

# ARTICLES

## SPECIES VARIABILITY AND CREATIONISM

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### ABSTRACT

*Before and after the publication of Origin of Species, creationists have held a diversity of opinion regarding the origin of species. Studies of species in the sixteenth century began with numerous suggestions of wide variability, but after Francesco Redi helped to falsify spontaneous generation, scholars began to view species as essentially fixed. This was reinforced by prominent natural theologians, who endorsed a static creation. Despite the popularity of fixity, even Linnaeus himself doubted it. After Darwin, many Christians instinctively defended the fixist definition of creationist that Darwin himself popularized in Origin. Only in the early twentieth century did creationists return actively to developing models of limited speciation or polyphyletic evolution. The independent recurrence of these ideas suggests that they have some intrinsic appeal to those seeking an alternative to monophyletic evolution.*

### INTRODUCTION

Before any history of creationist biology can begin, it seems important to define the term “creationist.” The definition of creationism has gained some attention recently, as a sort of pejorative term. For example, Intelligent Design (ID) advocates try to challenge the evolutionary theory in theologically neutral terms, while their critics persistently describe them as “creationists” (e.g., Pennock 1999, Pigliucci 2003). Others define “creationist” in extreme terms. For example, Douglas Futuyma defines “special creation” as “the doctrine that each species, living and extinct, was created independently by God, essentially in its present form” (2005, p 524). Similar definitions can be found in other textbooks (e.g., Stearns & Hoekstra 2005, p 17-18; Ridley 2004, p 688), even though Numbers’s (2004) research on creationism shows that fixity of species is a minority among modern creationist positions. If we accept Futuyma’s definition of “special creation,” then there are very few adherents of special creation among young-age creationists. So what is a creationist?

Numbers (1999) traced the usage of creationism and found that today it almost universally applies to young-age creationists, those advocates of a short chronology for the earth and a universal deluge. This minimalist

approach to the biblical issues surrounding the definition of *creationist* allows for a wide variety of scientific views held by creationists, only one of which might be species fixity. I will follow this biblical definition of *creationist*, even though I acknowledge that applying *creationist* to many of the individuals discussed herein is anachronistic. Nevertheless, if they hold to the same doctrinal positions regarding Genesis that I do as a creationist, then there exists a kind of theological and intellectual kinship, which transcends specific differences regarding scientific or other theological ideas.

What then constitutes creationist biology? More specifically, what is *the* creationist perspective on the origin of species? Despite Darwin's discussion of creationists in *Origin*, creationist opinions on species fixity and variability have always been quite diverse. Since most attention is given (for better or worse) to creationists who endorse species fixity, I wish to focus more on the diversity of opinion among creationists who reject species fixity. We shall see that there is no single creationist perspective on the species issue.

### THE EMERGENCE OF SPECIES FIXITY

At the foundations of modern science, the enumeration of species arose as a specific aspect of defending the account of Noah's Ark in Genesis 6-9. These listings gradually became more sophisticated over time until they became interesting pursuits in their own right, regardless of their application to Ark apologetics. Johannes Buteo's (1559, see also Griffith & Monnette 2007) list of Ark animals exemplifies early efforts. In addition to sheep, goats, cows, and wolves, Buteo's list of Ark animals also included unicorns, the pegasus, and the manticores. Royal Society founder John Wilkins (1668, see also Wood 2007) took a more conservative approach and omitted some of the more fanciful creatures of Buteo's list. Wilkins also suggested the possibility that some oxen on his list might have originated from a common ancestor by "various changes ... frequently occasioned in the same species by several countries, diets, and other accidents" (Wilkins 1668, p 165). Thus it would not be necessary to carry every minor variation of cow onto the Ark. Finally, John Ray, who assisted Wilkins in composing his tables of animals, later created his own lists of species using a more "natural" scheme (see Shapiro 1969, p 218).

Other biological considerations about Noah's Ark can be found in the work of Jose de Acosta, Jesuit missionary and explorer who published *Natural and Moral History of the Indies* in 1590 (López-Morillas 2002). Acosta considered three explanations for how animals could have reached the Americas from the Ark's landing site in the Middle East. The distance

precluded swimming or flying, and Acosta thought it unlikely that people would willingly transport “wolves and foxes and other such vile and worthless animals” (López-Morillas 2002, p 62). Acosta concluded that the third method of transport was the most likely: Animals came to the new world by walking on an as yet undiscovered land bridge. Anticipating the discovery of the Bering land bridge is Acosta’s chief claim to fame in biogeography today (e.g., Klein & Schiffner 2003).

