



Amb motiu de la seva participació al cicle de col·loquis *Comunicar la Ciència: Plaers i Obstacles de la Narrativa Històrica*, després de la seva xerrada a l'Institut d'Història de la Medicina i de la Ciència a València, Patricia Fara va ser entrevistada per Amparo Bruño sota la supervisió de Pedro Ruiz-Castell.

Patricia Fara is Senior Tutor and Director of Studies in History and Philosophy of Science at Clare College, and Affiliated Lecturer in the History and Philosophy of Science Department at the University of Cambridge. Some of her main publications are *Pandora's breeches: women, science and power* (London: Pimlico, 2004), *Sex, botany and empire: the stories of Carl Linnaeus and Joseph Banks* (Duxford: Icon Books, 2003) and *Newton: the making of genius* (London: Macmillan, 2002). We talked with her about the history of science and her latest book *Science : A four thousand year history* (Oxford: Oxford University Press, 2009).

You currently teach history of science at Cambridge University, but you were trained as a physicist. As far as we know, you owned a computer education company for several years. How did you end up interested and devoted to the history and philosophy of science?

My first degree was in physics and after a couple of years I decided that it was a terrible mistake. I think what happened was that when I was at school it was a time when teachers and everybody wanted to encourage women to do science; because I was a girl and I was very good at doing science, everybody immediately said: “OK, she’s got to go to University and do science”. It never occurred to me or to anyone else to think whether that was what I really wanted to do. Just because I could do it, everybody assumed that I should, and I was pushed in to that way strongly.

I ran a company that made tape slides. We were the first people in England and America to provide visual training material about computers at an elementary level. Therefore, we had no competitors. At first it was just the two of us, my husband and me. We were literally doing it on the kitchen table. Because nobody else was doing it, we were very successful. We sold the product to a lot of universities and technical colleges. Then we went to San Francisco and we did exactly the same thing in America. We did it for about 15 or 16 years, but then video started to be introduced and there was less money in education. We had to choose between stopping or becoming a big company. The whole point of doing it in the first place was that we were idealistic children of the sixties and the seventies who did not believe in big business. To set up a big company would have been completely contradictory.

While at university studying physics, despite hating all the practical work, I was really interested in the bigger ideas and the theory. When I decided to do a Masters in History and

Philosophy of Science, I wanted to study philosophy, but after few months, I realized that I was more interested in history. Thus, I did a PhD in History.

Did you find any obstacles to entering such a world, both as an adult student or as a woman?

Certainly not as a woman. Neither as an adult student. History of Science is something that was largely done as postgraduate level. I chose not to think about my age too much. The only time I found a problem was when I became very friendly with some of the people on the course. There was a young woman and she was complaining to me about her mother. She said to me: “You know, these mothers are so awful...” and I thought: “I’m on the side of the mother in this case, I think the mother is right!” But I went very quiet and finally said: “Oh, mothers are absolutely awful”.



You manage to summarize in your last book a four thousand year history into four hundred pages. How did such a project come to your mind and how was it shaped?

I think it first came into my mind when I was a student doing my PhD. There was a big conference in 1991 in London called “The Big Picture problem” that Jim Secord organized. with a lot of eminent speakers. I was in the audience and I became really interested in it. I think that was when I first had the idea that I would do something like that. I didn’t know then that I would start in Babylon, but the idea of doing a sort of big history did appeal to me. It was obvious as a student (and also now that I teach other students) that there were not any books like that. When I was studying there was Charles Gillispie’s book *The Edge of Objectivity*:



An Essay in the History of Scientific Ideas (1960), which went from Copernicus up to modern days. I found it very interesting to read, but it contradicted all the other things I was being told as a historian of science.

In fact, your book presents a *big picture* different from the *big pictures* written by other historians of science. Is it because of the influences of the social and cultural history and of the science and technology studies?

Absolutely. That was what I wanted to get across very strongly: all the research that has been done during the last 30-40 years over new ways of thinking about history. There is a view of history that publishers like to present; it is a very old fashioned world. And it is very difficult to persuade them to change their minds and do something new, because they think that people like to read and to hear what they already know. They like nice stories celebrating how we've reached our current understanding because that is unthreatening, entertaining and interesting.

The title of your last book, *Science: A Four Thousand Year History*, has been translated into Spanish as *A Brief History of Science*, which slightly changes the original meaning. What do you think about it?

