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NEARLY FIVE CENTURIES OF SCIENCE BOOKS

Scientific books in American culture. An interview with Bruce V. Lewenstein

Interview by Giovanni Blandino

Bruce V. Lewenstein

ABSTRACT: The interview presents an overview on the role of scientific publications during some key periods in United States history. It describes the developing of a culture scientifique in the late XIX century and the increasing relevance of the US within the scientific world, intertwined with a new public demand for science stories; only during the Cold War some books begin to question science. The author here argues that scientific books are a key marker of the way science fits the American culture.

In the XIX century which was the audience for scientific books? Were lay people part of it? How this state evolved over time?

I should say right at the beginning that lot of what I will say is based on the work of my colleague Marcel LaFollette who has written some book chapters about science books in the XIX century in the United States. One of the things she has argued is that in the early part of the century there were very few science books published in the United States, the ones that were, were almost all brought over from Europe, especially from England.

The audience that has started to grow through the middle of the century was almost entirely the scientific community and technical community. So there were text books and books for engineers, doctors and so on. But we really didn't get very much of a real independent scientific community in USA until nearly the end of the XIX century. Only then, we did start getting both more books been published in the United States and the beginnings of the popular science movement, that really starts in the last third of the century, after our Civil War.

Laypeople were part of the audience, but we are still talking only about the very highly educated class and the intellectuals. It was not until very close to the end of the century that enough people had scientific education and enough income to be able to start buying science books.

So there are some popular science books in the XIX century, and there are a couple of classic examples, but most of them came at the very end of the century.

Were there embryonic examples of popular science books during the XIX century?

There were a few and probably the best known is a book called Jane Marcet's *Conversation on Chemistry*. And this was a sort of popular chemistry book, originally published in England and then many editions re-published in the United States at the beginning of the XIX century. The interesting thing about those books is that they were very much targeted at women. Again it was still the educated class, but the market was women who were at that time still not very able to pursue careers but who were beginning to be well educated and to be interesting in pursuing a wide range of topics and science was one of those. There was a desire to serve their need, so there were books like Marcet's *Conversation on Chemistry*, which were intended for the educated lady who would be able to converse about important

topics in the world.

And they often linked science to things in the household, like cooking, textiles or childbearing. That was a very sort of the beginning.

On which features did this sort of prototype of popular science books in the XIX century play?

They were focused on explaining and they were often structured as a series of questions. So there would be a character who would play the innocent young person who didn't know anything about science and ask a question at which the scientist, or Mr. Marcet, would answer. There was a sort of question and answer feature, this is part of why they were called conversations.

There were also books that started to appear in the middle of the century that were explorations. Part of the United States history was the exploration of the continent, so there started to be books towards the middle to end of the century that would be the story of exploring the Grand Canyon the Missouri River. And those books were very much natural history books talking about the wonders of the natural world, but they were told as travel books, a sort of "next we went down there and this is what we saw".

When did the popular science phenomenon appear for the first time? Was its birth linked to a particular state of the scientific world?

Obviously there were these examples that I talked about that started early, but I don't think they can really be tied to the state of the scientific world. Really what happens in the United States is that in the last third of the XIX century we begin to get a local scientific community that is recognized as contributing to science at the international level. Our first research University is set at that time and that begins to create both a market of educated people (who had much more education in modern science during the growth of science), but also a growing understanding that science and technology are contributing to the development of the modern world.

You get electricity industry, electrical industry and the growth of the chemical industry, things which really happened in the final third of the XIX century. And it began to be more and more people who want to read about science both because they need it for practical purposes, but also because it becomes part of the discussion, part of the culture, that science and technology are things you need to know. In English we don't have a term for *culture scientifique*, the French term, but I think what is happening in the final third of the XIX century is that we are beginning to develop a *culture scientifique*, where is part of the general discussion to know more about science and technology in general.

Around that time another thing happened: we started to have prominent scientists that were beginning to become evangelist for science. They wanted everybody to experience science and to think scientifically. And they began to publish lectures that they give, sometimes in magazines and then collected in books. That happened right at the end of the century and at the beginning of the XX century, you had the great men of science beginning to reach out and evangelise for science.

Was the US rise in the scientific field during the XX century directly followed by an increase in the public engagement in science?

I am not sure I want to say followed, I would say intertwined. They were happening together and this was most evident in the chemistry field or at least that is where we know the most about. Initially the chemists were not so aware of the need to be public, but then World War I happened.

