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SCIENCE COMMUNICATION AND INNOVATION: ZOOMING OUT FOR MICRO-LEVEL INSIGHTS CLOSE TO REALITY

Science, brands and the museum[1]

Robert Bud

Abstract

This paper argues that for citizens to be engaged with science they need to be able to share analytical techniques as well as the results of analyses. The category of "brand" which condenses the instrumental with the symbolic is both powerful in its uses and familiar to laypeople. The paper shows briefly how the categories of penicillin, biotechnology and applied science can be analysed in this way. It suggests that historians apply such an approach to the historiography of such new categories as synthetic biology and that this might be useful to curators of such topics in museums.

Keywords

Informal learning; Public engagement with science and technology; Public understanding of science and technology

Introduction

How do our societies make sense of sense of science? Answering this challenge is not an optional extra: such possibilities as biotechnology in the past, and synthetic biology in the future, have been, and will be, disruptive, culturally, technologically and economically. To prepare our citizens for change, to give pride in past successes, and confidence for the future, in the twentieth century we developed major science museums such as the Boerhaave in Leiden, the Leonardo da Vinci Museum in Milan and the Science Museum in London. These institutions have come to think about their role in promoting expert consumption: not of individual goods certainly, but instead of culture and of science. Annually, scholars from such museums meet to discuss their historical tasks.[2] We know that the challenge is more than to provide useful knowledge. A generation of historiography has highlighted the inadequacy of such terms implying passive reception by the public as 'the popularisation of science' [Gregory and Miller, 1998; Gregory, 2016]. Instead the relationship needs to be active, as expressed for instance by the term 'science engagement'.

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[2]See www.artefactsconsortium.org.

Brands

More than mere good intentions, the shift from passive to active audience requires a move towards an analytical model that attributes agency to the general public [Commission of the European Union, nd]. Such an analytical structure needs also to be shared by the people with whom the museums are engaging, so that, by sharing the analysis, we can share too the ability to analyse. Consumption is, of course, highly mediated. In the consumption of concepts as in the consumption of goods, we are each influenced by the media, by institutions, advertising, private organisations and by our shared constructions. My suggestion is that we have a model for such relationships which could be drawn upon: the branding of products. Van der Vorst has summarised brands as multilevel networks of concepts [van der Vorst, 2004, pp. 158–159]. Jean Baudrillard who saw in them the language of consumption highlighted their role as a condensation of the instrumental with the symbolic [Baudrillard, 1996]. That of course can apply not just to a high street 'brand' but more generally to such material things around us as clothes or food, to knowledge, 'knowing how to drive', being a wine expert, or objects of knowledge, whether it be cookery or 'science'. Brands of course are not always either positive or attractive. Across many parts of Europe the brand of nuclear power has become so tarnished as to make the building of new power stations quite unacceptable.[3]

Baudrillard drew upon the French business writer Pierre Martineau author of the 1957 manual *Motivation in Advertising*. This work provided the illuminating exploration of the meaning of instant coffee and the subtle differences in meaning that this drink had acquired from ground coffee. Older readers may recall the less than authentic or even palatable taste of the powder-based drink, long before the modem granules. Martineau could explain 'When people become articulate about coffee, they go way beyond any drab drink which is on the table three times a day like a glass of water.' [Martineau, 1957, p. 54]. Branding should not be seen simply as an extension of marketing. The consumer is too active an agent. So in the case of the Volkswagen "Beetle", the identification of the product with alternative culture in California was neither intended nor driven by the company [Olins, 2003]. In the case of nuclear power, the branding of the product as "dangerous" in several societies had little to do with the intentions of either industry or government [Horlick-Jones, Prades and Espluga, 2012].

Three examples

This process of branding is not merely a cognitive process. In a recent study of lay-people's talk about emerging technologies Schwarz-Plaschg points out, 'sense-making cannot be disentangled from interactional processes, actors' interests, and sociopolitical constellations.' [Schwarz-Plaschg, 2016, p. 2]. It involves institutions, power, the mitigation of fear and human aspirations. To help thinking about how this works with science, I shall suggest three levels of brand. The most obvious is the individual class of artefact. Gregory has recently explored the complex class of shoes, whose qualities extend far beyond their simple function as foot coverings [Gregory, 2016]. I might take the alternative category of penicillin [Bud, 2007]. Not even to the scientist is this as simple as a single chemical. Certainly, in the public sphere where it stands for antibiotics it is a rich and complex brand associated with a triumphant but now distant past, a carefree attitude to most infectious disease but disturbing future. Arguably it was the single brand faith in which established faith in modern medicine. That faith, in part, was

