

# The flat-earth myth and creationism

Jerry Bergman

The idea that Christians once commonly believed in a flat earth for theological reasons is a myth. The story was invented to promote the claim that Christians have widely resisted scientific advancement due to doctrinal constraints. A major motivating factor behind propagating this myth has been to bolster the Darwinian worldview and to further the goal of displacing the biblical worldview. No evidence exists to support the common claim that scientists were once persecuted for opposing the flat-earth belief or advocating the spherical earth view, which has been commonly accepted for millennia.

Darwinism defenders sometimes compare their critics to flat-earth believers. Faulkner notes that this claim is one of the most common ridicules heaped on creationists of all types today.<sup>1</sup> A typical example is Professor Daniel Dennett, a strong antitheist, who angrily wrote that if Christians

‘... insist on teaching your children falsehoods—that the earth is flat, that “Man” is not a product of evolution by natural selection—then you must expect, at the very least, that those of us who have freedom of speech will feel free to describe your teachings as the spreading of falsehoods, and will attempt to demonstrate this to your children at our earliest opportunity. Our future well-being—the well-being of all of us on the planet—depends on the education of our descendants.’<sup>2</sup>

A Google search of ‘creationists’ and ‘flat earthers’ produced 37,100 responses, and most of the articles reviewed in some way referred to creationists as ‘flat earthers’. An example is Schadewald’s claim that ‘flat-earthism is as well supported scripturally and scientifically as creationism.’<sup>3</sup> He adds:

‘The creationist and flat-earth movements have similar foundations and histories, and both have used similar strategies to propagate their beliefs. Indeed, both believe they are battling the same behind-the-scenes opponent.’<sup>4</sup>

Schadewald then claims, without citing any empirical evidence, that no modern flat-earther would object to the Creation Research Society’s statement of belief.<sup>4</sup> Another example is from Whiting, who wrote that creationism ‘contains a number of variations ... . Some believe that the earth is flat or that the earth is the center of the universe.’<sup>5</sup>

According to my research, flat-earth believers in the West consisted of only a handful, at best, of true believers and most of the last few adherents died decades ago. A flat-earth web site exists in Great Britain which is actually a discussion group about a variety of topics, and none of the members appear to be flat-earthers. The most well known flat-earth believers were members of a religious organization headed by John Dowie. He ruled the town of Zion, Illinois, a small city on the shore of Lake Michigan.<sup>6</sup> Dowie was deposed in 1906, and Wilbur Voliva led the group until he died in 1942. Voliva first ‘focused on converting

his congregation to flat-earth belief’, then planned to work on converting outsiders.<sup>7</sup> Evidently he was not even very successful with Zion’s residents. When he died, the organization disintegrated and the flat-earth movement there died.<sup>8</sup>

The Flat Earth Society of America became moribund when the head of the flat-earth society, Charles K. Johnson of Lancaster, California, died on March 19, 2001 at age 76, ending the last organized flat-earth society. Johnson was an American born in Texas in 1924, and his wife was born around 1928 in Australia (figure 1a). Judging from my phone calls and correspondence with him, he was semi-illiterate.<sup>9,10</sup> His letters to me—regarding spelling, grammar and logic—were without exception the worst I have ever received, including letters from elementary school students. He ‘recognized that his education was haphazard and his mastery of grammar particularly poor’ but claims that he read a great deal.<sup>11</sup>

Working as an aircraft mechanic, Johnson considered his mind ‘pretty logical and not warped as bad’ as most of the population.<sup>11</sup> Described as ‘kind and compassionate’, but also ‘mercurial and paranoid’, he poured his heart and his meagre income into his flat-earth work.<sup>12</sup> Yet Johnson never had more than a handful of followers, and, judging from my correspondence with them, most were as uneducated as Johnson. He was especially antagonistic to creation groups such as ICR.

