

BOOK REVIEW

Dogmatism in Science and Medicine: How Dominant Theories Monopolize Research and Stifle the Search for Truth by Henry H. Bauer. McFarland, 2012. 301 pp. \$24.99, Kindle \$14.74. ASIN B008AHNIGS.

Dogmatism in Science and Medicine (DSM) by Henry H. Bauer is about the corruption of modern science. For practicing scientists it is a disturbing book to read. Medicine is bitter, yet we put up with it to get better. *DSM* is bitter medicine intended to improve the health of science.

Overview of the Book

DSM describes “knowledge monopolies” (KMs) which can be thought of as Kuhnian paradigms that have been hijacked to carry out nonscientific agendas—political, economic, or governmental—with disregard for the substantive scientific content. KMs subvert science for nonscientific purposes, thereby suppressing alternative scientific interpretations that threaten the hegemony of the KM; hence the monopoly aspect. KMs are bad since they repress the hallmark activities of science: modification of ideas based on honest, open critique of evidence acquired and interpreted based on technical and theoretical competence.

Several chapters are dedicated to detailing the three main examples of KMs: HIV/AIDS (which Dr. Bauer studied in detail (Bauer 2007), anthropogenic global warming, and the Big Bang Theory. Chapter 4 provides shorter descriptions of thirteen other KMs including, for example, antidepressant drugs, migration to America, dinosaur extinction. Perhaps surprisingly to some, the Special Theory of Relativity is even included as a KM.

The chapters alternate between broader analyses of KMs, and detailed analyses of specific sciences and official reports from national and international bodies. The broader analyses include the general features of KMs (Chapter 2), some historical context of KMs (Chapter 4), and the consequences of KMs (Chapter 10). Detailed analyses include an interesting discussion of the cancellation of the Elsevier journal *Medical Hypotheses* (Chapter 3), and detailed critiques of reports from UNAIDS and The World Bank on the global HIV/AIDS epidemic (Chapter 8). Scientific peer review is critiqued in a variety of contexts. Chapter 7 gives a wonderful discussion on the misuses of statistics that should be required reading for all professional scientists.

The various discussions are intelligent, thoughtful, and meticulously documented. Dr. Bauer treats the Reader as intelligent. The bitter pill of the book is that it relentlessly plows the reader with examples of the disinformation, incompetence, and dishonesty engendered by KMs. The relentlessness may wear down the Reader. The final chapter offers possible solutions, but, generally, the cons of implementing them outweigh the pros, and the book concludes in an unresolved state.

Critique of the *DSM*

My critique of *DSM* revolves around the issues that a work addressing the corruption of modern science: (1) will have a hard time communicating to its target audiences, and (2) cannot cover all aspects of relevance.

Target Audience

DSM is grounded in “science and technology studies” (STS); the academic disciplines of the history, philosophy, and sociology of science. *DSM* contributes to this literature, but does not strictly adhere to its formalities because Dr. Bauer is not an STS worker. This is an advantage: First, as Professor of Chemistry, then Dean of Arts and Sciences at Virginia Tech, Dr. Bauer has first-hand experience in the trenches of science. This experience provides a personal and relatable element throughout the book. In his discussions of unreasonable peer reviews or faulty data analysis, I thought to myself, “Ugh, this has happened to me, too.”

However, the reliance on the insights of STS puts Dr. Bauer in a catch-22 with potential target audiences. It is hard to anticipate how STS practitioners might evaluate *DSM* given the broad variety of schools of thought in STS. Regarding practicing scientists, Dr. Bauer repeatedly states that STS is not part of formal science education, a conclusion my experience also supports. My familiarity with STS is due to reading in my spare time the works of Kuhn, Merton, Feyerabend, Popper, Marie Boas, etc. Lacking STS background, practicing scientists have little basis to appreciate Dr. Bauer’s positions. I expect the average practicing scientist would be emotionally defensive and not assimilate *DSM*. Dr. Bauer recognizes that the average scientist will not appreciate the realities discussed in *DSM* until their own research runs them afoul of dominant forces in their specialty. Nonspecialists are at a major disadvantage: They lack professional scientific experience, STS knowledge, and, importantly, are subject to the scientific propaganda described in *DSM*.

While the target audiences have much to gain from reading *DSM*, Dr. Bauer is certainly in a spot in attempting to educate these groups. The reader who will appreciate the book most readily is the practicing scientist with

some knowledge of STS literature or with experience of the effect of KMs in his or her career.

