1985. Scientists can't do science alone, they need publics.

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In the spirit of Massimiano Bucchi's inaugural editorial in this journal (Bucchi, 2016), this short piece is intended as a glance to past PUS scholarship, in order to feed in current debates taking place in the field. For this first 'historical moment in PUS', I have chosen to focus on the year 1985, and what some of the literature published that year can tell us about the phrase 'science in public'. It has become customary, at least in the UK, to have historical accounts of the PUS movement begin in 1985, mostly down to the fact that 1985 saw the publication of the Royal Society's report on the public understanding of science, a.k.a Bodmer Report, which many consider to have provided the PUS movement with its initial impetus, at least an institutional one (The Royal Society, 1985).[1] The report prompted a few healthy scholarly reactions in the years following its publication, but if it were for this report alone, 1985 should not be that memorable. However, at least two volumes appeared this very same year, Shinn & Whitley's *Expository Science* (Shinn & Whitley, 1985) and Shapin & Schaffer's *Leviathan and the air pump* (Shapin & Schaffer, 1985), both highlighting the communicative facet of science-making to argue that audiences for science play an active role in knowledge production. Finally, looking at some post-1985 scholarship shows that the

[1] For a comprehensive discussion of the production, contents and consequences of the report, see Simon Jay Lock, 2008, *Lost in Translations, Discourses, Boundaries and Legitimacy in the Public Understanding of Science in the UK*. Unpublished PhD dissertation, University College London.

ideas put forward in these two volumes opened a field for the scholarly exploration of science in public that is still very fertile today.

If one thing, the Bodmer report placed the question of the publics for science, and especially that of their involvement in the production of knowledge, on the table. But the report is a problematic text, most notably for its naturalising of the so-called deficit, or empty tea-pot model as the norm for the communication of science. This deficit model postulates that science develops in a sphere of its own, distinct from the public sphere. The communication of the results of scientists' work is meant to allow an ignorant society to bask in the light emanating from the sphere of science. The one-way chain of communication proposed in the report—science-mediators-public—is nothing more than the adaptation of the linear model [producer-text-receiver] prevailing at the time in communication studies, to the specific case of science communication. Encapsulated in this model is the notion that communication has a measurable effect on the receiving end. When it came to science communication, this effect is believed to be quantifiable through surveys of public levels of scientific literacy. Consistently low levels of such literacy would indicate endemic levels of misunderstanding of science in the lay population, resulting from poor or inefficient communication.

The report was to spark a flurry of criticisms. Some of them found their way in the first issues of this journal and have become classical texts in the PUS literature. For instance, Jean-Marc Lévy-Leblond (1992) pointed out that lamenting misunderstandings of science in the general population also entailed the fallacy of conceiving of science as a monolith. A corollary was that 'if scientists are definitely not universal experts, non-scientists are not universal non-experts' (p.17). The notion of misunderstanding, he argued, is a relative one.

Consistent measures of scientific illiteracy should not mask the fact that we live in a technoscientific culture, which makes the Enlightenment dream of universal shared knowledge fade. In its stead, Lévy-Leblond suggested, we should come to term with the reality of a shared relative ignorance, which in an apparent paradox can be seen as reinforcing the democratic bond as it strives on trust. However, from this vantage point, the main problem of the public understanding of science is not scientific literacy anymore, but the balance of power between scientists and non-scientists. Similarly concerned with the notion of misunderstanding as it relates to this balance of power was Brian Wynne's paper (1992) building on his previous study of sheep farming in Cumbria (Wynne, 1989). The argument is well known. Like Lévy-Leblond's it points towards the notion that expertise is not the appanage of scientists. Other forms of expertise stemming in non-scientific cultures are relevant to the production of knowledge. Only through 'intercultural understanding' (Wynne, 1989: 37) can solid and reliable knowledge be obtained.

