was to be an integral part of the "third angel's message". It was also becoming clear to her that the fledgling group must establish a water-cure of its own.

> I was shown that Sabbathkeepers should open a way for those of like precious faith to be benefited without their being under the necessity of expending their means at institutions where their faith and religious principles are endangered, and where they can find no sympathy or union in religious matters.[39]

Within two years this idea would materialise into the Western Health Reform Institute and ultimately it became a world-wide medical missionary work.

Before proceeding to revisit the establishment of this institute, and what it would come to mean for Adventism, it is interesting to note that phrenology was quite popular among early Adventists. White was clearly quite attracted to this practice for a time, taking both her sons to have their heads "read" on the occasion of their first visit to Our Home on the Hillside in 1864. She was delighted when Dr Jackson pronounced Willie's head to be one of the best that had ever come under his professional examination.[40]

The Western Health Reform Institute

The end of the Civil War in 1865 had been welcomed as a great opportunity for evangelism but the following two years had seen the work crippled by ill health—to the point where the committees of both the Michigan Conference and the General Conference had been unable to meet because sickness had prostrated a majority of members. In May, 1866, the General Conference Committee pled for better health during four days of special prayer, soon after which they convened for the third annual session.

One has to admire the expedition and dispatch of the early Adventist pioneers. Just six weeks after White's strong presentations on health

given at this General Conference, the 16-page, monthly journal, *The Health Reformer,* was launched under the editorship of Dr Horatio S. Lay and within four months the Western Health Reform Institute in Battle Creek had opened its doors to the first patients. The grand opening took place on September 5, 1866. Its principles of operation were essentially those of Our Home on the Hillside, but with the inclusion of exercise rather than inactivity for the patients and a strong spiritual, particularly eschatological, emphasis, as discussed in Chapter 1 of this book. There were, of course, no worldly amusements. *The Health Reformer* carried many articles railing against "popular physicians" and their treatments, although by this time many longstanding medical practices, such as bloodletting and calomel-dosing were already in marked decline.[41] Although it started strongly it wasn't long before *The Health Reformer* itself was experiencing some decline. Its failure to keep up to date with medical advances, together with its "lightweight" feel, may have been factors which contributed to a loss of subscriptions.

In May, 1868, Trall himself was invited to visit Battle Creek to deliver health lectures. Following his successful visit he was signed up as a regular contributor to *The Health Reformer*. Clearly it was hoped that featuring an author who was "admitted by all to stand at the head of the health reform in this country, so far as human science was concerned" would revitalise the ailing publication.[42] It is interesting to note this acknowledgement of science as a valuable yardstick. Could it be that such appeals to science predisposed leaders to continue abiding under its wings in medical matters, irrespective of where it moved? In fact, on commencing this association with Adventists, Trall folded his monthly *Gospel of Health* and gave its list of subscribers to *The Health Reformer,* assuring his old readership that they were in good hands. This merger would put Battle Creek and Adventism at the forefront of American health reform.[43]

Despite its strong, although at times troubled, start the mid-1870s saw patient numbers at the Institute in decline and financial weakness threatening. This was due substantially to the perception by potential patrons that its medical foundations were behind the times. This was very understandable in light of the rapid rise of American medical standards at that time and the tightening of the qualifications required to practise medicine noted earlier.[44]

It so happened that a few years earlier the Whites had been instrumental in encouraging four young men to complete the three-months-long course at Trall's College in New Jersey. One of these, John Harvey Kellogg, had recognised his need for a more complete medical education and had gone on, with some sponsorship by the Whites, to complete the three-years' course of medical training at New York's Bellevue Hospital Medical College, emerging in 1875 as the denomination's first fully trained doctor. The Whites had great faith in Kellogg's ability to resist the secularising influences of the great institutions. Kellogg was subsequently to have such a pivotal role in Adventist medical practice that he is the subject of a full paper in this series (Chapter 6). Even before finishing his medical degree Kellogg was asked to assume the editorial chair of *The Health Reformer* and under his expert direction the publication continued to prosper. In 1876 the young Kellogg became medical director of the Institute, beginning a new era for both Adventist health and the denomination. It would seem that Kellogg's appointment as director came in the nick of time to answer, and to a large extent circumvent, the charges of poor medical leadership mentioned above.

