

History 3029 Transnational History: A New Perspective on the Past

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Book Review

Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy

By Alfred W. Crosby

Have you ever thought of why we can have such abundant supply of energy? Have you ever thought of how to deal with the coming energy exhaustion? For those who bear these questions in mind, I suggest they read *Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy*, written by Alfred W. Crosby and published in 2006. In this recently published book, Crosby reveals how energy has kept playing a role in the history of humanity since the Paleolithic era. By tracing the energy history, he shows how our ancestors differentiated themselves from animals by tapping into sun energy, and how energy development has shaped human society. Then, he tries to analyze the current situation of energy uses and gives his own solution to the coming energy exhaustion. In the book, Crosby argues that energy development, particularly after the industrial revolution, largely contributes to the development of society; and he also suggests hydrogen fusion is probably the ideal solution for solving the coming energy exhaustion.

Alfred W. Crosby is an influential cultural and environmental historian. He made significant contributions to global and environmental history by introducing the idea of the “Columbian Exchange.”¹ Crosby once suggested that an environmental historian should always be skeptical about human exploitation of the earth and their explanation of it.² Therefore, Crosby’s work always introduces innovative ideas which may challenge or contradict current ideas and thus allows us to study history from another perspective. His most famous book *The Columbian Exchange*³

¹ Megan Gambino, “Alfred W. Crosby on the Columbian Exchange,” accessed November 19, 2015. <http://www.smithsonianmag.com/history/alfred-w-crosby-on-the-columbian-exchange-98116477/?all&no-ist; perhaps + Columbian definition>.

² Alfred W. Crosby, “The Past and Present of Environmental History,” *The American Historical Review*, 100, no. 4 (Oct., 1995): 1189.

³ Alfred W. Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport, Conn.: Greenwood Publishing, 1972).

explores the ecological and cultural changes brought by the contact between the “Old World” (Eurasia) and the “New World” (the Americas).⁴ Another book, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*, attributes the success of European military expansion to the “New World” to biological reasons.⁵ *Throwing Fire: Projectile Technology through History* discusses the impacts of humans’ manipulation of fire on the development of civilization.⁶ All of his books provide some inspiring ideas. *Children of the Sun* is of course not an exception. For example, by looking at the relationship between social and energy developments, he suggests that thriving energy development today is a miracle and hence we should be cautious on the instant access to abundant energy that we are enjoying today.

Anyone who reads *Children of the Sun* will first find the title very catchy. The book title *Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy* in fact hints what the book focuses on. The first part of the title, *Children of the Sun*, refers to the human dependence on the sun. Sunlight is a decisive factor that allowed life to begin on Earth. We cannot live without sunlight. The term “Children of the sun” was first used by Russian geochemist Vladimir Vernadsky to describe this dependence.⁷ Crosby agrees with Vernadsky, suggesting that human beings and even the earth systems rely on sun. He therefore puts this term in the title. A minor problem is that it may be misleading because some people may link it to solar energy.⁸ However, this is not a serious problem because the subheading of the book, *A History of Humanity's Unappeasable Appetite for Energy* clearly indicates the focus of the book. What’s worth our attention is the wording: “unappeasable appetite for energy.” It suggests our energy demands will never be satisfied. We always look for more energy sources to enhance the society. Therefore, Crosby wants to show how we, children of the sun, keep on tapping into more and more types of energy which all originated from the sun from the very beginning of our existence to the present.

⁴ Gambino, “Alfred W. Crosby on the Columbian Exchange.”

⁵ Martin Kalb, review of *Ecological Imperialism: The Biological Expansion of Europe, 900-1900* by Alfred W. Crosby. *Middle Ground Journal* no. 9 (Fall, 2014). Accessed Nov 18, 2015. <http://www2.css.edu/app/depts/his/historyjournal/index.cfm?name=Review-of-Ecological-Imperialism:-The-Biological-Expansion-of-Europe,-900-1900-by-Alfred-W.-Crosby&cat=7&art=294>.

⁶ Cambridge University Press, “*Throwing Fire: Projectile Technology through History*,” accessed November 22, 2015. <http://www.cambridge.org/us/academic/subjects/history/global-history/throwing-fire-projectile-technology-through-history>.

⁷ Alfred W. Crosby, *Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy*, (London; New York: W.W. Norton, 2006), 2.

⁸ Martin Pasqualetti, Review of *the Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy*, by Alfred W. Crosby. *Technology and Culture* 47, no. 3 (2006): 639.