A Brief History of Science was the title I originally intended to have. I'm not sure in Spanish, but it is a joke in English referring to Stephen Hawking's *A Brief History of Time*. The one science book that everybody has bought but nobody has read is *A Brief History of Time*. It sits on bookshelves as a symbol of learning, rather like Newton's *Principia* in the 18th century. It is such a famous book that I wanted to call mine *A Brief History of Science*. I liked it as well because it emphasizes that it is a book about history. With the title *Science: A four thousand year history* it has been converted into a science book. That is what publishers like. They want books about science more than about history. But it is very interesting that in Spain the title has been changed.

When you consider a book like this, where easy reading is combined with academic rigor... what readers do you have in mind?

Students are very important, but I also wanted to write a book for wider audiences. It seems to me that science, politics, government and commerce are very closely linked, so every decision that is made about science is, in fact, a political and a financial decision. Science is not separated from politics in any way. In England, there is a big programme encouraging people to learn more about science. I believe it focuses far too much on the content of science and it seems to me a complete waste of time to try to teach people all the complicated theories of science.: we can leave that to specialists As educated citizens in a scientific democracy, we should have some knowledge about how scientific decisions are made and about how science is conducted. I think ordinary people should have some knowledge about the political and financial forces that are affecting scientific decisions. That was a large goal I had in writing the

book. And there is also a more immediate goal of enabling students who are coming in to the history of science for the first time to have some way of understanding what it is the modern historians of science are talking about at an introductory level, which I think has been completely missing. There are a few books doing it, but none of them cover the range that I do, and are all different from mine and from each other.

In the first chapter of your book you deal with the peculiarities of the number seven. The book is organized in seven sections, seven chapters each. Why did you choose such an arrangement?

I found it difficult deciding how I was going to organize the book and how I was going to break the past up into chapters. I like the seven x seven structure because it is symmetrical and it implicitly sends a message: it is completely arbitrary to impose a pattern on the past. There is no relationship between this structure and any ideological way of thinking about the past. I like the fact that it was arbitrary, because we think in centuries or in terms of great Kings, Queens and great governments, but there are objections to all of them. Mine is a neutral system but it was very helpful for me to have that in order to think how I could organize the book or where I would put different things. When the sun was known to go around the earth, there were seven planets: the sun, the moon and five others. Therefore, it makes sense scientifically. The number seven is also interesting mathematically: if you have a torus (like a tyre's inner tube) and you want to draw a map on the surface so that no two regions have the same colour, seven is the minimum number of colours you need (on a flat surface it would be four). Seven is also a magic number, and I intended to implicitly reinforce the idea that magic and science are quite closely related. Scientists would like to say magic has got nothing to do with science. However, I intended to combine those two ideas, that the structure was arbitrary and that science and magic are more closely linked than one might think.

In your book you reinforce the links between science, magic and a different way of understanding science. Do you think that science should be taught in schools in that sense, underlining the links with magic, or do you think that the teaching of science in schools should be completely different? What do you think about formal teaching of science?

Entrevista a Patricia Fara
“Comunicar la Ciència: Plaers i obstacles de la Narrativa
Històrica”

Amparo Bruño i Pedro Ruiz-Castell



In a way, if you want to captivate the audience, if you are a scientist doing a television show, something for young children or any other sort of audience, then you emphasize the magic things that science can do. You make things happen mysteriously and then you explain them. That would be a very good way because you could present under magic something that nobody could understand and then have the children trying to rationalize and understand it. I think it would be good because it would emphasize the process of discovery. Too often one is presented with scientific results as if they were absolute facts and something you have to learn.

Related to this, authors such as Richard Dawkins feel strongly that science and religion have completely nothing to do with each other. I think Dawkins is tending towards scientific fundamentalism. He is rather like a religious fundamentalist: he stands in his laboratory and says, basically: “I am a scientist. You, ordinary people out there cannot understand what I say. Believe me, trust me. I am a scientist, therefore I am right”. And that is exactly what religious fundamentalists say: “You have got to believe me because I am right”. I think there are important ways in which science and religion play similar roles in society. Isaac Newton and Albert Einstein are not just people who were very clever; they are seen as people who were extraordinary, only born once in five generations. People go back to the places where they lived, the places where they were born. It seems that the aura of genius is very like the aura of sanctity, so culturally is fulfilling the same function. I am not saying that a saint is a genius, nor that Einstein and Newton are geniuses, but it seems that some humans need to have these higher beings. Now we visit the house where Isaac Newton was born, or we go to the Royal Society and look at the telescope that he owned... and it seems to me that this is exactly like a saint’s relic. Again, genius and sanctity are fulfilling similar social functions, so you can think of

Isaac Newton as a secular saint. In the 19th century people used to talk in English about scientists as the “priests” of science. If you go somewhere like the Natural History Museum in London or the Science Museum in Oxford, they are both built in the gothic style; they are gothic cathedrals.