In 1877, looking back on this period, James White wrote, "Five years since, we became satisfied that our Health Institute could not rise to eminence and the full measure of usefulness without thoroughly educated physicians to stand at the head of it."[45] Although there may be some uncertainty on this point it appears from a careful reading of James White's comment that he felt that the "thorough education" was required more for the recognition and continued patronage of the Institute than because of any intrinsic value to its programs. This is almost certainly the view of Robinson, who wrote a history of this period some 70 years later.

> The cause of health reform might well be begun by discarding the use of drugs, adopting a rational diet, and using water and other natural agencies as remedies for disease; but it was impossible to make a strong appeal in its behalf to the more educated and cultured classes of society until there was a leadership whose scientific knowledge could command respect. The benefit of rational treatments had been demonstrated empirically, but this was not sufficient. The scientific and physiologic principles for the

> success of certain rational and therapeutic agencies must be made clear.[46]

Robinson went on to note that this "required a much more thorough knowledge of chemistry, physiology, anatomy and materia medica than could be taught during the short course at the Hygieo-Therapeutic College" (of Dr Trall, in New Jersey). About this time G. I. Butler, then General Conference President, also recognised that "our Institute buildings are larger than our doctors."[47] This latter comment could be understood to imply somewhat more of a recognition on Butler's part than on James White's that the doctors actually *needed* more education. It is likely that Kellogg may have helped James White and G. I. Butler to reach the positions reflected in the statements quoted above.

The fact that by that stage recognition of the value of water treatments was forthcoming from the mainstream medical establishment contributed to the medical profile of the Institute. Kellogg himself, by this stage highly regarded by peers for some of his medical innovations, was a major factor in bringing about this recognition. Kellogg was applauded for his invention of gym equipment and had "won a reputation as one of America's leading surgeons." He was also a member of a number of medical associations.[48] His *Rational Hydrotherapy*, a *tour de force* of 1193 pages published in 1900, described more than 200 "hydriatic" and "thermic" procedures. Of these the most significant were seen to be the electric light bath, the percussion douche, cold mitten friction, cold towel rub and hot and cold compresses. The book described some of the scientific instruments used, such as the calorimeter, the plethysmograph and the ergograph. Kellogg stated in his preface that:

> Thanks to the progress made in the development of rational medicine within the last century, and especially within the last twenty five years, it is no longer necessary to offer an apology to scientific medical men for the recommendation of a remedy which, though the simplest of all elements, has come to be recognized as one of the most powerful means of influencing the varied functions of the animal body, having, by careful clinical observation and patient laboratory research, been thoroughly rescued from the limbo of blind empiricism and placed on a scientific and rational basis.

One method of treatment commonly used in conjunction with hydrotherapy, and indeed favoured by Kellogg, was the application of galvanic electric currents, usually between 20 and 40 mA. In connection with his extensive discussion on such electrical treatments he again stressed the importance of scientific knowledge, writing, "No medical practice can properly claim to be strictly rational which is not at the same time physiological."[49]

Also significant in the Kellogg science narrative was the significant role played by the principal's wife, Ella Eaton Kellogg. Ella earned her Bachelor of Arts degree from Alfred University in 1872 and was awarded her Master of Arts degree in 1885. In 1883 she established an experimental kitchen at the Sanitarium, where she developed and tested new products whilst at the same time being responsible for feeding the 500–700 clients. *Science in the Kitchen*, by Ella E. Kellogg, was first published in 1892. The Preface described Ella Kellogg as the superintendent of the Sanitarium School of Cookery and went on to note that "the art of cookery is at least a century behind in the march of scientific progress." Ella was also on the editorial staff of *Good Health* for over forty years and served at one time as the Chairman of the World's Fair Committee on Food Supplies for Michigan.[50]