Children of the Sun tells the history of “how people access the energy to get work done.”⁹ To do so, Crosby traces the energy development and explains its impacts on human society. The book is divided into three main sections with nine succinct chapters. The first section, “The Largess of the Sun,” focuses on three breakthroughs before the eighteenth century, which are the domestication of fire, the development of agriculture and finally the famous Columbian exchange. The first chapter “Fire and Cooking” is about the human domestication of fire and the invention of cooking, which are the unique activities of human beings. Fire can be seen as an energy source originating from sun because it is obtained by burning biomass, such as wood, which can grow owing to sunlight. Fire, as a reliable means to tap sun energy, differentiated our ancestors from animals and “armed our ancestors with imperial power over flora and fauna”.¹⁰ Cooking is also important because it provided a source of new and better fuel (cooked food) for the fundamental prime mover of humans: muscle.¹¹ Besides, the use of fire and cooking prompted the formation of societies since people would gather to cook. Chapter 2, “Agriculture,” talks about the invention of agriculture which allowed people to exploit solar energy more effectively than hunting and gathering. Agriculture requires less land and provides a stable supply of food. Besides, the emergence of agriculture contributed to the formation of civilizations because it provided a means to produce food stably. Stable supply of food stimulated population growth, which allowed civilizations to develop.¹² In chapter 3, “The Columbian Exchange,” Crosby explores how the Columbian Exchange affected the agricultural production of the “New World” and the “Old World.” He suggests that the exchange of plants and animals between the two “Worlds” brought mutual benefits and hence maximized the agricultural production. It means that humans were able to produce food (which can also be seen as a way to exploit sun energy) more easily and efficiently since then.

The second section, “Fossilized Sunshine,” explains how the use of fossil fuels has altered the society. Crosby states humans “hit the ceiling in utilizing sun energy in the eighteenth century.”¹³ While some other energy tapping methods were developed such as treadmills and watermills, most of the time people relied on manpower to produce before the eighteenth century. However, the growth of population implied that relying on individuals to produce could gradually not meet rising demand. Therefore people needed new energy sources to satisfy demand. The

⁹ Crosby, *Children of the Sun*, xiii.

¹⁰ *Ibid.*, 8.

¹¹ Prime mover here refers to a mechanism or a machine that converts energy into work. See *Ibid.*, 4.

¹² *Ibid.*, 40.

¹³ *Ibid.*, 60.

source they discovered was fossil fuels. Chapter 4 “Coal and Steam engine” discusses the developments and impacts of the use of coal and the steam engine. The invention of the steam engine largely increased productivity, which altered the global economy and balance of power. It also enhanced transportation and spurred migration. Chapter 5 describes the discovery of oil and the impact of the oil-fueled Internal Combustion Engine (ICE). The ICE is said to be the most influential invention because it contributed to development in different aspects. For example, it contributed to the invention of airplanes and automobiles, which revolutionized transportation. As a result, oil, which is the fuel of the ICE, is thought to be the most valuable resource since the twentieth century. Oil issues have become important in international affairs since its discovery. Chapter 6 focuses on electricity. Electricity is useful because it could be used to finish sophisticated and complex works. The electricity generated by ICE altered society drastically by enhancing lighting and communication, such as leading to the invention of the telegraph.¹⁴ Generally speaking, the electrification brought huge conveniences to society.

The last section, “Energy at the turn of the Third Millennium,” discusses the energy development since the twentieth century. While coal and oil brought us a lot of breakthroughs such as new forms of transportation, the use of fossil fuels has risen to an unprecedented level. Therefore, Crosby suggests that there will be a fossil fuel shortage in the future. This is one of the purposes for Crosby to write the book. There is much discussion about the reality of the energy crisis. Many people are not really concerned by it as long as the current energy supply is stable. Therefore Crosby writes the book in order to draw public attention to this issue. The over-dependence on fossil fuel also contributes to severe environmental pollution. Hence it is necessary to find new and environmentally friendly energy sources. In Crosby’s opinion, hydrogen fusion would be the best choice. Chapters 7 and 8 both focus on the use of nuclear energy. Chapter 7 describes the development of fission—to tap the energy by splitting an atom into two or more atoms—and the pros and cons of using fission to produce energy. Chapter 8 provides a summary of the current development of fusion—to tap the energy by fusing smaller atoms into a large atom. It is still under research and is not yet used because of many practical problems. This summary is then particularly useful because he summarizes the results of scientific research and presents it in a simple way. General readers can understand the current situation easily. Crosby has very high expectations on hydrogen fusion because it can produce more energy than fission does, it is free of radiation and does not produce any pollutants. The final chapter “The Anthropocene” serves as a conclusion. Crosby suggests the human beings are lucky enough to have access to abundant energy

¹⁴ *Ibid.*, 106.

and describes it as a miracle. He also predicts that there will soon be an energy exhaustion because of our enormous energy demands as well as the increasing population.¹⁵ Hence we should both look for alternatives to fossil fuels and be careful in our current situation because whether we can still thrive depends on how we deal with the situation.

