

Comment: Creationism and Intelligent Design: Dogmatic concepts that will not go away

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Many historians of biology, such as Stephen Jay Gould (1941–2002), have claimed that creationism is a home-grown phenomenon of North American sociocultural history. There are two major reasons for this assertion. The first is the widespread occurrence of evangelicalism. Due to the evangelical zeal that has been present in the United States since its beginning as a nation, biblical literalism became quite influential in the USA. It is not surprising that an organized creationist movement arose there in response to Charles Darwin's 1859 publication of the theory of descent with modification (i.e., biological evolution, Kutschera, 2017) that contradicts most crucial evangelical beliefs. The central importance of religion in North America can be traced back to the earliest periods in American history as the Puritans brought with them the idea of establishing a "city on the hill" where man lived according to God's rules. These Biblical literalists saw their movement in the Americas as the most significant action in human history since Christ's crucifixion. The missionary spirit of the first communities is still alive. The very structure of these communities and their independence from mainstream theologies create a breeding ground for the growth of creationism.

Second, unlike many other countries, the American school system is not regulated by national laws but is instead largely dictated by state-level decisions, which means that public education in the United States varies greatly state-to-state, due to the lack of a nationally centralized curriculum or education standards (Watts et al., 2016). Committees and boards of elected individuals make the decision about curricula. Accordingly, there are numerous possibilities for Biblical literalists to try to manipulate the educational system, especially science education with a focus on biology and geology.

Modern scientific creationism first occurred in the US, but then spread to other countries, including Western Europe. American creationism is used as argumentative and strategic planning template for creationists and ID-champions around the globe.

In 2006, Ronald L. Numbers published the expanded edition of his monograph *The Creationists. From Scientific Creationism to Intelligent Design to explain the origin and international spread of creationism*. In this monumental 600-page book, Numbers (2006) provided an overview of the origin, occurrence, dispersion and impact of fundamentalist views of creation and how these views are used to expound a selection of biological facts. This composite of evangelical views and real-world phenomena, taken from geology and biology, must be labelled as a pseudoscientific construct, void of explanatory power and significance. Nevertheless, the same Biblical fundamentalism (originating in the 1920s) that gave rise to the creationist movement spread from US-epicenters, to Europe and other countries. Today, creationism represents a disturbing, world-wide phenomenon with negative impacts on science education and society.

In 2009, the second edition of Eugenie C. Scott's more accessible book *Evolution vs. Creationism. An Introduction* was published. In contrast to the comprehensive treatise of R. L. Numbers, the account of Scott is shorter and much easier to understand, so that this popular reference book developed into the standard treatise on creationism in English-speaking countries. In contrast to Numbers (2006), Scott (2009) focused on the situation in the United States of America; she introduced basic concepts comprehensible to the general reader, and hence provided a solid base for the ongoing agenda of the National Center for Science Education (NCSE) in Oakland, CA, to combat the spread of anti-evolutionism in the USA.

With the publication of the 2016-PhD-thesis of Elizabeth Watts in the pages of this journal, a more timely account of this topic is now available for generalists and specialists alike (E. Watts: *Analysis of Creationism in the United States from Scopes [1925] to Kitzmiller [2005] and its Effect on the Nation's Science Education System*, *Ann. Hist. Phil. Biol.* 19, pp. ii–361, 2017). In five major chapters, supplemented by a Foreword/Introduction, and Conclusions/Afterword, Watts (2017) analyses the following topics: The conflict between science and religion in the USA, with reference to Christian fundamentalism, evangelicalism, evolution

and Darwinism; Bible-inspired creationism vs. its elaborations, i.e., creation science and Intelligent Design; examination, chronology and geography of legal conflicts – from Scopes (1925) to Kitzmiller (2005); the evolution/creation-conflict with reference to the American education system/curriculum (science) standards, inclusive of textbook adoption/classroom strategies; creationism post Kitzmiller (2005) and anti-evolutionism outside the US with a focus on Germany. In six appendices, important documents are provided that pertain to creationism in the US and its effects on science education (the Declaration of Independence; Texas Essential Knowledge and Skills for Biology; California Science Educations Standards for Biology; The Wedge Document; Council of Europe Resolution 1580 of June 2006; List of Theses).