In order to provide staff for an increasing number of health institutions the church found that it required training programs. Again, the initiative here was carried by Kellogg. His 1877 school of hygiene at Battle Creek which offered 20-week courses was augmented in 1883 by a school providing nurse training. A third school was later added to train "hygienic cooks" and "health missionaries." Doctors were a more difficult problem. During the first decades of the Institute Kellogg had tutored promising medical students and then encouraged them to complete a recognised medical course, like that offered by the University of Michigan at Ann Arbor. However, he and other church leaders were continuously frustrated by graduates' being tainted in various ways by their association with these worldly institutions. Finally they decided to begin their own medical training program, a charter for which was obtained from the State of Illinois in 1895.

The new American Medical Missionary College (AMMC) at Battle Creek offered a new, four-year study program that Kellogg felt to be

equal to any program offered elsewhere. Students would complete much of their clinical work in Chicago where there were large hospitals and a Seventh-day Adventist dispensary. During the next ten years, 194 doctorates in medicine were awarded by the AMMC, supplying the church with "a generation of much-needed physicians."[51] Around 1906, after sustained tensions with church leaders, Kellogg was dis-fellowshipped, following which the institution effectively passed from Adventist hands.

Outgrowth from the Institute

Ellen White had always opposed the concentration of the work in Battle Creek and urged the establishment of health facilities in other places, particularly in California.[52] In 1904 properties were purchased near San Diego and Los Angeles. These became the Paradise Valley and Glendale Sanitariums respectively. Despite the indebtedness of these facilities, at Ellen White's instigation an even bigger investment was made in 1905 with the purchase of the Loma Linda Estate in the Redlands-Riverside area. With Ellen White's encouragement the institution built on this land would soon take over the major educative functions that had been performed at Battle Creek but lost by the Seventh-day Adventist Church.

A sanitarium was begun in the year of purchase and after its opening White continued to urge the use of natural remedies, advising against some of the newer "scientific" devices, such as the X-ray machine, about which she claimed that God had advised her that it "was not the great blessing that some suppose it to be." However, in about 1911, she had a black spot on her forehead successfully removed by x-ray therapy.[53] This may have softened her attitude a little!

A small nurse training school was also opened in 1905. This was absorbed into a more comprehensive school, the Loma Linda College of Evangelists, which opened on Sept 20, 1906. In 1909, following much debate and explicit endorsement from Ellen White,[54] the General Conference voted to secure a charter for a medical training College. Shortly thereafter a charter was obtained under the laws of the State of California enabling "the College of Medical Evangelists to grant degrees in the liberal arts and sciences, dentistry and medicine." This commitment on the part of the church would not be without its on-going cost. In 1910, the very year of opening, "it became necessary

to provide a well-equipped laboratory building to meet the requirements of the state."[55] Science was beginning to bite in earnest!

A nearby and well equipped clinical training hospital would soon represent extra cost. Indeed there have been many occasions since 1910 when the costs of necessary scientific innovations have threatened to curtail Loma Linda's advancement. The College of Medical Evangelists became part of Loma Linda University in 1961, where it continues today.[56] Numbers notes that the Loma Linda Medical School "has the distinction of being the only medical school in America to have come out of the hydropathic tradition."[57]

Adventist Medical Work in Australia

In 1899, after small health ministry ventures in Melbourne, Sydney, Cooranbong and Adelaide, the small group of Australian Adventists, with the encouragement of the then resident Ellen White, purchased land for a significant new health venture in Fox Valley Road, Wahroonga, a northern suburb of Sydney, NSW. The architect and principal building supervisor would be Merritt Kellogg, older half-brother to John Harvey. The facility was opened on January 1, 1903, even though the building was unfinished. It was a considerable improvement on the earlier seven-roomed cottage in Ashfield, Sydney, which had been equipped only with "a massage table, a sitz bath, a faradic or electric bath, a bucket for fomentations, and a gas hot-water system."[58]