Acosta also entertained the possibility that the animals of the Americas were not different species from those found in Eurasia and Africa. “We must also consider whether these animals differ specifically and essentially from all others or whether their difference is accidental; this could be caused by various accidents, as in the lineage of men some are white and others black, some giants and others dwarfs” (López-Morillas 2002, p 236). He admitted that this type of variation was unlikely to account for all American animals, but his discussion of the possibility of wide variation is intriguing. Acosta was not the first or last to suggest that such species variation was possible. This opinion was repeated in the English-speaking world by Sir Walter Raleigh in 1614 (Raleigh 1829, p 214) and Matthew Hale in 1677. So developed was Hale’s view that Zirkle (1946) called him a “pre-Darwinian evolutionist,” even though he evidently held the same doctrinal views as creationists.

These musings do not negate the more common view of species fixity, even prior to Linnaeus. For example, in 1695, John Woodward asserted that “the Animal and Vegetable Productions of the *Antediluvian* Earth did not in any wise *differ* from those of the present Earth” (p 247). Even Acosta rejected his own suggestion, “For if we are to judge the species of animals by their characteristics those of the Indies are so diverse that to try to reduce them to species known in Europe would be like calling an egg a chestnut” (López-Morillas 2002, p 236).

The common understanding of “species” at the time was Aristotelian and Platonic (Landgren 1993). In Greek philosophy, the species was an idealistic form, an *eidōs*. As an eternal object, the *eidōs* could not change in its essence. This Greek conception of species became linked to the Genesis “kind” via the Vulgate, which translates *min* as *species* in Gen. 1:21, 24, and 25. In the Hebrew Old Testament, *min* is used very infrequently, but usually refers to a category of living thing. From its usage, we infer that it was an imprecise term, much like the English word “kind” (Wood et al. 2003). The philosophical concept of an immutable essence was imposed on the text by linking *min* to species. Thus, while these early modern scholars suggested that the species might be defined broadly,

they still held to the concept that species were defined by an immutable essence.

The demise of speculations about wide species variability is closely tied to the downfall of spontaneous generation, although as we shall see, species variability did not entirely disappear. Throughout the seventeenth century, a series of studies and experiments built the case against spontaneous generation. The decisive work in the minds of many contemporaries was that of Francesco Redi (1668), who showed that rotting meat, if kept carefully separate from insects, did not generate maggots. Subsequently, scholars such as John Ray explicitly linked the rejection of spontaneous generation to species fixity. Ray (1691, p 298-299) wrote, “My Observation and Affirmation is, that there is no such thing in Nature, as Æquivocal or Spontaneous Generation, but that all Animals, as well small as great, not excluding the vilest and most contemptible Insect, are generated by Animal Parents of the same *Species* with themselves.” Similarly, Carolus Linnaeus wrote in *Systema Natura*, “If we behold the works of God, it is more than sufficiently obvious to all, that every animate being comes into existence out of a parent’s egg, and that all eggs produce offspring like its parents, wherefore no new species can arise” (quoted in Landgren 1993).

By the 1740s, however, Linnaeus became concerned with the occurrence of hybridization (Landgren 1993). If species were marked by their ability to reproduce only after their own species, as scholars had assumed since Redi’s experiments, what do we do with a hybrid, which resembles two apparently different species? Linnaeus began to suggest that in the beginning, God had created only a single species in each genus, and that hybridization between those species produced the wide variety of species we see today. In Linnaeus’ more mature view, modern species did not represent the originally-created forms, but instead arose during history as God’s created forms intermingled. Unfortunately, Linnaeus is so linked to species fixity that his later view on species variability is forgotten.

Speculations on the variable nature of species and God’s creation continued well into the nineteenth century. English clergyman and plant breeder William Herbert developed a view of species in which God originally created a single member of each genus and variation occurred naturally without hybridization. Although Herbert accepted a global Flood, he rejected the young-age chronology (see Guimond 1966, p 200-202), and thus he is not strictly a creationist according to my doctrinal definition. Nevertheless, his view on species variability is fascinating. According to Herbert, modern species were descendants of the created types that had varied and changed in response to climate changes after the Flood.

*If the Almighty created the original types capable of permanent variations under different circumstances, perhaps of soil or climate, those variations were worked at a very early period, on the first diffusion of seeds into every different portion of the world, especially by the operation of the flood, and may have in part resulted from the changes of climate which accompanied it and shortened the life of man (Herbert 1837, p 338).*

As might be expected, Herbert is presently considered to be a kind of evolutionary forerunner to Darwin (e.g., Darlington 1937; Guimond 1966, 1985), despite his clear advocacy of doctrinal issues that mark him as an old-earth creationist.