As the title of her monograph indicates, and as detailed in the Foreword, the published doctoral thesis of Watts (2017) on the origin, historical development and impact of creationism focusses specifically on science education. Since biology – the science of the living world – is attacked by Biblical literalists (mostly evangelical Christians) via a number of strategies, for instance, the questioning of facts such as macroevolution, the age of the Earth etc., the evolution/creation-conflict represents the key topic of her broad analysis. In the conclusion section, Watts (2017) provides a list of recommendations as to how to combat creationist interferences in biology curricula in the US, as well as in European countries, such as Germany. Since creationism steadily evolves and adapts to new intellectual environments and challenges, it will not simply go away.

The comprehensive analysis and documentation of creationism and its elaborations (Intelligent Design) published by Watts (2017) in this journal is an important source for arguments against the sophisticated strategies of anti-evolutionists in fundamentalist (mostly Evangelical Protestants) communities around the world. Why is this issue of ongoing importance?

In the most recent North American Gallup-Poll (May 22, 2017), it was found that approximately 38 % of U. S. adults still believe that the Biblical God created humans in their present form about 10,000 years ago. This means that approximately 4 out of ten Americans adhere to the dogma of Young Earth creationism, which not only rejects the evidence for macroevolution, but also essentially all principles and facts of the geological sciences (specifically, the age of the Earth of ca. 4.600 million years). Although this anti-scientific attitude from 2017 is the lowest in 35 years (40 to 43 % creationists were recorded over the past three and a half decades), this result reveals that science education with respect to biology and geology is still insufficient. The same fraction of Americans (38 %) as those who believe in the Adam & Eve-story assume that humans evolved, but God guided this process in some way. These educated people adhere to the principles of Old Earth Creationism, Intelligent Design or theistic evolution. Together with those who accept naturalistic (Darwinian) descent with modification (ca. 19 %), about 57 % of American adults “believe in some form of evolution”, the authors of

Gallup May 22/2017 argued in their announcement (Silva, 2017; Watts et al., 2017).

Over the past decade, the first author of this Comment has repeatedly witnessed in Stanford Palo/Alto CA (USA) the following representative dialogue.

Person A: "With respect to evolution vs. creationism, we can't really say what is true, I mean everyone has their own theory. Sure, the atheists believe in evolution, but I am just not convinced. The scientists don't even have any real evidence. Humans are just too special to have evolved. We are obviously designed!"

A typical response to such a claim reads as follows.

Person B: "You know that the term 'theory' means something different in biology, right? Theories in science explain collections of facts and data – they are not just guesses or hunches. Neither Creationism, nor its elaborated brainchild, Intelligent Design, is science, and these ideas cannot be considered a theory to explain anything, because there is zero empirical evidence to support it. The fact is that organic evolution can be explained in detail by a well-supported theory."

If we replaced the last word by "a system of theories", which represents the core principles of evolutionary biology (a scientific discipline), our Person B would have exactly summarized the current consensus among biologists working at research institutions around the world (Kutschera, 2017).

Unfortunately, the arguments of our Person A persist in the USA, as well as in many European countries. For instance, here in Germany, the evangelical Studiengemeinschaft Wort und Wissen (W+W) would defy the claims of the "atheistic Darwinists" and argue that the Biblical God created "Basic Types of Life" a few thousand years ago (Blancke et al., 2014). Therefore, the work of Watts (2017) published in this volume of the *Annals of History and Philosophy of Biology* is of special importance. Her detailed analysis of the roots and developments of American anti-evolutionism is an important reference work. Since it contains recommendations regarding how to help Person A better grasp the nuances of evolutionary theory and its central role in modern science, the work of Watts (2017) will be a key publication for the improvement of science education for years to come.

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