Johnson once claimed he had about 100 members, then revised the number to 2,000, and later to 3,000 members. Most ‘members’ were curiosity seekers or researchers such as myself who had to join his society in order to obtain their literature for this research (Figure 1b).<sup>13–15</sup> One estimate put the actual membership at only 100,<sup>16</sup> which could be likely because he specifically made it clear that ‘stupid mindless, brute beasts ... whose only aim is to scoff’ were not welcome.<sup>17</sup> Johnson’s lack of success is evident in the fact that he could not find a single person willing to carry on his work. Yet the media gave him much exposure, even implying that he headed a thriving organization. Johnson had many unorthodox ideas besides the flat-earth—he also believed that the sun and moon are both about 51 km in diameter, the earth is disc shaped, and the stars are about as far away from the earth as San Francisco is from Boston.<sup>18,19</sup> Instead of converting the world to his idea as he predicted, his movement has died.<sup>20</sup> He lived much of his life below

Image from Flat Earth News



JUNE 1979

## ONE FLAT WORLD UNITED STATES

Figure 1. The founder and president of the International Flat Earth Society, Charles K. Johnson and his wife, Marjory Waugh (left) taken from the front page of the September 1979 issue of Flat Earth News. Johnson's picture was often prominently featured in his magazine and literature. The headline of a typical issue of Flat Earth News (right) published by Johnson four times a year.

the poverty line and died homeless and penniless, ending his lonely crusade against what he called the 'Grease Ball' myth.

### The myth

According to the standard myth, the Church taught the flat-earth theory for most of its history, a cosmology that most Christians once accepted for theological reasons. When scientists empirically demonstrated that the earth is actually spherical the Church strenuously resisted and persecuted those brave scientists who advocated this new unbiblical view. Schadewald even claimed that 'flat-earthism has been associated with Christianity since the beginning. Many of the Fathers of the Church were flat-earthers.'<sup>21</sup> Antitheistic biologist, Massimo Pigliucci, argued that, for 'most of Western history, Christians have espoused' both geocentrism and flat-earthism.<sup>22</sup>

One leading history of science text claimed that the sphericity of the earth was 'accepted some time before the meridian of Greek thought. Aristotle clearly stated it, and it was worked out in detail by Ptolemy.' But when Christianity became dominant, the round-earth belief was

'... forgotten in the West for a thousand years, and replaced by imaginary constructions based on the supposed teachings of Holy Writ. The sphericity of the earth was, in fact, formally denied by the Church, and the mind of Western man, so far as it moved in this matter at all, moved back to the old confused notion of a modulated 'flatland', with the kingdoms of the world surrounding Jerusalem, the divinely chosen centre of the terrestrial disk.'<sup>23</sup>

This claim has often been repeated in scores of major references. Typical is one popular textbook that stated:

'Middle Ages were a dark period for the development of science in Europe. At best, scholars made accurate but sterile copies of the works of the ancients, rejecting anything which did not conform

with the dogmas of the Church. Such an intellectual environment stifled any development of critical scientific analysis. Concepts of the world which had been developed in ancient times were reshaped to conform to the teaching of the Church. The Earth became a flat disc with Jerusalem at its centre.'<sup>24</sup>

One major high school textbook, widely used for almost a half century in public schools, claimed that when Columbus applied for financial support to sail west to reach the East Indies, the 'learned council declared the plan too foolish for further attention.'<sup>25</sup> These educated churchmen concluded that Columbus' goal was 'absurd' because it is foolish 'to believe that there are people on the other side of the world, walking with their heels upward, and their heads hanging down', adding that a ship could not travel there because 'The torrid zone, through which they must pass, is a region of fire, where the very waves boil.'<sup>25</sup>

The idea was uncritically repeated in mass media publications for decades. A *Newsweek* article claimed that when the

'... Catholic Church condemned Galileo in 1632 for his heretical notion that the earth was a round globe hurtling through space about the sun, its effort to maintain the traditional Ptolemaic, flat-earth system was already doomed. The age of exploration was more than a century old, and men were roving all over the planet without falling off the edge.'<sup>16</sup>