Given the heritage from which it arose, it was little wonder that in 1898 those outlining the rationale and mission of the planned Sydney Sanitarium would write: "The remedial agencies employed in this institution shall be in harmony with the true principles of rational medicine given by the Creator. We believe that God's remedies are the simple agencies of nature, such as pure air, pure water, electricity, cleanliness, proper diet, purity of life, suitable exercise, recreation, rest and a firm trust in God. The adoption of these principles necessarily leads us to discard the use of poisonous drugs."[59]

Although subsequent decades saw the systematic enhancement of early treatment regimes with modern, scientific medicine, the use of many of the original hydropathic remedies persisted at the Sydney Adventist Hospital until about 1990, at which point they were

discontinued and the facilities closed. The reasons for this closure are not hard to determine. For many years serious infections were often best treated by hydrotherapy, which stimulated the body's systems to fight the pathogens. However, this was changed by the advent of cheap and effective antibiotics during the 1950s. Furthermore, whereas it was not uncommon for patients to stay some weeks at the "Sydney San" in the 1950s and '60s, this changed soon after, largely as a result of rising infrastructure costs. During the 1970s government standards were introduced for "length of stay", with shorter stays being recognised as reflecting more successful treatments. Eventually doctors were mandated to supply justification in the event of longer than usual patient stays. In the face of these changes the number of hydrotherapy patients declined rapidly. Eventually the cost of staffing and operating the hydrotherapy facility, together with an urgent need for the space it occupied, dictated closure.[60] There is a sense in which such changes were inevitable.

Right from the beginning the importance of properly educated and accredited doctors had been acknowledged. At times the procurement of such qualifications proved expensive, such as in the case of Indiana-born Dr Charles Harrison, who was sponsored to earn a respectable British qualification. Such doctors inevitably brought the latest scientific techniques back with them.

Against some opposition an X-ray machine was purchased for the San at a cost of some £1400, a huge amount at the time. The installation was completed and the unit became operational in 1926. There had always been a "laboratory" at the hospital but it appears that serious laboratory medicine began at the San with the appointment in the 1930s of Dr Eva Shipton, Sydney's first female pathologist, as "consultant pathologist". Mr Dolf Dawson ran the upgraded pathology laboratory after his return in 1939 from training in America and England. This service would soon differentiate into a modern pharmacy and pathology laboratory. The addition of radiotherapy and oncology departments soon followed. In this type of progression the San mirrored that followed by every other Adventist health institution. Science in Adventist medicine had come of age, as Laurie Evans, then South Pacific Division President, reflected in his foreword to the Sydney Adventist Hospital's centenary volume: "Adventists believe these institutions are important to its (the church's) mission, working

as they do where science, medicine and faith interact at the point of human need."[61]

A smaller institution, the Warburton Sanitarium Home, began operation in Victoria in 1910. It offered "good wholesome diet, massage and hydro-therapy." It would be known by a number of names before closing in 1991.[62]

The Face of Modern Adventist Medicine and Health Ministry

The Adventist Church's flagship medical institution is undoubtedly Loma Linda University, a world-recognised centre of medical quality and innovation. This institution's technological leadership may be illustrated by reference to just two historic firsts, both hugely reliant on the latest scientific technology.

On October 26, 1984, Dr Leonard Bailey successfully performed a xenotransplant, placing a baboon's heart in 2-weeks-old Stephanie Fae Beauclair (Baby Fae), who had been born with hypoplastic left heart syndrome, a fatal heart defect. Although Fae lived only another three weeks, the experience gained was invaluable. Within a year Dr Bailey had performed the first infant allograft (infant-to-infant) heart transplant on Baby Moses (Eddie Anguiano), who is now 29 years old and carries the distinction of being the oldest recipient of a heart transplant as an infant.[63]

In 1990 James M. Slater pioneered proton therapy at Loma Linda in what is now the James M. Slater MD Proton Treatment and Research Centre. This was the first hospital-based proton treatment facility in the US and only the second in the world. This technologically advanced treatment utilises protons which have been accelerated to high energy in massive magnetic fields. These may be directed at dangerous tumours with elegant precision and awesome destructive power while the fine focus results in minimal damage to adjacent tissues.[64]

As described in Chapter 3, the modern Sydney Adventist Hospital, now an acute-care centre, is also known for its advanced equipment and procedures. One small factor which has influenced its transition from a health retreat/sanitarium, as with its US counterparts, has been

demographic trends. Initially located in an idyllic rural setting, it is now surrounded by suburbia.

