

Book Reviews

version of their brain on file in case they develop Alzheimer's disease.

Third, the author plays around with technology like playing around with an apple in one's hands, not sure whether to eat it or not. It would have been helpful if the author had done more to explain the circumstances in which science and technology serve good purposes and those in which they do not. Although Jacques Ellul died in 1994, his *Technological Bluff* remains a prophetic word with implications more profound with every passing year. Interaction with some of the classic works on the ethics of technology would have strengthened the book's argument.

This book is an enjoyable read, and could be used as a springboard for conversations about the ways science and technology interact with Christian faith. People who minister to the age group which is the focus of this book will find it enlightening. However, a classic ASA member might find this book lacking in scientific rigor, and with an inadequate delineation of science and technology. But, to find out, buy the book, share it with your young adult friends, and have a conversation about it. Cootsona's experience in increasing the confidence of young people, by showing that the gospel is not made irrelevant by science, is impressive. This book is another contribution to that end.

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CITIZEN SCIENTIST: Searching for Heroes and Hope in an Age of Extinction by Mary Ellen Hannibal. New York: The Experiment, 2016. 423 pages including notes, references and index. Hardcover; \$25.95. ISBN: 9781615192434.

[G]eology, biology, and human history may be investigated by us as separate chapters but, in fact, they make up one book. And the time has come for us to learn to "read" that book. (p. 6)

Mary Ellen Hannibal is a prolific environmental journalist. Her previous works include *Evidence of Evolution*, commemorating the 150th anniversary of *On The Origin of Species*; and *The Spine of the Continent*, describing the most ambitious conservation effort yet attempted. She is an appropriate author for this rich and lengthy volume about the legitimacy of citizen science research. She takes it much further than mere legitimacy, however. This book amplifies her claim that data produced and reported on a variety of subjects (migratory birds, bees, redwoods, and tide pool creatures are a few specifically described) by interested members of the general public is crucial for the preservation of endangered species and ecosystems.

Essentially, scientists simply cannot do it all. They need to enlist all the help they can get, and passionate volunteers make worthy contributors.

Hannibal has a particular gift for connecting the scientific community to the public. This is evident in this book, and indeed, it could almost be considered the theme of it, because this connection is the core of citizen science. Perhaps a clarification of the term "citizen science" is needed here. Citizen science is simply scientific work that is done by interested citizens rather than by professional scientists. *Citizen Science* describes a number of projects that are underway and functioning because of the efforts of countless nonscientists who document the honey bees they observe, or count the migrating hawks that pass over a particular point each fall, or note the dates that local plants first bloom in the spring. They typically record their data electronically and submit it to scientists who use it in various ways, such as establishing population baselines so that changes can be documented, or the reverse—comparing reported numbers with baselines established in past decades.

The book includes several citizen-science-related scenarios in eleven, sometimes lengthy, chapters. The author lives in Northern California, and many of the ecosystems and associated projects and people she details occur there. These include California's original habitats and how they have been altered in the last two hundred or so years, citizen science and Silicon Valley technology, the redwood forest, Pacific tide pools, the founding of the California Academy of Sciences (by citizen scientists, not professionals!), and Mt. Tamalpais ecosystems.

My favorite account was the story in chapter 9 of a champion citizen scientist, Ed Ricketts, and his friends Joseph Campbell and John Steinbeck. Hannibal's picture of Monterey, California, in the 1930s and the development of the classic natural history books *Between Pacific Tides* and *The Log from the Sea of Cortez* are fascinating. The intriguing and enduring relationships among these brilliant characters are also explored. Campbell is the author of *The Hero with a Thousand Faces* (1949) and the originator of the phrase "follow your bliss"; Steinbeck received a Pulitzer Prize for *The Grapes of Wrath* (1939) and authored many other outstanding books. Ricketts's holistic approach to science in general and ecology in particular comes together in *The Log from the Sea of Cortez* (co-created with Steinbeck), which can be rightfully considered a manifesto of citizen science if not even a bible. Darwin is to evolution what Ricketts is to the integration of science with its sister humanities. Hannibal carries this sense of integration throughout her book, quite intentionally. "I'm trying

to do in this book what they [Ricketts and Steinbeck] were trying to do—put it all together, the personal, the historical, the scientific” (p. 7). This is an appropriate approach to a defense of citizen science, which combines the layperson’s love of nature with the desire to do something to make a difference, and it results in valuable contributions to professional scientific efforts.