One best-selling history of science text claimed that curiosity about the natural world all but disappeared in the early Middle Ages due to the ascendancy of the Church which

'... redirected the worries of "educated" people toward abstract theological questions; the seeds planted by the Greeks were to lie dormant for quite a while ... . The only acceptable wisdom was ... theological ... , and any questioning about the workings of the world was considered superfluous

and dangerous to the salvation of one's soul. The state of astronomy was so regressive that for seven hundred years, from roughly A.D. 300 to 1000, the Earth was once again considered to be flat!<sup>26</sup>

One biology textbook even claimed that, until the '1500s, many Europeans believed the earth was flat' and that 'work of astronomers like Copernicus and Galileo, caused considerable controversy at the time'. As a result of the Inquisition,

'... some scientists were executed for teaching that Earth and the other planets orbited the sun. Can you imagine living in a time when scientific curiosity was so discouraged or even forbidden?'<sup>27</sup>

As late as 1988 the myth was repeated in major textbooks by leading earth science authors and educators. Timothy Ferris wrote that the Church took science back centuries, teaching that the planets 'were pushed around by angels ... . The proud round earth was hammered flat; likewise the shimmering sun.'<sup>28</sup> One scientist wrote:

'... not so very long ago ... people by and large thought the earth was flat. The voyages of the exploration of Columbus' era can be considered empirical investigations of the shape of the earth.'<sup>29</sup>

Eventually, the popular myth goes, most Christians acknowledged their error and accepted a spherical earth, but the so-called fundamentalists continued to persist in their outmoded, unscientific belief and ridiculed those who espoused the round-earth view.

As we will show, the 'supposed Dark and Medieval consensus for a flat earth—is entirely mythological'<sup>30</sup> (figure 2). Furthermore an 'extensive body of literature' refutes this myth, sometimes called 'The Flat Earth Error'.<sup>31</sup> In an extensive study of Columbus, Kirkpatrick Sale concluded that one of the main Columbus myths was that 'he wanted to prove that the world was round.'<sup>32</sup> Sale concluded that the 'fact is that any educated European at the time, and certainly anybody who was engaged in maritime activity, knew that the world was round.'<sup>32</sup>

#### History of the flat-earth myth

The story that Christians believed in a flat earth until Columbus' time, and for some time thereafter, began as part of a fictional story that was elevated to historical fact by late



Image from <www.wikipedia.org>

Figure 2. A 15<sup>th</sup> century view of a flat earth which assumed only part of the globe was accessible to humans because the torrid climate around the equator could not be transversed by life. This view attempted to combine the common perception of a flat earth held by the common people at the time with the knowledge that the earth was, in fact, a round globe.

19<sup>th</sup>-century Darwinists who used it primarily as a means to ridicule Christians.<sup>33</sup>

The spherical shape of the earth was known to the ancient Greeks, who even made some good estimates of its circumference and, contrary to the claims of the flat-earth myth perpetrators, was never lost. One well-known example is Eratosthenes who measured the earth's diameter fairly accurately in the 3<sup>rd</sup> century BC.<sup>30</sup> Eratosthenes calculated the circumference using geometry to within 3.5% of the true value.<sup>1</sup> The ancient Greek experimenters knew its shape by evaluating a variety of evidences, including the earth's shadow during a lunar eclipse and the changing sky as one travels northward and southward.<sup>1</sup> The ancients knew much about astronomy because they spent a great deal of time studying the heavens and stars for navigation purposes and because of their strong interest in astrology.

Christian theologians, almost without exception, likewise accepted the fact that the earth is a sphere. The only two Christian writers known to have advocated a flat earth were a 4<sup>th</sup>-century heretic, Lactantius, and an obscure 6<sup>th</sup>-century Egyptian Monk, Cosmas Indicopleustes.<sup>34</sup> Later, these two obscure and unimportant writers were used as the prime evidence to prove that the flat-earth view was accepted by the Church as a whole—or at least by large parts of it.