Similar interrogations on the nature of audiences, or on the role of communication in science-making are to be found in *Expository Science: Forms and Functions of Popularisation*, edited by Terry Shinn and Richard Whitley (Shinn and Whitley, 1985). This volume engaged with precisely the same topic as the Bodmer report, the public communication of science, but remains one of the founding volumes in our field for the many theoretical insights it provides on this topic. In his perceptive introductory essay, Whitley takes issue, for instance, with the fallacy of viewing the audience for science communication as one 'large, diffuse, undifferentiated and passive' entity (Whitley, 1985:4). On the contrary, he argues, audiences for science communication are many, all pursuing different goals in relation to scientific knowledge, which are all important and relevant to scientific research. Besides, these

audiences are historically contingent and so are the ways in which they encounter scientific knowledge. There is no one science, there is no one science communication. Here, Whitley turns the pyramid of science communication which appears in the Bodmer report, upside down. From this perspective, audiences are active participants in the communication process and therefore crucial to the scientific enterprise as a whole. In turn, this notion leads to call into question the idea that the communication of scientific results is only a downstream activity. Quite the opposite, communication of results 'to other professions, semi-professions and the laity is a necessary activity for research being continued' (Whitley, 1985: 9). Science-making cannot be divorced from its communicative dimension.

The history of science confirms this centrality of communication to the set of practices that we now call science. The seventeenth-century project of establishing experimental science rested on the notion that knowledge production is an enterprise that needs to be rooted in civic culture if it is to succeed, that science cannot exist without publics engaging with it. In order to be reliable and solid, Francis Bacon's 'new science' had to be practiced in front of witnesses. As Steven Shapin and Simon Schaffer (1985) showed when retracing the debates between Robert Boyle and Thomas Hobbes on the role of experiment in scientific exploration, to devise 'literary technologies of virtual witnessing' was pivotal to Boyle's endeavour of placing experiment at the heart of natural philosophy. He illustrated his written accounts in order to impress in readers' minds a view of the experimental scene, thus rendering direct witnessing and replication unnecessary for his claims about the physical world to be constituted into matters of facts (Shapin and Schaffer, 1985:60). In a related manner, a few centuries later, Michael Faraday worked hard to create performances that would move the natural phenomena he identified in the privacy of his laboratory to the

public sphere, where they could become part of the lived experience of other scientists and interested members of the public alike (Gooding, 1985:107, see also Morus, 2004). But doing so was also part of what enabled him to understand what he was doing, and observing. For example, after having realised the phenomenon of magnetic rotation in September 1821, Faraday spent several weeks devising a portable apparatus which would make the phenomenon visible and self-evident to his colleagues, thereby winning their acceptance for his discovery. The work he put in devising this portable apparatus participated in his understanding of the magnetic rotation phenomenon itself (Gooding, 1985:120-21).

Today as in the past, researchers' communication of their work is essential to knowledge production. This centrality of communication to the scientific endeavour is perhaps most vividly captured in Bruce Lewenstein's 1995 'Web of science communication contexts' (p.426). This diagram concludes a study of the infamous case of chemists Pons and Fleishman who announced that they had achieved cold fusion in their University of Utah laboratory during a press conference. In the few months following this media event, reports appearing in newspapers and on television became part of the scientific process as, for a short period of time, they were the only sources from which other research teams could get information on the materials and methods which they needed to try and achieve cold fusion themselves, thereby replicating Pons and Fleishman's claim. The cold fusion saga, as it came to be known, is one brightly coloured example, amongst many others, which highlights the centrality of public communication to the production of scientific knowledge (Bucchi, 1996).

Rosemary McKechnie, in 1996, called for analyses of the public understanding of science that 'decentre science' (p.129). The departure point should not be what people know, or

don't know about science, scientific facts, or processes, but how they 'reflect on the status of their own knowledge and situate themselves *vis à vis* science and *vis à vis* others in relation to science' (McKechnie, 1996:129). Moving away from the linearity of the deficit model and towards a more integrated model, like for instance Lewenstein's web model which effectively decentres science (because there is no centre there), should alert us to the idea that audiences for the different forms of communication involved in science may be as central to the production of scientific knowledge as are researchers. Bruno Latour noted that researchers are very good at socialising nonhuman objects to form collectives with human subjects (Latour, 1999:20). What we call practices of knowledge production are the practices which socialize such nonhumans entities as virus or minerals or seeds, to make them part of the collective. From this vantage point, it is easy to see that science communication is itself such a set of practices of socializing of nonhumans. And audiences for science communication, as part of the collective too, have an active role to play in the production of scientific knowledge, as it is their active engagement with researchers' efforts through their participation in communicative relationships, that will ultimately make such socializing possible and successful.

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2004 words