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Review

When boffins go POP: Eduard Kaeser expects that the bubble of spectacular science may burst

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E. Kaeser, Pop Science: Essays zur Wissenschaftskultur, Schwabe reflexe (2009)

ABSTRACT: Eduard Kaeser has written an interesting and critical book that is concerned with the connections between science and everyday life. The conception of 'pop science' is introduced to characterize developments in science popularisation that are spectacular, superficial and potentially harmful to science-society relationships. The book is of special interest to the science communication community, since it may initiate discussion about the purposes of communicating science, and also about legitimate and illegitimate strategies and means of doing so.

The Swiss physicist and philosopher Eduard Kaeser, who is also a physics and mathematics teacher, provides us with an interesting collection of essays on the contemporary (popular) culture of science. Most of the essays collected in this sharp little book were published in general interest magazines and newspapers and are directed at a broad readership. Generally speaking, they are dealing with issues such as the popularisation of expert knowledge and the intersections of science and everyday life. The collection is held together by Kaeser's conception of what he calls 'pop science', which should be of interest not only for a general audience but also, in particular, for the science communication community.

Pop science is not necessarily the same as popular science. Kaeser describes pop science as bubbling mixtures of public education and popular culture as found, for instance, in contemporary video clips, arts and music. Terms such as 'edutainment' or even 'sciencetainment'[1] are closely related to pop science and indicate a shift from knowledge and enlightment to entertainment and amusement. This is, according to Kaeser, not necessarily a bad thing since learning and laughing are often magnificently connected. The author, however, is more troubled by the new cultural, economic and technological conditions that often take the popularisation of science to extremes. What could emerge from this situation, so the worry, are spaces between the science world and everyday life where people act like they understand science, but where understanding actually matters less than the spectacle for its own sake. Obviously, it is the area of science communication that is becoming increasingly professionalized, that is playing an important role in this process of turning science into spectacle.

Kaeser delineates four aspects of this process in the introduction of the book. He calls the first aspect the 'bazaar of knowledge'. Here he refers to Georg Franck's conception of the 'economy of attention' under the conditions of 'mental capitalism'. In this situation knowledge alone does not count any more, attention is the new universal currency in media saturated societies. Not a big problem for science so far, as science is pretty visible in the public sphere: popular science books enjoy decent sales figures, science appears in blogs, magazines and newspapers and almost every TV station now features some sort of science programme. What preoccupies Kaeser, however, are newly emerging media formats such as superficial knowledge quizzes and science comedies that pretend to educate but are actually designed to entertain. Here, Kaeser observes bustling hosts that present something spectacular, lurid or attention-grabbing from the world of nature and technology like exploding spray cans in a microwave. More or less plausible explanations by TV presenters might lead to short-lived sudden insights, but are hardly enough for learning about elementary scientific principles, which would allow a general understanding of phenomena and effects that could be applied more generally. A consequence of this 'bazaar of knowledge' that is based on spectacular facts alone is what the author calls the 'myth of the knowledge

society' in which it seems that all the knowledge of the world is available by entering search terms in an internet search engine. From reading Kaeser it becomes clear that knowing and understanding something are two very different things.

A second aspect concerns the self-presentations of scientific experts. Here, Kaeser assumes that the slogan 'be your own brand' is increasingly becoming relevant also for scientists (and maybe also universities and research institutions) who want to be noticed in the public sphere. In this sense, it is the 'iconisation' of scientists that becomes a characteristic of pop science. This development began with the image of Albert Einstein, who already became an icon during his lifetime – a fact that the media-savvy physicist also made use of himself. A further example for the personalisation of science is the molecular biologist James Watson, who described the all too human sides of science in a personal book. After that he cultivated the 'brand' of being a grumpy genius by making politically incorrect headline-grabbing remarks about polygamy and racial intelligence. In fact, the title of one of his books is telling: 'Avoid boring people'. Stephen Hawking is another best-selling example for a scientist who attracts a lot of public attention. Kaeser suggests that it is his very unusual appearance in the electric wheelchair, his electronic voice and his frail body that is inhabited by the 'mind of a genius', and also what Kaeser calls the 'sex appeal of theories that are hard to understand', that fascinate the media and consequently also many of us. In Kaeser's eyes these kinds of images are nowadays strongly instrumentalised and turned into symbolic capital in the struggle for public attention.

As a third aspect, closely related to the previous one, Kaeser identifies the highly-strung nature of claims that are sometimes made in the name of science in the public sphere. This implies, for instance, that some neuroscientists do not only claim that they have identified specific areas in the brain that are responsible for everything humans do, but also that human do not have a free will. Hyperbole is one of the tactics of pop science to gain attention. Another is provocation that can cause controversy, antagonism and quarrel, which are always helpful news pegs if journalists need a reason to cover a story. An archetype of this tactic is Richard Dawkins, who made himself a name as zoologist but increasingly turned into an atheist missionary in the crusade against religion. Dawkins' public statements that religious people are victims of a mental viruses and that religious education is a form of 'mental child abuse' are clear indications for Kaeser that Dawkins is an expert in the field of making a rumpus in the name of science. One may add here that even fellow atheist evolutionary biologists such as David Sloan Wilson accuse Dawkins for long having left the realm of science, since Dawkins consequently avoids engaging with scientific research that deals with evolutionary benefits of religion. What follows is that pop science is not necessary getting attention for scientific robustness and soundness, but getting noticed for being bold in the name of science.