Hannibal weaves these various components together smoothly and in an appealing way. She points out that crucial themes from *The Grapes of Wrath* continue to resonate today, from the perspective of land use and climate change to the consequences of human dissociation from the land, which leads to destruction of that land and then to the destruction of humanity itself. As the subtitle indicates, extinction is a recurring theme of her book. Disappearing species drive the urgency behind her calls for cooperation between nonscientists and scientists. She details the way citizen science efforts bridge academic and applied sciences and the growing validation by academic scientists of the value of data acquired by nonprofessionals. It is becoming more and more widely recognized that “citizen science monitoring ... is probably the only tool that can really scale to aggregate big enough numbers of local observations to create a picture of global consequence” (p. 59).

A significant point Hannibal makes in support of citizen science is that it is a way to cultivate a scientifically oriented society—something that is desperately needed. Understanding the ability of species to change in response to climate conditions requires interdisciplinary scientists and huge networks of citizen scientists (p. 287). One of many scientists Hannibal interviewed, Julia Parrish, works with between 750 and 800 volunteers monitoring beaches from Northern California to Alaska. She comments,

Scientists alone can’t begin to document what’s normal, let alone how fast things are changing. We need a willing army to make that happen. In short, we need citizens—the locals who watch, and know, and love their backyards, their environments. (p. 80)

The book includes some chapters that become overly long and seem to veer away from the chapter’s theme. Some readers may find the recurring personal account of the author’s experiencing the death of her father tiresome—but its link to the disappearance of species and the fragile nature of life is both relevant and sad. Any reader who is interested in the natural history of California would find *Citizen Science* intriguing. As well, academics who question the value of data acquired by nonprofessional scientists would be wise to read the perspectives of scientists that Hannibal presents in order to understand the

significance of citizen scientists’ contributions. This book would also be of great benefit to anyone who wants to know more about the burgeoning approach to “doing science” that citizen science has become.

Moreover, from a Christian reader’s perspective, the biblical mandate for stewardship of God’s invaluable creation supports the entire concept of citizen participation in the scientific effort splendidly. We who claim relationship with the Creator can joyfully support scrutiny of the creation; it yields not only data but opportunity to marvel.

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TECHNOLOGY

TEN ARGUMENTS FOR DELETING YOUR SOCIAL MEDIA ACCOUNTS RIGHT NOW by Jaron Lanier. New York: Henry Holt, 2018. 160 pages. Hardcover; \$18.00. ISBN: 9781250196682.

As one who rarely uses social media, I found it easy to agree with Jaron Lanier. As stated in the title of the book, Lanier offers ten arguments as to why readers would be better off not using social media, particularly social media services provided by Facebook and Google.

A problem Lanier introduces early in his book is that social media automatically optimize for attention, and this usually means presenting negative information. This can come in the form of negative news feeds or encouraging negative, argumentative, and unhelpful discussions. This is not necessarily intentional from the makers of social media platforms; the process of automatically testing users with small random changes leads to promoting negative content in social media over positive content. The purpose of this automation is to make users available and susceptible to advertisers, who are the actual customers for social media companies. Additionally, users may unknowingly interact with automated users and consequently adopt the viewpoint selected by advertisers. Similarly, social media can initially be helpful with early adopters with impressive results, but it subsequently lends itself to trolls taking over after the human users have been sufficiently modeled.

As mentioned in his title, Lanier’s proposed solution is to encourage widespread deletion of social media accounts. He specifies that it is not the social media platform itself that is the problem, but the application of current algorithms that ruin the platform. At the end of his eighth argument, he suggests the need for users to pay for social media platforms, own their