The myth that the Church 'condemned as heretics all who claimed that the earth was round' was 'invented by two fabulists working separately: Antoine-Jean Letronne, an anticlerical 19<sup>th</sup>-century Frenchman, and Washington Irving.'<sup>35</sup> The 19<sup>th</sup>-century American writer Washington Irving was actually the first major promulgator of the flat-earth myth. In his very unreliable biography of Columbus, titled *History of the Life and Voyages of Christopher Columbus* (1828), Irving wrote that it was the flat-earth believing churchmen who vehemently opposed Columbus' plan to travel to the Indies on the grounds that his ship would fall off the edge of the earth while attempting to sail across the Atlantic.<sup>35</sup>

In fact, those who opposed Columbus not only knew the earth was a sphere, but also had a good idea of how large it was—and *this* was the major reason why they opposed Columbus. Columbus and his men were not afraid of falling off the earth as Irving claimed, but of travelling so far from land in an unknown part of the world. They did not know the American continent existed, and, for this reason, Columbus'



critics correctly believed that a voyage to the Far East would take far too long and cost way too much. Unfortunately, Irving used many facts from reputable references to make his fictional account appear well supported, and, as a result, ‘the public was fooled into taking his literary game as history.’<sup>36</sup> A careful reading of Irving makes it clear that his ‘history’ was deliberately designed to make Christianity appear prejudiced, dogmatic and ignorant, and to make scientists appear as objective persons who were carefully weighing the facts and who, in the end, were correct. As Morrison correctly concluded, Irving’s account is ‘mischievous nonsense ... . The sphericity of the globe was not in question. The issue was the width of the ocean,’ and on this question Columbus’ opposition was correct.<sup>37</sup>

#### Flat-earth myth used to condemn Darwin sceptics

Darwinists have for decades argued that since modern science has demonstrated the truth of Darwinian evolution, Darwin critics today display a level of ignorance and simplistic thinking similar to the people in the past who believed in a flat earth. An example is Professor Pigliucci, who wrote that if the ‘Flat Earth Society (based in California) gains enough support to sweep the nation with its followers’ and became ‘an important force in local and national elections’, it could

‘... eventually demand a revision of all science curricula in astronomy [and argue that] Schools should stop teaching that nonsense about a round Earth and [that we should] warn students that if they travel far enough, they will fall off the edge of the planet. This scenario seems laughable; indeed, that is why people in virtually every other industrialized country are laughing at this state of affairs in the United States: The scientific status of creationism is in no way superior to flat Earthism.’<sup>38</sup>

The flat-earth myth largely remained in the realm of fiction until after Darwin published his *Origin of Species* in 1859. Russell documented that the flat-earth myth was appropriated in the second half of the 19<sup>th</sup> century in a very successful attempt to discredit creationists. To discredit their critics Darwinists needed support, and since the evidence for the creation of all life by natural means was non-existent then other means were sought. The few writings of those who claimed the Church suppressed science, especially the flat-earth claims, were exploited by the foes of creationism.<sup>39</sup> They attempted to support their case by exploiting the obscure writings of Lactantius and Indicopleustes, who

‘... were convenient symbols to be used as weapons against the anti-Darwinists. By the 1870s the relationship between science and theology was beginning to be described in military metaphors. The philosophers (the propagandists of the Enlightenment), particularly Hume, had planted a seed by implying that the scientific and Christian views were in conflict. Auguste Comte (1798–1857)

had argued that humanity was laboriously struggling upward toward the reign of science; his followers advanced the corollary that anything impeding the coming of the kingdom of science was retrograde. Their value system perceived the movement toward science as “good”, so that anything blocking movement in that direction was “evil”.’<sup>40</sup>

Evolutionists then elevated the myth into popular, historical fact in the two most well-known books defending Darwinism and attacking Christianity: John Draper’s *The History of the Conflict Between Religion and Science*,<sup>41</sup> and Andrew Dickson White’s *A History of the Warfare of Science with Theology in Christendom*<sup>42</sup> (figure 3). Both authors used copious references, and the ‘educated public, seeing so many eminent scientists, philosophers, and scholars in agreement, concluded they must be right.’ The reason they were in agreement was because they imitated one another.<sup>43</sup>

