camp. It does not address human evolution in any depth or explore the newest genetic evidence for evolutionary theory. Rather, it is for those who are just embarking on a journey of reconciling evolutionary theory and their Christian faith. It is easy to read, understandable, clear, and accessible enough that beginners will not get lost in the details of the science or the theological arguments. Evangelical Christians will welcome his evangelical faith, expressed without hesitation, and will be drawn into his contagious enthusiasm for science. I will keep a few copies of this book on my office shelf to loan to students who come into my office with questions about how to navigate the integration of science and faith.

Reviewed by Sara Sybesma Tolsma, Professor of Biology, Northwestern College, Orange City, IA 51041.



MAKING SENSE OF SCIENCE: Separating Substance from Spin by Cornelia Dean. Cambridge, MA: Harvard University Press, 2017. 281 pages. Hardcover; \$19.95. ISBN: 9780674059696.

Science can tell us what foods and activities are healthy for us, what medicines we should take when we are ill, where and how we should build our homes, how our activities can affect the environment and human health, and the viability of local and global economic activities. However, despite its success at illuminating the workings of the cosmos, the information science provides is rarely wholly unambiguous, leaving the way open for unscrupulous or unwary hucksters to manipulate, denigrate, and exaggerate scientific claims as they craft whatever narrative best serves their particular interests. Thus the public, the politicians and policymakers charged to represent them, and journalists reporting on scientific issues often find themselves presented with assertions of dubious veracity, if not multiple mutually incompatible scientific claims. Cornelia Dean's Making Sense of Science: Separating Substance *from Spin* is designed to help nonscientists navigate this situation.

Dean has thirty years of experience as a science journalist, including seven heading the *New York Times* science department. *Making Sense of Science* grew out of her concerns about the decline of responsible science coverage in an age where misinformation promoting websites is easy to come by. Her 2009 book, *Am I Making Myself Clear?*, attempted to fill in the gap by equipping scientists to communicate with the public. *Making Sense of Science* is a follow up to that work, this time aimed at helping the public assess scientific claims.

Dean's stated aim in *Making Sense of Science* is to show "the kinds of thinking we do in the newsroom when we try to decide whether a given finding is news-worthy, trustworthy, and important." However, she also seeks to equip her readers with the ability to make such judgements themselves, even providing an appendix with guidelines for evaluating scientific claims.

Making Sense of Science is divided into five chapters, which gradually transition from preparing readers to interpret scientific findings to exploring a host of issues associated with how scientific information is used and presented in the scientific community, the courts, marketing campaigns, politics, and other venues. The first chapter addresses how popular aversion to science and uncritical thinking lead us to misinterpret both scientific information and its relevance for our lives, particularly when understanding and acting on risks. The second outlines how science works, and what distinguishes science from nonscience. Dean explores the nature of scientific knowledge and explains how population-based studies are designed, how statistical data analysis and model building affect the results of scientific studies, and how the peer review and publication process gives preference to certain types of findings. The third chapter, entitled "Things Go Wrong," explores problems that can occur both within science and as science engages the wider world. It covers a range of moderately disjointed topics including not only scientific misconduct but also problems with the use of science in the courtroom, how scientists interact with journalists, and how the media handles scientific controversies. The fourth chapter focuses on how financial interests can work against the scientific ideals of "universalism, communalism, disinterestedness, and [detached scrutiny]," by discussing numerous issues related to diet, medicine, and health. The final chapter addresses the impact of politics on science as well as the use and abuse of science in politics, a topic that also serves as a sort of common thread running throughout the book. Noteworthy for exploring how political considerations exert an influence on what scientists study and how science and technology shape public policy, it concludes with Dean's assessment of the evolution wars and the compatibility of science and religion.