Continuing in the tradition of John and Ella Kellogg's first experiments with grains and nuts, Adventist health food companies are heavily reliant on scientific procedures, scientific testing and sophisticated equipment. Currently Sanitarium Health and Wellbeing (Australia) employs some 20 scientists of various specialties in its well-equipped laboratories. This company is also affiliated with other companies which conduct research.[65]

The Complete Health Improvement Program (CHIP), a lifestyle medicine initiative currently administered by the South Pacific Division (SPD), provides another contemporary example of Adventist Health's reliance on evidence-based, scientifically validated practice. Routine scientific tests are conducted on participants at two stages within the intervention, with results to date reported in some 26 peer-reviewed papers in recognised medical and lifestyle medicine scientific journals.[66] Attendees at conferences organised by the SPD Adventist Health Professionals regularly hear the descriptors "peer-reviewed", "evidence-based" and "research-validated". In the context of research-based study into health mention must also be made of the well-known, and ongoing, Adventist Health Survey, conducted by the School of Public Health, Loma Linda University, California.[67]

4. Factors within Adventism that Give a Raised Profile to Medical Science

Educational Emphasis and the Accreditation of Adventist Medical Institutions

In connection with the transition from "counter-establishment health reform to establishment medicine" Jonathan Butler notes that:

> This shift led, first to a reorganized medical school, then to accreditation of colleges to feed the medical school, then to professional seminary education to keep the ministry apace with medicine. And this general upgrading of education and professionalism was accompanied by a social and economic upward mobility in Adventism at large. The blend of material and spiritual impulses which characterized mid-Victorianism

> played itself out in the movement, as Adventists came a long way, and rather quickly, from the sacrificial Millerites.[68]

Clearly it was the push for medical recognition which helped the church to see the importance of high standards of education in other areas. In this connection it is interesting to note that when writing on Adventism, Bull and Lockhart place their chapter on medicine immediately before the one on education.[69] The first steps in the direction of outside recognition and accreditation were undoubtedly taken by Kellogg. He not only appreciated the immediate medical advantages accruing from properly qualified personnel but understood the strategic and economic value of having the quality of his institution widely acknowledged. Ultimately the AMMC was recognised by the London Medical Council, which was regarded by Kellogg as the highest medical authority in the world. Also, as earlier noted, he personally invested in the education of his staff up to recognised standards. Bull and Lockhart note that, "Up to this point Adventists had considered the seeking of 'worldly recognition' as a potentially corrupting influence on their institutions."[70]

Thirty years later the same push towards state recognition was seen at Loma Linda. When the College of Medical Evangelists opened in 1910 it was granted only a "C" rating by the AMA. However, its Dean (later President), Dr Percy Magan, was determined to obtain an "A" rating, the very highest available, and expended every effort towards this end. In this sense he was much like Kellogg before him. This was finally achieved in 1922.[71] Along the way, the "B" rating had been awarded just in time to prevent the drafting of large numbers of students for service in the First World War. Clearly high standards brought their rewards. Many of these standards involved exposure to, and adoption of, advanced technologies.

Ellen White's Literary Borrowing

Revelations of Ellen White's borrowing began in the area of Adventist health, with the troubled publication of *Prophetess of Health*[72] in 1976 by Ronald Numbers. This work was followed by other studies, in areas unrelated to health, which revealed that White had borrowed thoughts and words much more widely than had been recognized up to that time.[73] These disclosures diminished her authority for many Adventists. Although they occurred after the substantial assimilation

of modern medical science into Adventist Health they may have strengthened the collective desire on the part of the church organization to establish all health strategies on a firmer authority, that of science.