Both Draper and White relied heavily on Cosmas Indicopleustes to support their claim that the Church widely accepted flat-earth cosmology. White goes into great detail explaining Cosmas’ ‘flat parallelogram earth surrounded by four seas’ cosmology.<sup>44</sup> White then falsely concluded that Cosmas’ flat-earth idea was received as virtually inspired by the Church,

‘... and was soon regarded as a fortress of scriptural truth. Some of the foremost men in the Church devoted themselves to buttressing it with new texts and throwing about it new outworks of theological reasoning; the great body of the faithful considered it a direct gift from the Almighty.’<sup>45</sup>

Unfortunately, ‘Many authors, great and small have followed the Draper–White line down to the present.’<sup>43</sup> One modern example is Hakim, who claimed that Cosmas’ rectangular (twice as long as wide) flat-earth cosmology became the dominate view in the middle ages.<sup>46</sup>

University of California at Santa Barbara Professor of History, Jeffrey Burton Russell, has effectively shown the arguments of both Draper and White were totally without merit in his now-classic study of the affair. He carefully documents that the entire Church rejected the flat-earth theory, and Cosmas’ writings were almost totally ignored. Russell also examined a large selection of textbooks and found those written before 1870 usually included the correct account, but most textbooks written after 1880 uncritically repeated the erroneous claims in Irving, Draper and White. Russell concludes that Irving, Draper and White were the main writers responsible for introducing the erroneous flat-earth myth that is still with us today.

The late Harvard professor, Stephen Jay Gould, concluded from a study of their writings that the main goal of both Draper and White was to discredit Christians who opposed Darwinism.<sup>47</sup> Draper, an active anti-Catholic, was so anti-religious that when his sister’s son died, ‘she put the boy’s prayer book on Draper’s breakfast plate’ which so infuriated Draper that he drove her from the house, permanently alienating her from the family.<sup>48</sup> In Russell’s

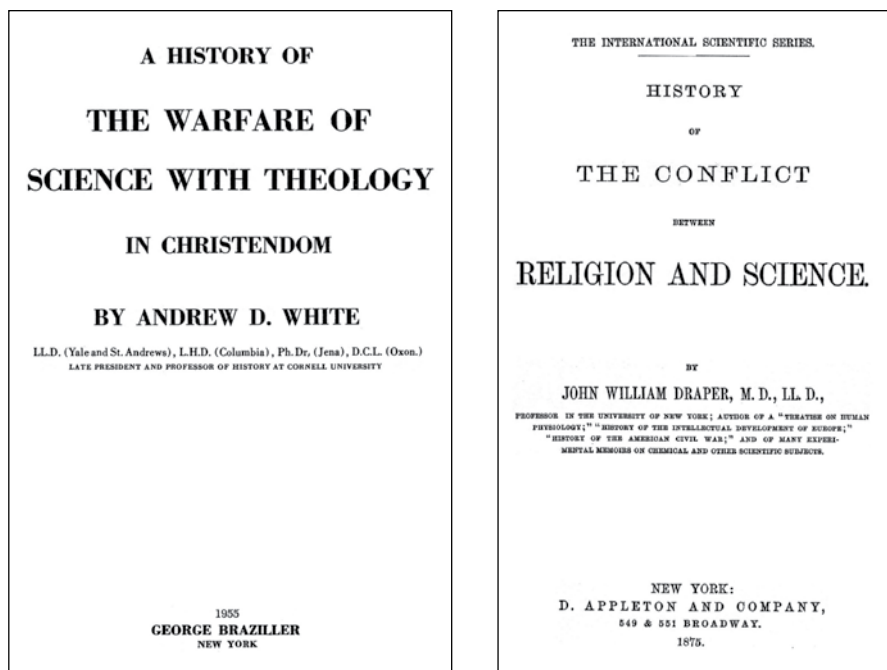


Figure 3. A 1955 low-cost reprint of White’s highly influential book (left), one of the many reprintings completed since the book was first published in the late 1800s. Note White’s four degrees, two from American schools, one from Oxford in England and one from Jena in Germany where the leading German Darwinist Ernst Haeckel taught. The title page of Drapers 1875 best selling book which also has been reprinted numerous times (right). Draper was one of the first historians to popularize the myth that Christianity actively fought against scientific progress for much of its history.