### **NATURAL THEOLOGY AND SPECIES FIXITY**

British natural theology, as popularized by Wilkins (1675), Boyle (1688), and Ray (1691), is also partly responsible for perpetuating the belief in species fixity. The object of natural theology was to derive religious principles from observation or reason, without explicit reference to special revelation. The functionalist approach to natural theology viewed contrivance as evidence of a divine designer, and attempted to derive the characteristics of that designer from the admirable traits of his designs. By rejecting the use of special revelation, natural theologians were forced into rather contorted and unlikely explanations for the more unpleasant aspects of creation. John Ray (1691, p 309) exhibits this in his discussion of lice:

*Here, by the by, I cannot but look upon the strange Instinct of this noisome and troublesome Creature the Louse, of searching out foul and nasty Cloaths to harbour and breed in, as an Effect of Divine Providence, designed to deter Men and Women from Sluttishness and Sordidness, and to provoke them to Cleanliness and Neatness.*

However, we would oversimplify the issue by attributing this strange explanation of lice and many others like it merely to the inability to use special revelation (especially the account of the Fall of man and the subsequent curse on creation). Besides just avoiding special revelation, there was also a more subtle requirement on natural theology. As Ray (1691, Preface) expressed it, “by the Works of the Creation, in the Title, I mean the Works created by God at first, and by Him conserv’d to this Day in the same State and Condition in which they were at first made.” Natural theology required a strong measure of stasis to work. If any change in creation was allowed, it would alter God’s revelation, just as surely as

altering the text of the Bible would change special revelation. If we see God's attributes in creation (which according to the natural theologians we definitely do), then creation must be the same as when God made it.

When faced with natural evil, English clergyman and author of *Natural Theology* William Paley (1830) took a peculiarly dualistic approach. He included the viper's fang and bee's sting in admirable contrivances that demonstrated wise designs, without commenting on the purposes to which those contrivances were put. At the conclusion of *Natural Theology*, however, Paley gave an extended account of the problem of natural evil in which he explicitly endorsed death as part of God's design. "Immortality upon this earth is out of the question. Without death there could be no generation, no sexes, no parental relation, *i.e.* as things are constituted, no animal happiness" (Paley 1830, p 329). If death is a part of the design, then death is not an enemy to be vanquished or an interloper in God's creation, as most modern creationists would hold. Instead, death must have been there from the beginning, and nature is necessarily static.

Thus we see that as scholars better understood reproduction, species fixity became fashionable, and from natural theology we find another strong tradition of the stasis of creation. These traditions resulted in a view of the universe as an unchanging and unchanged entity. Seen in this light then, Charles Lyell's doctrine of uniformitarianism in geology came as no novel proposal, but as a logical outworking of the prevailing views of his day.

### THE RESPONSE TO *ORIGIN*

Despite individuals advocating species variability, scientists of the first half of the nineteenth century commonly assumed that species were fixed and unchangeable. That does not diminish the reality of pre-Darwinian scholars who advocated species variability, but it is important to note that these ideas did not gain widespread acceptance. Consequently, Darwin referred to the common view of species fixity throughout *Origin*, and he explicitly linked species fixity to the doctrine of special creation (e.g., Darwin 1859, p 44, 469). Given that Darwin should have known about creationist alternatives to species fixity, why did he equate special creation with species fixity? It is almost as if he was creating a straw man creationist in *Origin* with which to contrast his evolutionary views. This is probably not correct either, since Darwin heard about Herbert's view on species from Herbert himself, but Darwin considered him a kind of evolutionist (F Darwin 1897, p 312). Landgren (1993) suggested that Darwin's "creationist" was Darwin himself, an expression of Darwin's own personal embarrassment at the naïve views of nature that he held in his youth.