[3] For research on this phenomenon at a European level see www.honest2020.eu.

rooted in experience of unprecedentedly rapid and total cure. Penicillin and the other antibiotics have an almost shockingly effective impact on many infections, speedily curing the miserably sick. They also have given authority to the patient 'knowing' what to expect, and the wish to believe in a medicine which has seemed to 'work'. This was in the context of resurgent health systems after the Second World War enabled to deliver new levels of care through antibiotics and through the operations that antibiotics made possible. Antibiotics, moreover, took away not just the physical suffering of illness but also the shame that failure to prevent illness had once bestowed. Certainly, penicillin has its iconic stories, exemplary anecdotes and of course objects by which its past, present and future have been symbolised. There is also an urgent need to help the public reflect on the brand they have created in order that a medically very valuable class of drugs can be rebranded before they are rendered worthless through abuse.

A second more general version of the brand is 'biotechnology'. Since the early twentieth century it has been seen as the sequel to the transformative effect of chemical technology [Bud, 1993]. It is usage by government, scientists, industrial promoters and journalists that together have created a strong association between biotechnology and the idea of 'the next industrial revolution'. In 2016, a search of the two terms together yielded more than 700,000 hits. It, indeed, could be said that being part of 'the next industrial revolution' is an aspect of the biotechnology brand. This did not just "happen" either. New and unprecedented products, such as human insulin made by engineered yeasts, emerging around 1980, gave material meaning to biotechnology. The brand was also created both intentionally and unintentionally through the debates around 1980 about the supreme risks that the new technology threatened and, by contrast, the supreme benefits it offered. The very word, as used in the title of magazines, was trademarked by the stockbrokers E. F. Hutton in 1979.

The technical processes entailed by the term 'biotechnology' have changed, of course, markedly over the past forty years. In the late 1970s, it referred to the manufacture of chemicals using fermentation, on the one hand, and on the other to engineering of yeast DNA to make proteins and other chemicals; it then shifted to the engineering of human DNA; and most recently to mutating cells using CRIPR-Cas9. It could certainly be argued that it is the brand quality rather than any technical meanings that have endured. Biotechnology deals with using life. It is transformational; associated with high science.

A third even higher level of organisation is represented by the term 'applied science' which has served to describe an enduring dream [See Bud, 2012; Kline, 1995]. The history of the development of this concept is the topic of my own current research. Today, the term has largely gone out of use but for a hundred years between the mid-nineteenth century and the middle of the twentieth century it was treated as something as real as the cars and aeroplanes it subsumed. By the early twentieth century the universities in British industrial towns known as 'Redbrick Universities' and many American institutions had popularised the term in their department names publicised in local newspapers, proud of their research and of their graduates, and supportive of their frequent appeals for money. After the First World War, known as the 'Chemists' War', the term came to be commonly used for innovations of all kinds. Thus, at the time of the opening of the building of London's Science Museum in 1928, the new building was referred to as 'a sort of

cathedral of applied science' [Our London Staff, 1928]. In Jasanoff's terms, applied science as captured in Aldous Huxley's 1932 novel *Brave New World* was also a sociotechnical imaginary [Jasanoff and Kim, 2015]. Used largely as a term to describe education in the later nineteenth century, it became a broader cultural category in the inter-war years. The process of becoming real involved both sides of a bitter argument about the present and future of culture dividing science into two categories pure (or fundamental) and applied. Some applauded applied science as a source of communal wealth and individual convenience, while others more worried about society's inability to match ethics to capabilities denounced this symbol of science out of control. The popular writer C. S. Lewis complained in 1943, "'Man's conquest of Nature" is an expression often used to describe the progress of applied science' and proceeded to show that three symbols of its supposed success the aeroplane, the wireless and the contraceptive represented "power exercised by some men over other men with Nature as its instrument." [Lewis, 1946, p. 68]. During the post-war era, it came to be a symbol of the hope that success in fundamental science could be linked to growing wealth [See, for example, Blackett, 1968; Gibbons and Johnston, 1974] While in the last thirty years the term 'applied science' has been largely displaced, the concept has not gone away. Originally referring to all the ways things were made, technology has acquired many of the connotations of applied science as in "technology stocks" and "high technology". We are still living with the legacy of the conceptual debates of two centuries.