As a book of energy history, *Children of the Sun* studies the past and links the past with the present. By introducing the history of energy development, Crosby aims at warning us of our living style and the future development. In chapter 9, Crosby writes that “we have reason to believe that we are capable of environmental sanity; but first we have to accept that the way we live now is new, abnormal, and unsustainable.”¹⁶ He suggests that the current living style is abnormal because it is based on a miraculous and abundant access to energy which has only been available for no more than one and a half century. He aims to warn us to be cautious about our use of energy; however, he does not really mention what a more normal living style should be. In addition, Crosby also warns us of the coming energy exhaustion and urges us to take action. He writes in the preface that “fossil fuel supplies are ultimately exhaustible and currently responsible for such worrisome effects as global warming. We must revive old ways of tapping sun power, such as windmills, and invent new ways to do so, such as solar cells, and/or we must utilize new sources of energy.”¹⁷ This idea is also mentioned in other reviews. For example, reviewer Tamir mentions that Crosby’s main intention to write the book is to urge us to assess what we will possibly do to the world if we cannot find an energy source satisfying our needs.¹⁸ Hence, While *Children of the Sun* is an energy history book, it is also in fact an alarm to us who keep tapping the energy.

Besides, Crosby explains the relationship between energy development and the development of society. For example, Crosby suggests the human domestication of fire and agriculture were important in forming civilizations; and the use of fossil fuels enhanced transportation and increased the productivity. Reviewer Pasqualetti says that Crosby thinks the finding of new resources has always been closely related to the development of human society, and he “successfully illustrates the relationships between new resources and each upward leap in civilization and population.”¹⁹ Besides showing the linkage between the use of new energy sources and societal development, Crosby also attributes historical events to the issue of energy. For example, he ar-

¹⁵ *Ibid.*, 162-163.

¹⁶ *Ibid.*, 164.

¹⁷ *Ibid.*, xiv.

¹⁸ Dan Tamir, Review of *the Children of the Sun: A History of Humanity’s Unappeasable Appetite for Energy*, by Alfred W. Crosby. *Journal of World History*, 19, no. 4 (2008): 549.

¹⁹ Pasqualetti, Review, 638.

gues that the industrial revolution occurred in England simply because she ran out of forests (wood was one of the most important energy sources in England at that moment).²⁰ Although he does not further elaborate, this argument is quite inspiring because it offers a new perspective to look at the industrial revolution. Therefore, Crosby's work illustrates the interaction between energy development and social development, offering a new perspective for us to understand the world.

Children of the Sun is a valuable work in the field of world history because it clearly demonstrates the features of world history research. Firstly, *Children of the Sun* is large scale research. It studies energy development since the prehistoric period on a global level. Secondly, this book covers most of the regions on the world. It tries to offer commonalities and differences between different parts of the world. The best example is the "Columbian Exchange," in which Crosby compares the forms of agriculture and domestication of animals between nine different agricultural centers around the world, which are North America, the Highlands and Lowlands in South America, Central Mexico, Sub-Saharan Africa, Southwest Asia, North China, Southeast Asia and South China.²¹ Thirdly, Crosby adopts an inter-disciplinary approach which is very common in the field of world history. He had absorbed knowledge from different disciplines before he wrote the book. For example, he uses archeological and anthropological knowledge during the first three chapters and he also uses knowledge from physics to explain current research of fusion. Last but not least, the book provides a very thorough account of the development of humans' energy use which allows the reader to know more about the history of energy. Therefore, this book is a useful work of world history because it clearly demonstrates how world history research can be conducted.

One of the features of the book is its simple and engaging prose style. As mentioned before, *Children of the Sun* is written to remind people to pay attention to their current energy use and the on-going development. Therefore, it adopts a simple and engaging prose style to attract general readers. Crosby gets rid of the jargon and scientific parlance and uses vivid examples to explain some complicated concepts.²² For example, when explaining the significance of the "Columbian Exchange," Crosby describes the "New World" and the "Old World" as two joker players who played with nature, with the Columbian Exchange enabling them to share their cards

²⁰ Crosby, *Children of the Sun*, 69.

²¹ *Ibid.*, 47.

²² Pasqualetti, Review, 638.

and thus allowing them to win more easily than before.²³ Apart from the use of vivid examples, reviewer Tucker suggests that his writing style is engaging and witty.²⁴ This is convincing when looking at Crosby's descriptions; for instance, he describes the difficulty of maintaining the isolation of plasma—one of the steps in the nuclear fusion experiment—as “a man burning wet wood with a blowtorch.”²⁵ This kind of interesting examples and descriptions help simplify some complex ideas and hence make the book fun and easy to read.