Whatever the source of Darwin's ideas about creationism, after the publication of *Origin*, a variety of responses to the proposed theory of evolution can be observed (see Numbers 2006). Most of what we would call biologists accepted the occurrence of evolution with few objections. Many followed Asa Gray in the U.S.A., by interpreting evolution as God's method of creating species (e.g., Gray 1860). Regarding the mechanism of evolution, Darwin made it clear in *Origin* that natural selection was not the only means by which evolution might have taken place, but he believed that it was the primary mechanism. Many others disagreed. Substantive critiques of natural selection came from St. George Mivart (1871) and Fleeming Jenkin (1867). Within his lifetime, Darwin saw nearly the entire scientific community agree to his argument for evolution but reject his theory of natural selection. This is ironic, since Darwin himself claimed that an argument for evolution would be unconvincing without a credible mechanism (Darwin 1859, p 3). Proposed alternative mechanisms included a variety of neo-Lamarckian versions of the inheritance of acquired characteristics, a kind of internal drive to evolve called orthogenesis, DeVries's mutation theory, and divine inspiration of variations on which selection could work. So complete were the doubts about natural selection that Bowler (1983) named this period the "eclipse of Darwinism." During the eclipse, arguments against natural selection were readily available in scientific books and papers.

To understand the re-emergence of creationist biology in the twentieth century, we need to look at one other response to Darwin: the outright, passionate rejection. These individuals simply rejected everything that Darwin argued and vigorously defended the creationist caricature from *Origin of Species*, species fixity and all, as though they were themselves suffering a personal assault. The zeal of their defense suggests that Darwin was not so wrong in his characterization of at least a minority of creationists. Since most of them only argued for species fixity (contra Darwin) and little else, I will call them antievolutionists.

Typically poorly trained in science, antievolutionists filled their books with rhetoric and zeal but little logic or evidence. Even their book titles were sensationalistic, aimed at a semi-educated public. Examples include Charles Robert Bree's 1860 *Species not Transmutable*, J. Wesley Milam's 1926 *Specie Permanata*, and Alfred Watterson McCann's 1922 *God - Or Gorilla*. Bree concluded his book with this assessment of *Origin*, "From beginning to end the book is a cheerless, gloomy narrative. It destroys every vestige of the beautiful from the mind, without replacing it with even a plausible or intelligent theory" (Bree 1860, p 254). Milam's book is a classic of assumption without knowledge. Commenting on the nature of species (which he consistently misspells as *specie*), he wrote,

*Naturalists have been in the habit of classing many varieties as so many species, and classing so many specie under genera. Genera or genus has no business here. John Ray, the originator of the term specie as applied to animals and vegetables, etc., applied it to animals that were distinct and fixed, or supposed to be fixed, in nature. Linneus [sic] and Couvier [sic] accepted this nomenclature as indivisible. Now they give genus or genera the place held by specie and make specie divisible as varieties, yet in the theory of evolution they hold up species as divisible and say nothing about genera. It is a plain case of deceit practiced by evolutionists (Milam 1926, p 103).*

There is very little in that passage that is factually correct (Ray did not originate the term species, Linnaeus did not accept immutable species). This is an extreme example of shoddy scholarship, but it is not atypical of the standard antievolutionist text.

### LIMITED EVOLUTION

Thus the battle lines between evolutionists and “creationists” (actually antievolutionists) were drawn, and in the midst of this battle the Scopes Trial was born. Against this backdrop of conflict, where the combatants should have been easy to define, exists a surprising diversity of opinion regarding species fixity among creationists and religious opponents of evolution. A kind of limited evolution within basic created types was emerging (or perhaps re-emerging) independently in Europe and the United States. This new tradition was following closely and unwittingly the ideas of William Herbert.

One such religious objector to evolution was Erich Wasmann, a German Jesuit and entomologist. Wasmann identified himself as a theistic evolutionist (see Wasmann 1909, p 21-48) and believed that the Bible did not have any relevant input on the question of the origin of species. “We must first of all state clearly that *the Bible is not intended to instruct us in modern science*, and we scientists of the twentieth century ought not to seek zoological information in it” (Wasmann 1909, p 17).

Wasmann was convinced that a type of evolution had occurred, at least among the major groups of organisms, but he rejected the idea that mammals, reptiles, and birds might have evolved from a common ancestor (Wasmann 1910, p 291-292). “This alone is certain; there is no evidence at all in support of a monophyletic phylogeny” (Wasmann 1910, p 291). He also rejected the animal ancestry of human beings (Wasmann 1910, ch 11). His major objection to Haeckel’s version of evolution was Haeckel’s



use of evolution as an argument for “monism,” or what we would call philosophical naturalism (Wasmann 1909, pp 21-48). This brought Wasmann into direct conflict with Haeckel and led to a 1907 debate in Berlin with eleven prominent German biologists (see Lustig 2002).