Interpreting the brand

In exploring and indeed displaying the history of brands in this sense, we need constantly to recall that the tense inter-relationships between phenomena and their branding is historically located and may change radically. The material Penicillin has for instance been substantially rebranded since the early 1950s, when the term 'wonder-drug' was fashionable. That very fragility is however an important message to share with our audiences. For citizens are used both to analysing brands, and to their entitlement to think about them. Understanding that such aspects of science can be considered as brands helps make them comprehensible to the public. The history of their use is part of general folk history not the past of an esoteric 'other'.

Once the objective of sharing the analysis of scientific categories as brands is accepted, the historical challenge is to explore how terms are, and have been used, and their meaning has changed. Historians are beginning to use the huge quantity of digitised newspapers now available to examine the corpora of knowledge and information that would be drawn upon by citizens. Candela and Pasquarè Mariotto [2016] for instance have examined how radiation was treated early in the 20th century by the Italian press. Most ambitiously, and even before digitisation, Bauer and his colleagues studied the treatment of science in the British press [Bauer et al., 1993]. These studies and contemporary analyses of such issues as the acceptability of genetically modified organisms (gmo's) highlight the importance of institutional trustworthiness. It is well known that the branding of gmo's cannot be separated from the perception of the companies that make and market them. Equally the brand benefits of an emphasis on 'Responsible Research and Innovation' were clearly at the heart of the approach's attraction to the European Commission [Commission of the European Union, nd].

What is the implication for public engagement with new technologies? In a paper entitled 'Nanomedicine metaphors' [Loeve, Vincent and Gazeau, 2013] the authors emphasise the need for care in choice of metaphors used in thinking about drug delivery devices. Often these are discussed in military terms descended from the magic bullet of Paul Ehrlich. The authors point instead to the opportunity to think of the overcrowded economy of the 'oikos' [household] as a metaphor, from which they derive the concept of 'oecology'. Whether this would be universally applauded is here beside the point, rather it highlights the opportunity for varieties of players to be involved in metaphors which are a critical aspect of brand formation. It is the role of the Museum to promote expertise in understanding and interpreting such brands.

Contests over the meaning of 'risk' have been an important aspect of the discussions over how environmental issues and dangers should be constructed [Thompson and Rayner, 1998]. Historians have already begun to explore the history of synthetic biology as a 'brand' among scientists if not yet among the general public. Bensaude-Vincent has looked at the contestation between engineer-designers and chemist-designers not just in technical issues but also on such questions as ownership and sharing. The engineers draw on an open-source tradition she argues while the chemists for whom 'synthetic biology' is the natural sequel 'synthetic chemistry' find it natural to expoit their culture of patenting [Bensaude Vincent, 2013]. A next step would involve following the institutional and commercial processes by which the brand became more familiar to a general public, and further how the public actively used and reinterpreted the messages put out.

A museum curator will always ask what this has to do with objects. Fortunately, those that have been preserved have often expressed vernacular conceptions of what has been important. One can frequently see visitors to London's Science Museum stroking Stephenson's Rocket locomotive which made steam travel attractive and which is an icon of the tales which many people know. Such stories have, of course, been frequently enriched, reinterpreted or even dismissed by professional historians [Numbers, 2009; Numbers and Kampourakis, 2015]. But perhaps museums need to take more care about curating the stories, and the branding they represent. They express science not as the province of the expert but as a key component of 'our culture'. That does not imply coherence or internal agreement. Historians have emphasised that interesting concepts have been 'essentially contested'. These contests have, in the past, been fought at institutional, commercial and disciplinary levels. Such contests are also being fought out at this time, as different citizens think about their own civilisation and the way it establishes values and makes decisions.

The history of brands in this sense is linked to the historiography of the scientific experience that historians explore. It is neither cranky nor ahistorical. It however goes further than saying the 'past is a foreign country'. Rather it links to the heart of public concerns about how to manage in the present and the future. It will help members of the public be active and informed consumers of concepts as well as of things. They will be engaged, and informed and conscious participants in the ongoing process of developing new brands for new technology.

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Author

Robert Bud is Research Keeper at the Science Museum London, Honorary Senior Research Associate at the Department of Science and Technology Studies at University College London and an Affiliated Scholar at the Department of History and Philosophy of Science at Cambridge. In 2012 he was the Sarton Professor at the University of Ghent. He is the author and editor of books on the history of biotechnology, penicillin, applied science, chemistry and scientific instruments. He has curated permanent galleries at the Science Museum on plastics, petroleum and the Chemical Industry as well as major websites hosted by the museum which use the Museum's unrivalled collections to interpret the history of science, technology and medicine. E-mail: robert.bud@sciencemuseum.ac.uk.

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