STS Considerations

As the basis of *DSM* is STS, I offer two points where the book can be critiqued from an STS standpoint.

The Demarcation Problem. The demarcation problem (Popper 1962) asks: What distinguishes, or demarcates, science from any other human activity? There is no consensus on this question (Pigliucci & Boudry 2013), being one of the most formidable open issues, if not *the* core issue in STS. Dr. Bauer does not directly address the demarcation problem. In Chapter 6, he presents the idea of “knowledge filter,” which is the closest he comes to the demarcation problem. The “knowledge filter” depicts the psychological and social processes by which scientific knowledge becomes more reliable over time. The schema is sensible and provides a nice summary of processes that undergird scientific activity. But the schema implicitly assumes that science is, somehow, demarcated from other human activity. However, with slight modification, one could apply the knowledge filter idea to, for example, various arts (i.e. computer programming) and technologies (i.e. computer manufacturing) that also have become more efficient over time.

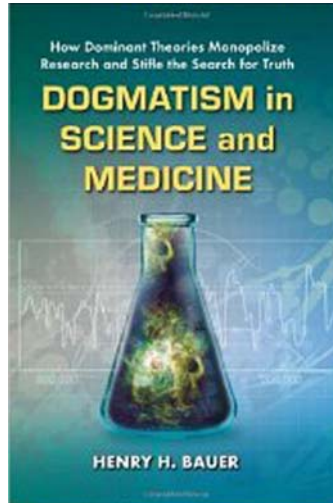
The problem with failing to address the demarcation problem is that many of the core issues surrounding KMs are demarcation problems of how science interacts with the greater society. It was possible to “read between the lines” and to see Dr. Bauer implicitly struggle with the demarcation problem, most obviously when he contrasted the classical idea of scientific knowledge as objective information, with recent sociological formulations of science as social construction (i.e. as in Woolgar 1988). He suggests, not unreasonably, that KMs are science bent too far toward the pole of social construction, but otherwise the issue was left open. This is not the place to go deeper into how KMs relate to the demarcation problem, but it is an important issue left unaddressed in *DSM* that I believe plays a key role in the rise of KMs.

Knowledge Monopolies as a Typological Construct. Dr. Bauer does not explicitly use the technique, but effectively treats KMs in a Weberian fashion as an “ideal type.” An ideal type is an intellectual device used in sociology to describe and compare social phenomena, serving as a conceptual “measuring rod to ascertain similarities as well as deviations in concrete cases” (Cosser 1971). The 16 main case studies presented in *DSM* provide a more or less successful fit with the ideal features of a KM. Some examples were canonical, including global warming and HIV/AIDS. However, other examples felt as if the Author was trying to shoehorn a particular example into the ideal type.

For example, the idea that Alzheimer's disease (AD) is caused by beta-amyloid plaques was presented as an instance of a KM. Amyloid plaques are a well-established symptom of AD, but whether they are cause or effect is unknown. As a member of the National Institutes of Health study section NOMD at NINDS, I served with AD experts, and AD-focused applications were routinely reviewed. I saw no indication of a KM when evaluating such applications. There was no bias toward a particular causal mechanism. A variety of mechanisms were equally considered, ranging from free radicals to cerebrovascular dysfunction. So AD research, in itself, is a less successful fit with the KM ideal type. That said, however, the broader discussion in Chapter 10, *Disasters of Cartel Sciences: Medical Malpractices*, gets more to the heart of endemic problems in modern biomedicine that affects all specialties from AD to cancer to antibiotics to HIV/AIDs. These discussions were spot on in my experience, and point to more general pathologies in biomedicine that, while significantly illuminated by the KM ideal type, probably require additional scope to fully characterize the pathologies.

Similarly, the critique of String Theory relied on well-known String Theory critics Lee Smolin and Peter Woit. While String Theory has dominated academic physics for the past 20 years, its ascendancy was not arbitrary as compared, for example, with computer models of global warming that altogether lack a firm theoretical basis. There were natural reasons String Theory arose and these reasons appear to be running their course, especially given the latest LHC findings (Schellekens 2013). Thus, String Theory, as an intellectual monopoly in academic physics, seems to me closer to a regular Kuhnian paradigm than a KM.