Wasmann published his views in two English-language books, *The Berlin Discussion of The Problem of Evolution* (1909) and *Modern Biology and the Theory of Evolution* (1910), which came to the attention of two British authors. Tom Bond Bishop, founder of the Scripture Union, included a favorable citation of Wasmann’s limited evolution in his 1918 compendium *Evolution Criticised*. Far more elaborate was Harold C. Morton’s development on limited evolution in his 1925 *The Bankruptcy of Evolution*. Morton spent an entire chapter explaining his theory of *parvolution* (from the Latin *parva*, small). “The real proven sphere of Evolution is simply *within the type*,” (p 168) to which he added ironically, “*nor is the most convinced Creationist concerned to deny it*” (p 170).

Across the Atlantic, similar thinking was coalescing around George McCready Price, Seventh-day Adventist teacher and self-styled geologist. Price himself never cared much about biology, thinking instead that the “problem” of evolution was largely geological. In 1924, he published his only major work on evolution, *The Phantom of Organic Evolution*, in which he wrote, “We seem to have in nature certain great groups of living creatures, call them what we will, genera, families, or tribes, but usually *larger than ‘species,’* all the members of each of which have probably descended from common ancestors” (Price 1924, p 39). He elaborated very little on that point, but he did admit that “the *Family* seems to be generally the original unit” (Price 1924, p 39). Coming out just before the Scopes Trial, *Phantom* found something of a following and actually yielded significant royalties for Price (the only one of his books to do so) (Numbers 2006, p 105).

Price’s *Phantom* was followed in 1927 by Lutheran pastor Byron C. Nelson’s “*After Its Kind*.” Unlike most previous critiques of evolution, Nelson made a sophisticated argument informed by Mendelian genetics and critiques of natural selection typical of the “eclipse of Darwin.” Like Price, Nelson allowed for variation, but he was more conservative than Price. Nelson relied heavily on the mechanism of “variation” (evolution) and did not make broader inferences based on what kinds of variations *might* occur.

Nelson explicitly used the term *species* for the originally created unit, but he distinguished between *natural species* and *systematic species*.

*The Bible does not mean to say that every distinct form of plant or animal men see about them came from the hand of*

*the Creator in just the form in which it is beheld. It is not the several types of dogs: fox-terrier, dachshund, collie, that were created to remain the same forever, but the one natural species, dog. The 'kinds' of Genesis refer not to the 'systematic' species identified by men, but to those natural species of which the world is full, which have power to vary within themselves in such a way that the members of the species are not all exactly alike, but which, nevertheless, cannot go out of the bounds that the Creator set (Nelson 1927, p 19-20).*

A major test of common ancestry to Nelson was the potential for producing fertile offspring. In an article in *The Bible Champion*, Nelson (1929a) wrote, "When we apply this test to the animal world we find that there are groups which belong together. All the 'dogs' belong together, which also includes the wolves, coyotes, jackals. But the foxes are not included, for foxes and dogs do not cross, even under human compulsion." The key to Nelson's thought is empirical demonstration. Nelson was willing to admit to wide variation if that variation could be demonstrated empirically or if interbreeding was possible.

California farmer Dudley Joseph Whitney took a different approach. Whitney began a correspondence with Price in the summer of 1927, after reading Price's 1917 *Q.E.D. or New Light on the Doctrine of Creation*. In one of his first letters to Price, he wrote, "I am disgusted with the way that the antis [antievolutionists] fight for practical fixity of species. It shows a complete ignorance of zoology and botany and Genesis does not demand it either" (Whitney 1927). Whereas Nelson used Mendelian genetics to construct an argument for a broad species fixity, Whitney objected to evolution on the grounds of the impossibility of radical alterations to organisms, such as originating a new organ or converting a leg to a wing.

In the summer of 1928, Whitney began an extended and sometimes heated correspondence with Nelson over the limits of biological change. Nelson insisted on empirical evidence of change and emphasized a mechanism of evolution. Whitney was willing to accept evolution within broad categories, if it meant that he could avoid the embarrassment of advocating rigid species fixity. The Nelson/Whitney debate spilled over into the pages of the fundamentalist periodical *The Bible Champion*. Nelson continued pressing his case in militaristic terms,

*My point is this: We ought to concede to development what is necessary, but not more than is necessary, or is justified on the basis of present scientific evidence. New speices – meaning by a species a 'group of organisms of marked*

*characteristics in common and freely interbreeding' (Bateson) – are not being formed today (Nelson 1929b).*