World War I is known as the chemists' war, it was one war where chemistry clearly played a role, including in the United States there was a lot of chemistry involved. One of the things that happened was that many of the patents for German chemicals were taken by the US government (because they were evaluated for the German companies) and they were given to something called the *Chemical Foundation*. The *Chemical Foundation* in the United States supported chemistry in a variety of ways. One of the things it did was to support diverse public outreach and public understanding of chemistry activities, including the writing of books. There was a particular kind of book called *Creative chemistry* that was

produced and supported by the *Chemical Foundation* and I think 200,000 copies were sent around the country, so that every school will have a copy. It became a very popular book.

So the public engagement in science was driven by the chemists, but there was also a public demand at that time as science was really being seen as something that America had a particular ability to contribute to. During the 1920s we begin to get books that were novels and fictional books where scientists were the stars. Among the well known, there is a book called *Arrowsmith* by Sinclair Lewis, where Arrowsmith, the hero, is a medical doctor.

Also in the 1920s we had a book published called *Microbe Hunters* by a writer called Paul de Kruif. That was a non-fiction book about microbiologists and it was an extremely popular book. It remained in print for decades and it was very influential in drawing people into science. Many scientists were today, or in the 70s and 80s, been asked "why did you become a scientist?" will answer "It is because I read Paul de Kruif's *Microhunters*".

So science was increasing but at the same time these popular science books were drawing people into science in order to keep growing the field. So that is why I want to say that they were intertwined rather than followed.

How did the Cold War influence the public perception of science? Did the scientific competition between the two blocs alter the popularization of science and, if so, how?

So clearly the Cold War was a very critical part of how America considers science. In the immediate aftermath of World War II (again that was the physicists' war and the war physics won) there was a big burst of popularization. At the same time this was also the beginning of the anti-nuclear movement so people begin to be talking about these issues.

The big event was Sputnik in 1957, where obviously there was a huge amount of resources poured into science education, but some of these resources went in popularization as well. So there were popular science books that began to be published and widely distributed. They were not bestselling books, interestingly, but there was a clear sort of commitment to the formal education, this was the focus. There were new textbooks that were written in physics and chemistry and so on, they became very popular in the 1960s. There was this commitment to the idea of the public understanding of science but it was almost always driven by a belief that science and technology would be the way that we could maintain the superiority of the United States in that Cold War context.

At the same time some of the questioning of science was beginning. The most well known example is Rachel Carson's book *Silent Spring*, published in 1962, where the idea that not all the products of science are necessarily good. And there was tension there because there were people who believed that science and technology should be fully supported precisely because of the Cold War and to be in anyway questioning science was seen as to be not patriotic in some sort of way. The same thing happened when some people began to protest the use of science and technology in the Vietnam War, we began to have a split in the United States' culture between those people who blindly supported science and those who began to question whether science could be separated from social issues. In the same way we had some people believing that we have to support the government because the government supports science and technology and other people who recognized that science and technology are more complicated than that and that you can not just assume that they can give us superiority over the Soviet Union. But I think that certainly some of the major books were part of a counterculture, in particular they were books that were questioning some of the effects of science and technology.

To conclude and summarize, why do you think can be useful to look at science in books?

To me was really fun, very fascinating, to look at this issue from a particular point of view: the way science books can help us to understand the relationship between science and American culture. There is a particular point that I am looking at: if I look at the number of science books that are on the New York Times bestseller list from 1945 to 2000, before 1975 they were pretty noisy but there are almost never more than 10 new science books on that list each year. After 1975 there are almost never fewer than 10

books a year added to the list. If you think at it as a curve, it is a s shaped curve going along in under 10 and then in the 1970s it goes up to be in above 10.

That means to me, along with a bounce of other evidences from books and television, that something changes in American society in the mid-1970s and that science actually becomes more central to American culture after 1970s that it does before.

I think you can argue the same thing I was saying about the 1920s: the idea that science was something that you might want to do as a carrier is something you can see by the rise of science books in that time. This trend shows that science has a presence in American culture that it didn't have before. So I think that by looking at books you can find these markers of the way science fits in lot of American culture.

Author

Dr. Bruce V. Lewenstein is a widely-known authority on public communication of science and technology — how science and technology are reported to the public and how the public understands controversial scientific issues and "emerging technologies" such as biotechnology and nanotechnology. Trained as a historian of science, he often uses historical case studies in his research. He has also done extensive work evaluating "citizen science" outreach projects, in which citizens fully participate in the scientific process by gathering, entering, and sometimes analyzing scientific data.

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