5. Sociological Factors Impacting the Profile of Medical Science within Adventism

A number of broader sociological factors have also impacted the emergence of science within Adventist Medicine. These include the following.

The Rising Profile of Science

Since the triumphs of science over disease during the late nineteenth century already noted there have been many more medical conquests, such as the finding of a cure for polio. These achievements have continued to impress on the public mind the efficacy of science as a provider of solutions to the world's problems. Furthermore, scientific technologies developed over the last 100 years in other areas have confirmed the economic, lifestyle and military benefits conferred by science. Particularly in the first four decades following World War II, the huge expansion in the fortunes of science was due in part to the popularly held view that science had provided the military capacity to end that global conflict. The Cold War also spurred governments to recognise the military and political power of science. In particular, the 1950s, '60s and '70s were eras of burgeoning university science departments, huge increases in student numbers, large science research budgets and almost unlimited funds for space exploration. The popular image of the scientist, epitomised by Einstein staring mystically at his relativistic cosmos, became one of all-pervading power and understanding.

Even though its status and fortunes have declined somewhat in the west over the last two decades, science still functions very much as the final court of appeal. It retains unprecedented authority. Appeals to science are still used and misused to sell or promote every conceivable idea and product. It is surely no surprise that, in the face of this trend, attitudes towards science within Adventist medicine have continued to soften.

The Medicalisation of Society

There is no doubt that medicalisation has been a major influence on western society over the last century. This is evidenced by such factors as the almost reverential respect in which the medical profession is now held, the size of national health budgets, increased rulings on matters of public health and the amount invested in private health insurance. Doctors attend us almost from conception until the time they sign our death certificates. Indeed, we are not dead enough to pass on our wills until they do! In a sense, medical professionals have displaced the clergy and the church as a dominant authority.

Since Kellogg, this process of medicalisation provides one of the main keys to understanding some of the major tensions experienced by Adventism today.[74] The ever-expanding medical work has given rise to a prominence of medical awareness and influence in the church. For example, by 1900 there were more employees in the growing network of Adventist medical institutions than working under the auspice of the General Conference.[75] In fact, Bull has suggested that medicalisation may have been more significant as an agent of change than more commonly recognised sociological factors such as secularisation.[76]

Bull and Lockhart note that evidence for this thesis is provided by the unusual level of independence long enjoyed by the Adventist medical work and the comparatively high wages paid by the church to medical workers, compared to teachers and pastors. It also seems that the pressures towards non-denominationalism and non-sectarianism that were first displayed by the medical "right arm" in the days of Kellogg, have continued to exert a liberalising influence on Adventism, despite its predominantly conservative trajectory. It is interesting to note in this connection that, as in the days of Kellogg, Adventist hospitals have much more relaxed attitudes to Sabbath observance and the serving of meat than are found in most other Adventist institutions. They also tend to employ higher ratios of non-church-members than other church organisations. First under the charismatic Kellogg and more recently, the medical "right arm" has come close to becoming the tail that wags the "message" dog. In fact, in some ways it has done so. As earlier noted, it was our need for accredited medical training to provide respected staff to run church health institutions that opened

the floodgates to institutional accreditation in all areas. Medicalisation is also evident in certain health policy areas. For example, in the matter of abortion, where one might have expected Adventism to follow the very conservative pro-life stance adopted by many other conservative groups, Adventism has been surprisingly non-committal.[77]

It should be noted that this process of medicalisation is particularly significant in the context of this chapter in that it represents the inroad of a medical philosophy and practice increasingly informed by scientific perspectives and principles.