Finally, there is one outstanding KM that *DSM* failed completely to mention. Newtonian physics dominated Western thought from about 1675 until Einstein's Special Theory of Relativity in 1908. It is now uncontroversial history (Hall 1980) that Newton, on being appointed head of the Royal Society in England, took as his first official action chairing the committee that investigated Leibniz for ostensibly plagiarizing calculus. Newton himself is believed to have written the document making these accusations. The effect of Newton and his cabal of cronies constitute one of the earliest and longest-lasting KMs in Western science. Leibniz's advocacy



of the relativity of space and time (e.g., as espoused in the Clark–Leibniz correspondence (Ariew 2000)) was suppressed for almost two centuries. Had there been representation of dissenting views in this instance, something like Special Relativity might have emerged much earlier than it did, not to mention the intellectual havoc wreaked for two centuries by treating Newtonian mechanics like an absolutist religion. Only now is the scientific depth of Leibniz’ ideas being rediscovered by scientists, as opposed to by philosophers (Calude 2007).

These examples are meant not to undermine the KM idea but to reinforce it. The breadth and depth of modern specialized scientific knowledge almost guarantees that no one can command many diverse fields. Nonetheless, to understand the corrosion of modern science demands the attempt, and Dr. Bauer is to be lauded as an exemplary trailblazer. For the sake of accuracy and credibility, it seems advisable to explicitly consider the KM as an ideal type, and to be sensitive to the goodness of fit in specific instances.

Historical Changes Correlated with the Rise of KMs

There are two critical historical changes that correlate with the rise of KMs which Dr. Bauer did not consider, but to my mind factor centrally in any remedy to the problem of KMs.

Deindustrialization of First World Countries. It is not difficult to link deindustrialization of the first world (Roberts 2012) to the rise of KMs. In economies contracting in terms of real wealth, scientific funding also constricts. A feature of KMs is the reliance on increasingly monolithic funding sources which can constrain the scientific agenda to be “economically productive” and force scientists away from “basic research.” Concomitant with deindustrialization has been a rise in bureaucracies, particularly in health insurance and academia, and these too have eroded the independence of medical and scientific institutions.

Economic constriction also facilitates corporate mergers as, for example, in media. One hundred years ago there were thousands of independent media voices in the US; today there are 6 or so trans-national mega-media conglomerates (Bagdikian 2004). Throughout *DSM*, “mainstream media” is often invoked as a force maintaining KMs. It was therefore surprising that media consolidation was not considered as a factor in the rise of KMs.

Recognizing the historical facts of deindustrialization, with the associated rise in monopolies and bureaucracies, would have given a deeper historical context to the rise of KMs. It also would have allowed the proposal of more substantial solutions, because those proposed were not informed by this history. For example, calls for dirigist, as opposed to oligarchical, economic policies would be expected to foster real economic growth, including

scientific investment. Anti-trust actions against media conglomerates would be expected to dilute the effect of KMs favored by specific media monopolies.

Decline of Tenure/Tenure Track Positions in U.S. Universities.

According to a report from the American Association of University Professors (Beaky & Besosa 2013), in 2009 75% of faculty appointments at U.S. universities were not tenured or on tenure track and 61% were part-time appointments. To quote:

Though many people inside and outside of higher education think of tenure-track appointments as the norm, in reality tenure-track faculty are a dwindling minority on American campuses: While in 1975, tenure-track faculty accounted for 45.1 percent of the instructional staff, by 2009 they accounted for only 24.4 percent.

At my own medical school, only 18% of ~700 medical school faculty are tenure/tenure track, and for the University as a whole only one-third of all faculty are tenure/tenure track. It seems to me that the decline in academic freedom and independence may be the key factor in the rise of KMs. Again, the solutions offered in the final chapter were not informed by the erosion of academic independence in the core source of scientific knowledge: the universities.

Both of these historical facts—first-world deindustrialization and the decline in tenured university professors—bring us back to the demarcation problem. Science is embedded in society, and what happens in the greater society intimately affects this ill-understood activity that we pretend to understand when we call it “science.”

Conclusion

Dr. Bauer does a professional, competent, and important job bringing the corruption of modern science into the light. The criticisms offered above do not detract from the fundamental correctness of the picture *DSM* paints, but instead underscore its seriousness, and the need to further refine the picture. To scoff at *DSM* or to think it is off-base is merely to reveal that the scoffer is woefully uninformed about the transformations that have occurred in science over the past decades. If one is a practicing scientist, or a concerned citizen of good will, one ignores this book at one's own peril.

DONALD J. DEGRACIA

Associate Professor of Physiology
Wayne State University, School of Medicine
Detroit, Michigan, USA

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