Whitney responded with his characteristic zeal,

*Look here. Take a rabbit species, just one rabbit species, and make twenty rabbit species out of it as different as can be. Have them all natural species (whatever that may be), or species which are perfectly sterile with one another. It would be only lateral evolution, or evolution without one new organ, without any constructive up-building of the organism whatever. Evolution cannot get anywhere on that sort of business. It might make lots of change, but it would not build any organs, and evolution does not amount to a snap of one's fingers unless it does some real up-building (Whitney 1929).*

This same conflict arose again in the Price/Clark/Marsh debate of the 1940s. Harold W. Clark was a science professor at Pacific Union College (PUC) who earned a master's degree in ecology from Berkeley in 1933 (Numbers 1995a, p ix). Clark had been a student of Price's, and he had published a book called *Back to Creationism* and more than 60 creationist articles in the Seventh-day Adventist (SDA) periodical *Signs of the Times* prior to earning his master's degree (e.g., Clark 1923, 1924, 1925, 1926, 1929, 1931, etc.). As a professor, Clark was challenged about Price's view of geology, and after spending a summer studying the issue firsthand with petroleum geologists in the American midwest, Clark changed his views and accepted the geologic column as a legitimate summary of stratigraphic evidence. He stopped using Price's *New Geology* as a textbook in his science courses at PUC and began to develop his own ecological explanation of the fossil record (see Numbers 2006, p 142-148).

When Price discovered Clark's views, he instigated a bitter crusade against Clark that would last at least a decade. Since Price believed himself specially guided by the "enlightening Spirit of God" (Price 1941a), he probably viewed all dissenters as heretics. Price accused Clark of spreading "Theories of Satanic Origin," the title of an anti-Clark pamphlet written about 1946 and privately distributed by Price (reprinted in Numbers 1995b). Although Clark responded with Christian grace, Price continued to hound him with vitriolic letters, even threatening him with a lawsuit in February of 1947, which he apparently never carried out (Price 1947).

In the early stages of the conflict with Price, Clark's new book *Genes and Genesis* appeared, with its proposal that hybridization explained speciation. Clark also claimed that animals such as *Archaeopteryx*, the platypus,

the hyena, and the wildebeest originated by hybridization (Clark 1940, p 103-105).

*The question may be raised, 'Why call these hybrids? May they not be as valid creations as any others?' It must be admitted that dogmatic assertions cannot safely be made; nevertheless it should be pointed out that according to the creation record, plants and animals were made each 'after his kind.' The original types must have been so distinct that there would be no difficulty in deciding in which category a plant or animal should be classified. The confused species dug up from the rocks and in some cases living today are a plain suggestion of crossing of original types (Clark 1940, p 105).*

Clark's views on hybridization were inspired by statements made by Ellen G. White about "amalgamation." She wrote in 1864, "Since the Flood, there has been amalgamation of man and beast, as may be seen in the almost endless varieties of species, and in certain races of men" (White 1864, p 75). Price (1931) believed that these statements referred to breeding between different races of humans with other races of humans and likewise among races of animals ("amalgamation of man and [of] beast"), but this view contradicted the views of Ellen White's son William and her personal secretary D.E. Robinson (White & Robinson 1933). Clark favored the more traditional view of man-with-beast over Price's newer interpretation of man-with-man and beast-with-beast.

Price read the manuscript for *Genes and Genesis* before he initiated the fight over geology, and he originally reacted very favorably to Clark's work (Numbers 2006, p 143-144). After publication of the book, though, Price took the opportunity to expand his anti-Clark war to include Clark's unusual views on hybridization. Price's criticism included scathing letters and harsh but veiled references in published articles. Price claimed that Clark's views on human/animal hybridization were "nothing short of blasphemy" and a "grotesque interpretation" of Ellen White's statements (Price 1941c).

In 1938, Price published an article called "Nature's Two Hundred Families," in which he repeated his view on speciation from *Phantom of Organic Evolution*, "We may admit that many changes have come about within the family, that families have split up and have produced many various forms, without being obliged to admit that this process of splitting or differentiation has gone any further than this." When that article was revised and published in Price's 1942 book *How Did the World Begin?*,

Price no longer endorsed speciation within families. Instead, he wrote that Darwin had

...said that there really is no such stable entity as a 'species'; it is only a name for a half-way stage in the change from varieties or races on to genera and the wider differences of families, etc. On this basis, the tendency for nearly a century has been to split up 'species' into smaller and still smaller units, thus erecting varieties or races into so-called 'species,' and the original species into "genera" (Price 1942, p 90).