words, Draper ‘brooked no opposition’ on matters of religion. White, a disgruntled former Episcopalian, was a University of Michigan Professor and later became president of Cornell University.

These three books ‘fixed in the educated mind the idea that “science” stood for freedom and progress against the superstition and repression of “religion”’.<sup>49</sup> Draper’s book ‘ranks among the greatest publishing successes of the nineteenth-century,’ and White’s book is still being reprinted today.<sup>50</sup> Draper’s book was, on average, reprinted every year for a half century after it was published in the U.S. alone. In the United Kingdom, it was reprinted twenty-one times in fifteen years, and was translated worldwide.<sup>51</sup>

Lindberg and Numbers wrote that White’s book ‘has done more ... to instill in the public mind a sense of the adversarial relationship between science and religion’ than any other work.<sup>39</sup> Noble wrote that the flat-earth myth

‘... became widespread conventional wisdom from 1870 to 1920 as a result of “the war between science and religion”, when for many intellectuals in Europe and the United States all religion became synonymous with superstition and science became the only legitimate source of truth. It was during the last years of the nineteenth century and the early years of the twentieth century, then, that the voyage of Columbus became such a widespread symbol of the futility of the religious imagination and

the liberating power of scientific empiricism.’<sup>52</sup>

Gould also concluded that it was the creation-evolution conflict that gave birth to the myth of religion’s war on science:

‘As another interesting similarity, both men [Draper and White] developed their basic model of science vs. theology in the context of a seminal and contemporary struggle all too easily viewed in this light—the battle for evolution, specifically for Darwin’s secular version based on natural selection. No issue, certainly since Galileo, had so challenged traditional views of the deepest meaning of human life, and therefore so contacted a domain of religious inquiry as well. It would not be an exaggeration to say that the Darwinian revolution directly triggered this influential nineteenth-century conceptualization of Western history as a war between two taxonomic categories labeled science and religion.’<sup>47</sup>

Their argument was, just as the Church foolishly opposed the science proving that the earth was round, Christians are likewise making the same mistake today by opposing Darwinism.<sup>33</sup> In short, defenders of Darwinism who ridicule their critics for being like believers in a flat earth were misled by a myth that Darwinists themselves helped to create. In fact, the success of Draper’s book was in large part due to the ‘controversy over evolution and the descent of man’.<sup>51</sup> The book provided ammunition in the secularist war against the creationists, an important tactic because the scientific case for Darwinism was so weak.

By the 1980s, many textbooks and encyclopedias had corrected the flat-earth myth, but it was still regularly repeated, even after Jeffrey Burton Russell’s 1991 work. In a widely read book by an Oxford University Rhodes Scholar and a former Librarian of Congress, University of Chicago Professor Daniel Boorstin wrote in a chapter titled ‘The Prison of Christian Dogma’ that after the Ptolemy era, Christianity conquered most of Europe, resulting in a

‘Europe-wide phenomenon of scholarly amnesia, which afflicted the continent from A.D. 300 to at least 1300. During those centuries Christian faith and dogma suppressed the useful image of the world that had been so slowly, so painfully, and so scrupulously drawn by ancient geographers.’<sup>53</sup>

In its place, Boorstin writes, were ‘simple diagrams [that] authoritatively declare the true shape of the world.’

In a chapter titled ‘A Flat Earth Returns’, Boorstin even claimed that almost every Christian believed the earth was flat except a ‘few compromising spirits’ who accepted a spherical earth for geographic reasons, while still denying the existence of Antipodean inhabitants for theological reasons.<sup>54</sup> Antipodean inhabitants were those people who lived upside down on the other side of the round earth.