Secularisation

There is no doubt that the same tensions which had arisen in the minds of the young Ellen Harmon and James White during the late 1840s over whether or not they should get married, given the nearness of the End, came up again in connection with the establishment of the Western Health Reform Institute. Perhaps showing the same thinking that had ultimately enabled their marriage—along the lines of occupying till He came—the Whites were clear over the need for the Institute. Ferret notes that: "White believed the motive for establishing institutions was the nearness of the Lord's coming rather than a declaration that institutions implied further delay of the Advent."[78] White was direct in her response to those who argued that building institutions was a waste of money given the extreme shortness of their remaining time on Earth: "All these (church institutions of publishing, education and health) are instrumentalities of God to cooperate in the grand work ..."[79] And in another place:

> Some may say, "If the Lord is coming soon, what need is there to establish schools, sanitariums, and food factories? ..." It is the Lord's design that we shall constantly improve the talents He has given us ... The prospect of Christ's soon coming should not lead us to idleness. Instead, it should lead us to do all we possibly can to bless and benefit humanity.[80]

Despite this assertion, however, sociologists note that as institutions develop, there is inevitably an increased need to recognise and comply with the regulatory requirements of the surrounding society: financial, management, labour and more recently gender equality and workplace health and safety. There is no doubt that, even by the energy and time

it absorbs, this process inevitably contributes to the erosion of those distinguishing features which initially defined the institution. The inevitable societal interaction must also mediate some transmission of outside societal values into the church. Knight notes that Adventism has demonstrated this inevitable trend.

> There is a sense in which failure was built into the very success of the young denomination. That is, in order to preserve the message of the imminent coming, institutions based on continuity and semi-permanence had to be erected. And in the process subtle and not-so-subtle transformations took place.[81]

Since ours is a science-and-technology-oriented society it is no surprise that this osmotic process has increased our receptivity to science, particularly as the profile of the latter has increased.

6. Changing Attitudes to Science in Evangelical American Christianity over 150 Years

According to Roberts "the pairing of science and religion did not become prominent until the definition of both terms attained recognizably modern form." Although theology had always been a feature of Christian thought, the Christian faith since the apostolic age had been primarily perceived by most of its adherents "as a life of piety and communal devotion and a set of ritual practices." This changed somewhat after the Reformation. With an increasing need to differentiate between burgeoning Christian denominations, and also other religions, which were becoming known through exploration, "beliefs" became more central to the concept of religion generally. [82]

It was also during this period that natural historians and natural philosophers moved from associating their enquiries with God's activities, to a style which emphasised natural laws and explicable processes. Even devout "scientists", as they were sometimes being called by the 1830s, often "preferred to confess their ignorance rather than invoke the supernatural" and in fact "the elimination of God-talk from scientific discourses constitutes a defining feature of modern science." Hence the term "methodological naturalism" was born.[83]

With respect to earth sciences Rudwick called this the "amicable dissociation of geology and Genesis."[84] Later in the nineteenth century the term "science" was further narrowed from being broadly employed as a descriptor for any form of systematised knowledge to apply only to the physical, natural realm. It is not hard to see that these re-shaped entities of science and religion could then much more easily come into conflict, and no surprise that the trope "science and religion", which really only made its appearance after the middle of the nineteenth century, was often used in the context of controversy.[85]

While natural history and natural philosophy had long been of interest to Christian scholars the sciences had seldom been perceived to be in any essential conflict with Christian faith. What strained or fractured this partnership for many Christians was the series of geological discoveries which followed in the wake of the industrial revolution, especially with respect to earth movements associated with mines and canals.

The threat brought by these troubling geological data was undoubtedly the main reason why the subject of science was of interest to evangelical Christians in mid-nineteenth century America. Although there were exceptions, such as Eleazar Lord, members of mainstream protestant denominations, such as Episcopalians and Presbyterians, generally adapted their views to accommodate these data, indicating an awareness of emerging science and a respect for it. This is no surprise given that these denominations tended to include the more educated among their adherents.

Other Protestant groups had a more ambivalent view of science. Perhaps the most conservative of these was the Methodist Church, from which many early Adventists were drawn. The strong influence of Methodism on early Adventism has been noted by a number of authors.[86] There is evidence to suggest that early Methodists were perceived by many other Christians to be comparatively uneducated and largely unaware of the methods of science. People of this mentality were quick to condemn and reject any science which appeared to contradict Scripture. Interestingly, Methodism had liberalised significantly by the mid-1800s, as evidenced, for example, by a number of fine Colleges established in the later decades.[87] It is

likely that attitudes to science among pioneer Adventists owed much to this early Methodist heritage.