So has Dean succeeded in achieving her aims? *Making Sense of Science* is easy to read at the sentence level and clearly illustrates how journalists evaluate scientific findings. However, it is less clear whether she has successfully equipped her readers with the

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tools needed to evaluate scientific claims. Her work explores many concepts needed to understand how scientific knowledge is produced, disseminated, and deployed and offers useful rules of thumb that readers can use to evaluate scientific findings, including a very helpful discussion of the role of probability and statistics in scientific model building, forecasting, and evaluation. However, readers are likely to lose track of Dean's argument amidst the book's rambling discourse, a problem exacerbated by poor editing. In some places sentences unconnected to the topic at hand seemingly appear out of nowhere and in others a discussion is dropped in midthought, only to be picked up pages later with nary a reference to anything said in between. Readers are also likely to be confused by how often Dean's own judgements ignore her own guidelines for responsibly assessing scientific findings. For instance, her treatment of food and health largely eschews careful analysis in favor of extolling the virtues of organic agriculture and demonizing "Big Ag." At one point she even stoops to encouraging readers to avoid foods for which you would "need a degree in chemistry to know what you are eating."

Dean's portraval of science is also at times misleading. She understandably focuses on science of interest to medical, environmental, and public policy concerns, much of which can be difficult to study or relies on speculative modelling. This, along with Dean's tendency to focus on problems in science rather than its ordinary operations, means that Dean effectively leaves readers with the impression that science is a more tepid, self-contradictory, and error-prone enterprise than it actually is. In short, the science she enjoins her readers to make sense of is far too easy to dismiss. This makes it hard to take her seriously when she alternately portrays science as unsure and encourages readers to accept the reality of global warming or scientific origin accounts on the authority of a supposed consensus.

Dean's reliance on the authority of luminaries rather than argumentation also limits the usefulness of the work as a resource for those who wish to understand the actual content of science and society issues or engage in the sort of thinking needed to develop their own position. This is well illustrated by her treatment of science and religion. Dean's account focuses narrowly on public debates over origins science and is at its best when exploring the debate's American educational context and the Discovery Institute's antievolutionary efforts. In contrast, the case for consensus origins science and its incompatibility with "literal" creation accounts that address "our place in the universe" are largely addressed via assertions based on the authority of mainline science and religion luminaries. Nowhere does she seriously explore the content of either evolutionary science or antievolutionist objections to it. Thus while readers of *PSCF* will likely find themselves in sympathy with her conclusion, that it is possible to believe in both science and a God "to whom one can pray," readers who do not agree with her at the outset will likely be left unpersuaded of either the reliability of evolutionary accounts or their compatibility with a coherent Christian theology.

It is also worth noting that while I enjoyed hearing Dean's insights into the role of special interests in the shaping of public perceptions and policy, her treatment of familiar topics often seemed sloppy, inaccurate, and misleading. The most notable example involved her confusion of ground level ozone with chlorofluorocarbons and smog, although it is also evident in her shallow account of scientific rationality based on an overly simplistic account of Popperian falsifiability and her sloppy use of ambiguous examples when summarizing Daniel Kahneman's *Thinking, Fast and Slow*. This left me wondering whether Dean accurately portrayed topics I knew less about.

Nevertheless Making Sense of Science can still be commended as one of the few popular-level books that seek to address the role of cognitive bias, modeling and statistics, and science's social and professional structure in the making of scientific claims. Dean is also at her best when discussing the public context of scientific issues; readers of Making Sense of Science will gain an appreciation for how science impacts American life. Dean also does well to introduce readers to the concepts and precedents that guide regulators, jurists, and others who use scientific findings in decision making, thus cautioning them about the role of politics and special interest-driven marketing campaigns in sidestepping the implications of unwelcome scientific findings. Yet in its treatment of scientific issues, Making Sense of Science does better at spurring further study than offering a clear and reliable guide.

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**ASTROPHYSICS AND CREATION: Perceiving the Universe through Science and Participation** by Arnold Benz. New York: Crossroad, 2017. 144 pages. Hardcover; \$13.56. ISBN: 9780824522131.

In this short work, Benz takes the reader on a tour of the universe while also trying to make sense of religious experience. He does the first very well. But in the process of building his philosophy, he ends up