In your book, you attempt avoiding a rhetoric based on great heroes and heroines. In fact you present the main actors as normal people that have to work to survive, that sometimes fail and that may even fight with some rivals. But to what extent do we need those big names in a story like the one you have written?

I think that it ties up with what I was saying about the need of figureheads such as Newton and Einstein. They are rather like saints and we do need models to look up to and admire... and it has become part of the ideology of scientific progress, as they are very appealing. I am not saying that they were not important; they were very important and clever and did a lot of things, but the history of science is about far more than just these great names. We need to look around them as well. Why is it that we usually write history in that other way? Could we write a different type of history? Could we become interested in the history of big organizations?

You are an expert in the role of women in science. In fact you wrote a book on 18th-century women who played a relevant role in science, *Pandora's Breeches: Women, Science and Power in the Enlightenment*. How is that your book *Science: A Four Thousand Year History* deals mostly with men and only few women scientists?

I wrote one book about women in science in the 18th century, but I do not want to be characterized as a feminist historian who only writes about women. Gender is something I am very interested in, but I would rather treat it along with class and ethnicity. I felt slightly uneasy about writing a book about women because I do not want to be seen as a gender historian. Second, I am not an expert. Women and science is now something that people are very interested in, and I am often asked to give talks on it. I am interested in the role of women in science, but when I wrote the book about women in science in the 18th century I wanted to think about what it meant for the history of science more generally: Do we just want to write about big heroes like Newton, Darwin or Galileo? Or do we want to think about all the people who were teaching, who were translating or classifying specimens and those behind the scenes working as invisible assistants? All of them contributed to science. If one goes further back, one finds people who used to make pottery or jewellery and developed a lot of knowledge which later came into science — as the science of mineralogy. Or farmers who knew what the weather was going to be and their expertise became part of meteorology. Or sailors whose skills became part of astronomy. There were huge numbers of people whose knowledge contributed to what we now call science, but there is no way that one would call

them scientists. By writing about women I was also trying to re-think how we think about history, using women as an example of how we might re-do the history of science. But there are not so many in this latest book because it seemed to me that to include a lot of women would distort the past. I do mention women, more than a lot of people would do, but I did not want to be overloaded with women.

Do you have any future projects related to some of the aspects that have been necessarily left out from your last book? Would you perhaps think about writing another book dealing with some of these elements?

I am very happy to go back to the 18th century. It has been quite few years since I did research into it. All the research I was doing about China and Islamic science for this book was not real research; it was all in secondary sources and I did not make any original contribution. I enjoyed writing *Science: A Four Thousand Year History*, but it is also very nice going back into archives and manuscripts. I am back into being a real historian and doing original research of my own.

I am working at the moment on a book about Erasmus Darwin, involving myself in the narrative in a new way. It is a different sort of project. There is a poem called “The loves of the triangles” that is a satire on Darwin’s poem “The love of the plants”. Instead of having semi-erotic plants, there are slinky triangles and parallelograms. It is a joke, but also it is a very political poem because it was printed in the journal *The Anti-Jacobin*, very much opposed to the French Revolution. Lots of people have mentioned the poem but no one has tried to analyze it. The basic question I am asking is: why is it that what seems to be a rather silly satirical poem was printed in the leading political journal of the day? Why is it that so many people referred to it? It must be more than just a simply parody; it must have lots of political meanings. I have read and re-read it trying to work out what those political meanings are.

Moving to the present, we have learnt that you recently had a meeting with the Prime Minister, David Cameron...

How did you find that out? [Laughs] I was invited to a dinner party to talk about how the government could support science. There were David Attenborough [natural history filmmaker], Tim Berners-Lee [inventor of the World Wide Web], Steven Cowley [director of the leading nuclear fusion research centre in Britain], Mark Walport [director of the Wellcome Trust]... There were twenty-two people around an enormous table. After dinner we were asked to suggest one way in which we could improve science in Britain and one whinge. I thought I had to justify my existence as a historian, so I said: “Think about Crick, Watson and the discovery of DNA. That would be impossible now, because everybody is forced to do a PhD in three years. There is no time to think around a subject. The meaning of research is that some projects just won’t work. You can do research and set up the answer in advance, but you also have to have room for research projects that do not produce an answer.