One of the reasons why many conservative Christians were able to reject geology, and subsequently biological models requiring long ages, was that at the time it was common to differentiate between two kinds of natural investigation, both going under the broad aegis of "science". The first was Baconianism, which was seen as characterising disciplines such as physics and chemistry. This was essentially bottom-up, empirical and inductive, reasoning from the facts to the generalities. This view of the scientific method reached America in modified form through the works of the Scottish Enlightenment writers or Common Sense Realists, such as Thomas Reid, whose writings were very pervasive.[88] The second kind of science was speculative, hypothetical science. This was an essentially top-down methodology, based on the testing of working hypotheses, and it was with this type of thought that many identified the new domain of geology.[89] Many conservative Christians claimed to see no problem with the first category but could not so readily accept the second.

By the mid-to-late 1800s all branches of science were presenting a more united front, Baconian methodologies and hypothetical thought structures having effectively come together as the latter assumed a rightful place in science. This was eventually acknowledged by most, whether Christian or not, although fascinating hints of this differentiation between geology and the enabling sciences remain to this day![90]

Despite this methodological unification of all branches of science, Adventism has displayed receptivity to science in medicine while remaining cautious of science in some other contexts. One possible explanation for this may be that Adventists, perhaps following Kellogg, have come to regard medical science as essentially Baconian, and hence as acceptable, in contrast to the more speculative "sciences so called". This may warrant further investigation.

7. Conclusion

It is interesting to observe, as Butler has done, that the authority of science as a yardstick is now tacitly admitted, even by some conservative Adventists, for whom definitive proof of White's prophetic gift has been seen in the endorsement of her original health teachings by science as the latter has eventually "caught up", although perhaps only partially so.[91] In 2005 Don McMahon, an Australian physician, published the results of his extensive study on White's health teachings in the context of other prominent US health reformers of this period, some of whom are mentioned earlier in this paper. His findings were somewhat enigmatic. With respect to White's *The Ministry of Healing* (1905), he concluded that where she had made "descriptive" statements concerning what was good and bad she achieved an 87% pass rate, as judged against modern scientific consensus. However, when she attempted to provide "causal" explanations for these positions she achieved only 45% against the same criterion. McMahon showed that, although in both cases these obviously fell short of 100% agreement with modern science, White scored considerably better than the other health reformers investigated.[92] The point made here is that McMahon clearly saw value in comparing White to modern science.

In one sense Adventists can be said to have always been on the side of evidence-based, scientific medical practice ever since the days when the Whites adopted Dr James Jackson's "rational methods" to cure their son. Given the largely negative effects of what were called "drugs" at that time it could be argued that it was an act of the clearest scientific discrimination to argue against their use. Thus, the whole-hearted adoption of modern medicine including modern drugs which, although possibly overprescribed, do substantially work, could be represented as simply a continuation of that policy.

However, it seems undeniable that modern Adventist medicine has a much stronger commitment to scientific ideology and practice than might have been anticipated from the attitudes of the church pioneers to the science of their day. As noted at the end of the last section, it is almost as if Adventism has retained elements of the commonly held nineteenth-century view which saw those experimental sciences that embodied American Baconian ideology as acceptable. Although rough

spots have been encountered, medical science has then prospered in the church because it is demonstrably based on physics, chemistry and biology. At the same time, however, Adventism has continued to display reluctance towards acceptance of what it sees as the more "speculative" sciences. This is despite the fact that such attitudes, although common 100 to 150 years ago, have now been discarded by many others. This reluctance does appear, though, to have been somewhat selective. Against this trend it is worth noting that sociological science has found some place in Adventism, particularly in areas such as modelling church growth, despite a perception of its being somewhat removed from the enabling sciences.

With reference to Adventism's maturation Patrick has referred to "a constant process of struggle and rebirth." The changing and diversifying attitudes within the church to medical science within science at large constitute no exception.[93]

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