### Conclusion

The flat-earth myth was created by intellectuals in their attempt to discredit Darwin sceptics. This ploy indicates the lack of persuasive scientific evidence for Darwinism that existed at that time in history. Darwinists, secularists and others saw the flat-earth myth as a ‘powerful weapon’ against sceptics:

‘If Christians had for centuries insisted that the earth was flat against clear and available evidence, they must be not only enemies of scientific truth, but contemptible and pitiful enemies. The Error, which had existed in seed from the time of Copernicus and had been planted by Irving and Letronne in the nineteenth century, was now watered by the progressivists into lush and tangled undergrowth. The Error was thus subsumed in a much larger controversy—the alleged war between science and religion.’<sup>55</sup>

Although the flat-earth myth was effectively debunked in 1991 by Russell’s scholarly study, the flat-earth myth is still used to claim that Christianity has a long history of persecuting scientists.<sup>7</sup> For example, Youngson claimed Bruno was burned at the stake for espousing scientific ideas, including denying the belief espoused by the Church ‘that the earth was flat and was supported on pillars.’<sup>56</sup> Historian of astronomy John North concluded that the flat-earth still ‘is a common myth—perpetuated, as it seems, by most teachers of young children—that Columbus discovered that the Earth is round.’<sup>57</sup>

By citing only secondary sources, the flat-earth myth propagandists did what they accused the church of doing—and what Darwinists do today—and, as a result, they created a ‘body of false knowledge by consulting one another instead of the evidence.’<sup>58</sup> This history clearly supports, not a war of religion against science, but instead a war of evolutionary propagandists against religion. The fact that White and ‘his imitators have distorted history to serve ideological ends of their own’ is only one of the many examples of this war by materialists against Christianity.<sup>39</sup>

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## Errata

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Truman, R., Searching for needles in a haystack. On page 93, in Appendix B, subsection ‘TEM-1 penicillinase’, the text in the second sentence of the second paragraph reads, ‘TEM-1 penicillinase is a typical class A  $\beta$ -lactamase consisting of 263 residues, and includes together in an orchestrated order, which leads reliably to the same three-dimensional, final, stable folded pattern. These considerations imply that the number of distinct folding patterns is relatively small<sup>33</sup> and in the order of  $10^3$  to  $10^4$ .’

However, it should read, ‘TEM-1 penicillinase is a typical class A  $\beta$ -lactamase consisting of 263 residues, and includes two structural domains. The whole protein, once folded, reveals several features which include nine strands, twelve helices and three chains. The larger 153 amino acid domain was studied by Axe.<sup>27</sup>

‘How many sequences would provide the enzymatic function? All possible mutations would require  $20^{153}$  different genes to be examined, which is not realistic. Axe shows how careful reasoning does permit extrapolation to a reasonable estimate based on far fewer mutants.

‘Protein folding is a concerted effort involving multiple portions of the polypeptide concurrently. Interactions between the side chains of different amino acids bring portions together in an orchestrated order, which leads reliably to the same three-dimensional, final, stable folded pattern. These considerations imply that the number of distinct folding patterns is relatively small<sup>33</sup> and in the order of  $10^3$  to  $10^4$ .’

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Williams, A., Life’s Irreducible Structure, Parts I.

- On p. 110, first column, last paragraph, the description of Figure 2 should read: ‘Figure 2 shows the back and front of two vintage silver coins?’
- On p. 115, reference 14, the second sentence should read, ‘Cytochrome c can tolerate  $10^{35}$  such variations...’

### Journal of Creation 21(3)

- The photo credit for the cover picture of a human eye should read. ‘Close up of human eye. Joe Crawford <flickr.com>’
- Silvestru, E., Naracoorte Caves: an archive in the dark. On page 6, the first sentence should read, ‘Naracoorte Caves in South Australia ...’