Price's new argument was adapted from Richard Goldschmidt's (1940, p 165-168) recently published *Material Basis of Evolution* (see Price 1941b). The argument was effectively indistinguishable from his original opinion, since it essentially viewed biological change within "families" to be possible. Price merely insisted that modern "families" were really species and not families at all. This allowed him to use the argument not only to attack evolutionists but also to reject Clark's acceptance of speciation and hybridization. Recent University of Nebraska Ph.D. graduate Frank Lewis Marsh (1943a) dismissed Price's argument, "it seems that it is your personal pride which to a large extent holds you to your present position rather than for any logical or sensible reason."

Frank Marsh was the first SDA to earn a doctorate in biology, and shortly thereafter in 1944, he published the well-known book *Evolution, Creation, and Science (ECS)*. As he would later confess to Theodosius Dobzhansky, his goal in writing the book was to demonstrate that the minority view of creationism was a legitimate alternative to evolution. "My avowed purpose is to present a theory of special creation which has a sound scientific basis and which will be recognized by most evolutionists as an alternative view of origins in case a person wishes to view things from that angle" (Marsh 1945). Accordingly, Marsh was irritated by Clark's views on hybridization. Marsh feared that Clark's ideas, and in particular his approving citation of a stag/horse hybrid reported by Ripley's *Believe it or Not!* (Clark 1940, p 96), damaged creationists' credibility (see Numbers 2006, p 150). Marsh believed, as Price did, that Ellen White's amalgamation statements could best be understood as "amalgamation of man and [of] beast" (Marsh 1941, ch 8-10). This interpretation allowed Marsh to reject Clark's unlikely examples of wide hybridization without rejecting the writings of Ellen White.

Marsh believed that hybridization was limited to members of the same "Genesis kind" or *baramin*. He endorsed the "law of reproduction" (Marsh 1944, p 32), his term for the idea that Genesis taught that reproduction could only occur within "created kinds." Although Marsh was not the

first to insist that Genesis taught the reproductive isolation of “kinds” (e.g., see Morris 1871, p 476; Price 1917, p 98; Nelson 1927, p 19), he was the first to integrate the possibility of interspecific hybridization with this supposedly biblical law of reproduction. Thus Marsh accepted the occurrence of interspecific hybridization (which Price rejected on semantic grounds) but argued that any hybrids could be produced only between organisms that belonged to the same “created kind.”

Because “kind” is a non-technical term, Marsh proposed a new word, *baramin*, that he coined from the Hebrew words for “create” and “kind” (Marsh 1941, p 100). With regard to evolution within baramins, I previously depicted Marsh as an innovator (Wood & Murray 2003, p 15-17), but Marsh actually came at the end of a long heritage of speculations about the nature of species and created kinds. Marsh was more of a synthesizer than an innovator. He integrated the recognition of real systematic species (which Price and Nelson rejected), true interspecific hybridization (which Nelson rejected), variation within kinds (which the antievolutionists rejected), and true speciation (which Nelson rejected) to produce his own unique view of creationist biology. Surprisingly, Marsh seems to have been unaware of most of the history of these ideas. He might have known about the Whitney/Nelson correspondence, but even Dobzhansky (1945) noticed his apparent ignorance of Wasmann. Herbert seems almost entirely forgotten.

The response to Marsh’s book *Evolution, Creation, and Science*, was decidedly cold. Price had already published his new view of species, in which he re-affirmed species fixity. Price was not about to relinquish this new anti-Clark position, but he eventually relented and endorsed Marsh’s ideas, possibly since Marsh agreed with Price about the danger of Clark’s geological views (Price 1945). Other creationists of the day were equally skeptical of Marsh’s book. Walter Lammerts, professional plant breeder and future co-founder of the Creation Research Society, rejected Marsh’s proposal (see Numbers 2004). William J. Tinkle, also a future co-founder of the CRS, preferred Nelson’s biological views, although he did mention Marsh’s *baramin* in his 1967 book *Heredity: A Study in Science and the Bible*. Lammerts and Tinkle both demanded empirical demonstration of variation before accepting any kind of evolution, and both endorsed the kind of Mendelian mechanisms proposed by Nelson.

Marsh’s responded to his critics in a fifteen-page manuscript titled “Confessions of a Biologist,” dated August 25, 1943. Though Marsh thanked his critics for their advice, he was clearly exasperated with them. He opened the “Confessions” by addressing the “wild rumor which comes to me that some of you men think I am an evolutionist” by reviewing once

again his own views of earth and life history. He then tackled sixteen different criticisms of the yet-unpublished *ECS* manuscript. The criticisms of Marsh ranged from insightful to misunderstandings, but they all expressed an extreme skepticism about speciation. In the words of one of Marsh's critics, "If we are willing to allow as much variation in animals as some of our most devout variationists call for, in the period between the flood and the present, it is going to be a little hard to talk to evolutionists about what might have happened in a few hundred millions of years" (Marsh 1943b). Marsh's response was an emphatic "Variation is not evolution! Yes, it could be, possibly, but it never goes that far."