The final and probably one of the most important aspects of pop science is the increasing eventisation of science. This point concerns not only individual scientists, but also scientific institutions and universities. Kaeser summarizes this point as being not about knowledge production but about the marketing of knowledge, and university rankings and initiatives about scientific excellence are as much part of it as events such as science lectures for children or open days at research institutions. For the author the results of good research are an event per se, but by staging them in public events, they are becoming part of a marketing strategy. This process does not only target lay audiences, but also the scientists themselves. Scientists and scientific institutions are increasingly forced to engage in PR activities if they want to compete in the public struggle for attention. The German sociologist Peter Weingart and other social scientists have studied how these medialisation conditions do affect researchers in their everyday work. Kaeser suggests that all these activities have to do with the legitimisation of knowledge: their function is to justify the efforts and money invested in science and technology. However, what pop science may lead to is a society that does not really want to know anything – but one that wants to watch, laugh and give applause to superficial spectacles, so Kaeser's grim outlook.

The core of the book consists of 15 essays on topics concerning various connections between everyday life and the public sphere with science, technology and medicine. They range from the inflated promises of scientists and engineers and placebo effects, to the relationships between science and religion, transhumanists, sports and technology, robots and neuroscience, to chimera, grand unified theories and the relationships between truth and power. Kaeser bases his critical essays on an impressively broad literature basis from many different disciplines and, of course, also on media reports about the various topics. Some of them are serene in tone, some are provocative, some are more pessimistic and sarcastic

and often seasoned with a good dose of continental European technophobia – but all of them deserve to be read, whether one agrees with the author or not. Kaeser suggests that his essays could be seen as aspects of pop science themselves, since they are located on the playground between science and everyday life as well, but he sees his own role as that of a spoilsport that makes over-inflated science bubbles go pop.

However, Kaeser's account is sometimes a bit too partial and one-sided. Of course it is true that the nature of science has changed in the recent years and that is has become increasingly 'managerialised', marketed, projectified etc. But is science a special case here, or does, for instance, the move to an 'economy of attention' also affect other areas of contemporary societies, such as politics, education, arts, sports etc., in a similar way? Another point is that Kaeser disdains the use of information technologies. However, citizens and scientists could also profit from using the web together, for instance when scientists blog directly from their labs and explain what they are doing without being filtered by the mass media. Citizens can get in touch with scientists directly, cooperate with them in 'citizen science' projects, but can also give direct feedback if they do not agree with them. Another question that remains unanswered in the book is what the driving forces behind 'pop science' are and who or what exactly it could be that makes scientists go pop? Closely related is the question who profits from pop science – if the trust in science erodes by too spectacular presentations of science, who else benefits from 'pop science'? Is 'pop science' about to become a systemic feature of science?

Solutions about what could or should be done about the situation are also not clearly spelt out in Kaeser's book, however if one looks closely one finds them between the lines. For instance, in a particularly recommendable essay on the authority of experts, Kaeser diagnoses contemporary societies not as knowledge but rather as belief societies: For most of the things that we think we know about, we only believe that we know about them – and we can only validate tiny fractions of facts ourselves. But we believe that there are experts that know exactly what they are talking about. However, looking at media coverage of science, we often find dissent between experts. And here the trouble starts. According to Kaeser dissent is a normal state of affairs in science. But it is getting dangerous when the dissent between experts is becoming politicized by spin doctors, consultants and PR strategists. This implies the risk that science is not only becoming politicized from 'outside' but also from 'within' when scientists are asked to conduct advocatory research or provide decisions about what should be done.

A possible solution lies in a new type of citizen: citizens that are knowledgeable about science. This is not a completely new idea; see for instance the debate about *scientific citizenship* in science and technology studies[2] or the debate around *teaching science for citizenship* in science education studies.[3] One main competence of the educated citizen should be the ability to judge, for instance, between experts and non- or pseudo-experts. For Kaeser this must lead to a qualified form of belief in experts. He wants citizens to listen to and value the opinions of the scientific experts that are well versed in the subject matter and he does not want them to get fooled by the lobbyists who tell them that certain scientific debates have not been closed yet. A precondition to do so is a (formal) science education for all (young) citizens (not just for the ones that decide to follow careers in science and technology) that enables them to make sense of science (for instance by studying content, processes and contexts of science) and participate in decision making processes about science and technology – a point that has been grossly neglected by many scholars dealing with the science-society interface so far.[4]

However, scientists and other experts also have to do their share. They have to act so that they are credible and that they can be trusted. The more they engage in what Kaeser calls pop science, the less they are sticking to the internal rules and values of science, and that is my interpretation of the book, the more credibility and public trust they lose (and in Kaeser's view they probably also don't deserve the public's trust any more).