In addition, Crosby also adds anecdotes at the end of most of the chapters (except for chapter 8) which attract general readers and made the content more thorough. I agree with Tamir that Crosby's way to blend hard facts with amusing and lively anecdotes makes the book appealing and enjoyable.²⁶ On the one hand, some anecdotes may serve as supporting evidence to his argument. For example, in chapter 4, Crosby tells the story of Nellie Bly, the first woman who used steamship and railroad to circle the world in 72 days, to show how steam engines enhanced shipping technology. On the other hand, some anecdotes provide more interesting or special stories of the relevant topics. For example, the coda in chapter 6 introduces the use of electricity in execution which is known as electrocution and reveals Abbé Nollet's use of electric current as an amusement to the King in the past. General readers may find the anecdotes enjoyable and fun. In addition, according to Crosby, the anecdotes also serve as a means to “counter generalities.”²⁷ Crosby well notices that it is inevitable to generalize the history when he is working with such a large temporal and spatial focus.²⁸ In my opinion, the anecdotes indeed provide another perspective for us to know the history and help make his book more appealing to the public.

Children of the Sun makes significant contributions to the history of energy by providing a coherent and succinct narrative. The book summarizes the human use of energy and discusses most of the energy sources, on only 166 pages. While it mainly focuses on fire, agriculture, fossil fuels (in particular coal and oil) and nuclear energy, it does not leave out other energy sources. The book also evaluates different sources of renewable energy, including solar, geothermal and hydroelectric energy, and other fossil fuels such as natural gas and gas hydrate. Besides, Tamir points out that Crosby successfully integrates different fields of knowledge to produce a thorough

²³ Crosby, *Children of the Sun*, 54-55.

²⁴ Richard Tucker, Review of *the Children of the Sun: A History of Humanity's Unappeasable Appetite for Energy*, by Alfred W. Crosby. *Environmental History* 13 no. 1 (2008): 158.

²⁵ Pasqualetti, Review, 639; Crosby, *Children of the Sun*, 156.

²⁶ Tamir, Review, 548.

²⁷ Crosby, *Children of the Sun*, 6.

²⁸ *Ibid.*

account of energy history.²⁹ As mentioned above, he also adopts an inter-disciplinary approach, which allows readers to understand the development of energy more completely. Therefore, *Children of the Sun* contributes to energy history by providing a coherent and concise narrative.

However, *Children of the Sun* still has some limitations. The most obvious one is the brevity of the book. One can easily find that the book length is quite short because it writes the energy history over millennia within just 166 pages. Although this reflects Crosby's ability to write history concisely and succinctly, the book inevitably skims or even skips some important topics. For example, Crosby does discuss how energy development made wars more devastating, but he does not mention the antiwar sentiment which, in my opinion, can be attributed to the wide use of advanced weapons such as nuclear bombs, which were invented mostly because of the energy development. Besides, although he suggests our living style is abnormal, he does not discuss this point thoroughly, nor does he explain how to live "normally." He leaves out the impact on social developments such as the impact of the use of electricity on urbanization. Pasqualetti defends him by saying that Crosby's purpose is not to write an expansive book but to show how the development of society has been influenced by the development of energy; readers can simply find other books for further studies.³⁰ However, I think the social impacts that he leaves out would be important for readers to understand current society. General readers may find these impacts more related to them. Therefore, the brevity of the book, which leads to leaving out some topics, is an obvious limitation.

Another limitation of the book is its relative minor academic contribution. As suggested by Tamir, this book may have little significance for specific research carried out by experts since they are not Crosby's intended readers.³¹ He aims to provide a survey of energy development for the general public. Therefore, it is understandable that the book may not be so attractive to experts of energy or scholars of other related disciplines. However, the book does make an academic contribution. It is valuable for students who are interested in environmental or energy history because it provides a concise narrative of the development of energy. Hence we can treat *Children of the Sun* as an introductory reading for energy history. Students or people with no prior knowledge of energy history can use it as a reference. *Children of the Sun* may not be so useful for experts, but the book has its academic value, in particular for those who do not have a prior understanding of energy history.

²⁹ Tamir, Review, 548.

³⁰ Pasqualetti, Review, 639.

³¹ *Ibid.*; Tamir, Review, 548.

To conclude, *Children of the Sun* is an impressive energy history book. It provides a concise narrative of how human beings have tapped into energy sources since the Paleolithic period. It clearly reflects how this energy development shaped the development of society. *Children of the Sun* shows that people have never been satisfied with the current supply of energy, and that they were always eager to look for better sources of energy. When productivity per individual could not satisfy their needs, they started to use fossil fuels (coal first, and then oil); when problems with fossil fuels came up, they started to look for new sources again. Meanwhile, this book makes important contributions to world history and energy history respectively because it is an excellent book working on energy history on a global level. I also believe his witty writing style and anecdotes must be helpful in attracting the public to read the book, and hence to understand his message. There are of course some limitations such as skimming or missing some important topics. However, *Children of the Sun* is still a good book worth reading.

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