Marsh's ongoing disagreement with Clark over amalgamation culminated in a 1947 meeting with fifteen SDA church officials, including then SDA president James McElhany (see Shigley 1982). For slightly more than an hour, Clark and Marsh presented their differing views on amalgamation, then fielded questions several hours after. Clark defended the view that Ellen White taught hybridization between humans and animals had taken place before and after the Flood. Marsh argued for his modified view, derived from Price, that hybridization can only take place within the limits of the created kind. The discussion focused most critically on Clark's view, with most of the SDA officials favoring Marsh's new interpretation (Shigley 1982). This might seem like a minor chapter in the history of creationist biology, but it helps explain why Marsh persistently seemed to hold a circular view of baramins. He claimed both that the defining characteristic of the kind was the ability to interbreed and that there is no evidence of interbreeding between kinds. The first claim is his scientific proposal. The second claim is an anti-Clark apologetic.

After publishing *ECS*, Marsh never really changed or developed his ideas to any significant extent. Instead, he spent the rest of his career promoting his species concept to his fellow creationists and on occasion to evolutionists as well. His neglect of actually identifying specific baramins might seem mystifying, especially since in the second edition of *ECS* he wrote, "through the very real laboratory test of fertility it is possible clearly to mark off the boundaries of all the kinds today" (Marsh 1947, p 180). In his correspondence, however, he repeatedly denied that possibility. For example, in "Confessions," he wrote, "I hold that it is quite impossible today to tell which forms are members of an original kind....Failure to unite in fertilization does not necessarily indicate membership in two different kinds because of mutational changes which may produce infertility" (Marsh 1943b).

In the end, Marsh became more of an apologist for his own view than a scientist concerned with understanding nature. That *ECS* was met with

such a cool response probably explains much of his work to spread his idea of the baramin without much work to apply it. In retrospect, it was probably good that he continued this self-promotion since future generations of creationists would be more receptive to his proposals. Indeed, many individuals involved in the recent revival of baraminology (see Wood 2006) became aware of Marsh's ideas through his 1976 book *Variation and Fixity in Nature*, an updated version of *ECS*.

## CONCLUSION

In a 2004 article, Numbers effectively argued that modern creationism has embraced limited evolution within “kinds” nearly since its inception with George McCready Price. In this work, I have extended that history to Europeans such as Wasmann who had little or no knowledge of Price, and to pre-Darwinians such as Herbert who were not encumbered with anti-evolutionary apologetic thinking. This work demonstrates that the concept of limited evolution is not merely a concession to monophyletic evolution on the part of creationists, nor is it linked to a particular interpretation of scripture (as Wasmann demonstrates). Instead, the concept of limited evolution within basic kinds of organisms appears to have an intrinsic intellectual appeal to scientists acquainted with species and taxonomy. That the history reviewed herein is fragmentary and not continuous only further supports the appeal of these ideas. Had Price, Nelson, and Marsh derived their ideas from Wasmann, Wasmann from Herbert, Herbert from Linnaeus, etc., one could more easily dismiss limited evolution as something of a “mutant offspring” of earlier ideas. This would be similar to the strategy employed by Numbers in reducing creationism (particularly flood geology) to an offshoot of Seventh-day Adventism (see Numbers 1999). In the case of species and limited evolution, however, there seems to be little, if any, intellectual continuity between Herbert, Wasmann, and Marsh. The recurrence of their views cannot be easily dismissed.

Unfortunately, even today conflict exists within creationism between the more liberal scholars who accept wide variation (like Marsh or Whitney) and more conservative scholars who demand more empirical evidence (like Nelson or Tinkle). This conflict is nothing new, but I hope that we can take from this history at least a lesson of civility. Little is gained by denouncing the other side as obscurantists, evolutionists, or purveyors of “theories of satanic origin.” What is needed instead is serious and ongoing research to resolve these issues. What is the mechanism of speciation that produces diversity within kinds? How far can it go? Is there independent evidence of baraminic membership? Is there evidence of wide speciation



apart from baraminic membership inferences? By working on these questions, we can hope to understand better the nature and extent of baramins.

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