Implicitly, this also raises the question how science communication fits into the picture here. Could it be that science communication practitioners have developed own quality standards, that have become detached from those of the scientific community? Of course, many science communication activities do a good job in bringing science and society together. However, more than once one gets the feeling that Kaeser's portrayal of science-society relations is spot on and that some science communication initiatives went 'slightly' overboard and that their focus is sometimes a little bit too much orientated on fun, spectacle, sexiness and excitement. The big question lurking behind is: What is the actual purpose of science communication? Is it, as Kaeser might suggest, just an activity to grab attention and eye-catchers in the name of science to legitimise whatever the scientists are doing in their labs? And which are the

values along which the quality of science communication activities could be assessed? The most pertinent question here is if the aim to get public attention should be valued higher than the internal norms and values of science?

In other words: Kaeser's book raises the question if spectacular and pompous science communication initiatives are actually (still?) doing science a service (and also if they actually want to do science service) – or if (semi-)professional groups of science communicators and media professionals solely take on 'knowledge' and 'science' as catchwords. In this context it must be asked whether science really needs science cheerleaders,[5] science tarot[6] or scientists dancing their PhDs[7] for the 'public engagement with science'? The question must be raised if such initiatives are really useful, and if so, in what way? It might be that some extroverted scientific experts enjoy such kinds of interchanges with members of the public, but on the other hand I heard more than one scientist say that they feel that they are turned into clowns in initiatives like these. For many of them it seems hard to believe that such 'engagement' initiatives could actually help to increase the trustworthiness of scientists and I perfectly understand some scientists' reluctance to participate in events like these.

One of the most important contributions of Kaeser's book is that it reminds scientists and other experts that trust and credibility can be gained by sticking to the own field of expertise and by doing good scientific work, and not by making exaggerated, funny or bold claims. The realm of popular culture has already become a battleground between scientific and other ways of explaining the world. [8]

Kaeser's book is of interest for the scientific and the science communication community. The book provides a good opportunity for scholars and science and science communication students and practitioners in German speaking countries to further reflect about what they want to achieve by communicating science. It might also initiate discussion in the science communication community about legitimate and illegitimate strategies and means of communicating science. In my opinion Kaeser's book – and especially the introductory essay on the conception of 'pop science'[9] – deserve to be read and discussed widely, whether the readers agree with Kaeser or not. To widen the impact of the book a translation into English would certainly be appreciated.

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Notes and references

[1] See also: C. Müller (2004), *Sciencetainment im Tangaslip oder Die Akte X der Wissenschaft*, in C. Müller (Ed.), *SciencePop: Wissenschaftsjournalismus zwischen PR und Forschungskritik*, *Nausner & Nausner*, pp.110-125.

[2] For instance: A. Irwin (2001), *Constructing the scientific citizen: science and democracy in the biosciences*, *Public Understanding of Science* **10**(1): 1-18;
U. Felt (2003), *Scientific Citizenship: Schlaglichter einer Diskussion*, *Gegenworte* **11**(1): 16-20.

[3] For instance: E.W. Jenkins (1999), *School Science, Citizenship and the Public Understanding of Science*, *International Journal of Science Education* **21**(7): 703-710;
M. Ratcliffe and M. Grace (2003), *Science Education for Citizenship: Teaching Socio-Scientific Issues*, Maidenhead: Open University Press.

[4] See for instance: S. Delamont (1989), *The Finger on the Blackboard? A Sociological Perspective on Science Education*, *Studies in Science Education* **16**: 25-46, or:
S. Turner (2008), *School Science and its Controversies; or, whatever happened to Scientific Literacy?*, *Public Understanding of Science* **17**(1): 55-72.

[5] http://www.sciencecheerleader.com/, accessed 9/11/2010.

[6] http://www.sciencetarot.com/, accessed 9/11/2010.

[7] For instance, here is the geneticist Josef Penninger 'dancing' his PhD: http://www.youtube.com/watch?v=jQMx8duCJw0 , accessed 9/11/2010.

[8] Compare the Anti-Dawkins Clip 'Beware the Believers' http://www.youtube.com/watch?v=oFXIALf9zDA , accessed 9/11/2010 with the Anti-Religion Clip 'Off That (Rationalist Anthem)"http://www.youtube.com/watch?v=aAYVY2eLMck , accessed 9/11/2010.
For more positive examples see for instance a clip by CERN scientists, explaining their work 'Large Hadron Rap': http://www.youtube.com/watch?v=j50ZssEojtM , accessed 9/11/2010 or the Hip Hop group Wu-Tang Clan's hit 'Gravel Pit' turned into a song on processes of neurotransmission: 'Synaptic Cleft':http://www.scivee.tv/node/11181 , accessed 9/11/2010.

[9] This section was also published as a separate article: E. Kaeser (2009), *Pop Science. Wie Wissenschaft Wind macht*, *Merkur* **63**(716): 76-80.

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