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THE UBIQUITY OF PUBLIC SCIENCE

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Instead of using the binary of public versus private science or autonomous versus state-sponsored science, this paper focuses on the ways in which Science, the Scientific Community, and the Scientific Enterprise have all been and are still public, serving the common good through the production, dissemination, and consumption of technoscientific innovations.

***Keywords*:** Public Good, Science for the People, Technoscience, Scientific Enterprise

ВЕЗДЕСУЩНОСТЬ ПУБЛИЧНОЙ НАУКИ

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Автор рассматривает науку вне бинарной оппозиции публичного и приватного, не как автономную или зависимую от государственного финансирования. В этой статье анализируются те аспекты, в которых наука, научное сообщество и научное предприятие всегда были и остаются публичными, служа общественному благу посредством производства, распространения и потребления технонаучных инноваций.

***Ключевые слова*:** общественное благо, наука для людей, технонаука, научное предприятие

In his "If Science is a Public Good, Why do Scientists Own it"? Steve Fuller raises a question that perpetuates a false binary (public good versus private ownership of science) and resists conceding the obvious: the scientific enterprise is paid for and conducted by the people and is meant to serve all the people. In what follows, I will critically examine some of Fuller's presuppositions and highlight the realities of the scientific endeavor in order to problematize an ideology that masquerades as a quandary.

Fuller begins by stating that "The key problem is that science isn't naturally a public good but must be made such". Claims about the "nature" of anything are suspect because they essentialize and generalize when careful examination of particular practices are advisable and are more fruitful for science studies. Science, according to the Oxford English Dictionary (OED), is "The kind of organized knowledge or intellectual activity of which the various branches of learning are examples". It continues to distinguish between earlier uses that define scientific activities as "what is taught in universities or may be learned by study" and later uses that define them as "scientific disciplines considered collectively, as distinguished from other departments of learning; scientific doctrine or investigation; the collective understanding of scientists". One of the key ingredients that distinguishes "scientific doctrine" from other

"departments of learning" is found in the last sentence, the "collective understanding of scientists", where the word "collective" is striking.

Fuller must be aware of the three general stages most science studies associate with scientific progress since the Scientific Revolutions. The first sees Science in an abstract and detached sense of the term, as an honorific and decontextualized description of knowledge production that differs from dogmatic and speculative thinking, religious or otherwise, because it follows Bacon's methodology and Descartes' radical doubt. Steven Shapin's [1994] "Gentlemen of Science" come to mind here. The second is the Scientific Community where, once again, the "collective understanding of scientists" produces and disseminates knowledge claims while supposedly adhering to Robert Merton's description [1973 (1942)] of their communal ethos: universalism, communism (communalism), disinterestedness, and institutional skepticism. The third stage, the Scientific Enterprise, is where neoliberal concerns with monetizing knowledge – both in the university and in industry – overshadow both science for science's sake and the supposed adherence to the scientific ethos [Krimsky, 2003; Greenberg, 2007; Mirowski, 2011; Mazzucato, 2014; Berman, 2014]. However idealized and roughly classified, these three stages or bundles of practices offer an overview of the trajectory of scientific activities in the past three hundred years in the Euro-American context (with some parallels elsewhere). Fuller's notion of the nature of science mistakenly takes the third stage and its neoliberal ideology to be the standard-bearer for how science is practiced today without paying sufficient attention both to various counterexamples where technoscientific innovation are neither monetized nor privately owned and to the questionable applications of such ideology to shared human knowledge production. "Science" never ceased to be a somewhat messy collective enterprise, where the exchange of ideas, since 1660 with the Royal Society of London, was at the heart of its endeavors (whether for the love of God or humanity), and where public support and benefit have intuitively and practically gone hand in hand despite periods of private funding by wealthy inquirers. So, perhaps the issue is what is a public or common good?

According to the OED, "Common Good" is defined as "Belonging to all mankind alike; pertaining to the human race as a possession or attribute", or "belonging to the community at large, or to a community or corporation; public". This in turn means that a common good that belongs to the public is "Free to be used by every one, public." The notion of common or public good dates back to biblical injunctions about keeping some land untended and accessible to everyone and to the British commitment to a "Commons". This term is defined in the OED as "A common land or estate; the undivided land belonging to the members of a local community as a whole", and in more recent times has been part of what economists consider utilities. Historically, commons has been "the patch of

unenclosed or 'waste' land". This parcel of land, or in our context, parcel of knowledge, is "In joint use or possession; to be held or enjoyed equally by a number of persons". The textbooks from which students study any scientific discipline, in this sense, are available to them free of charge (regardless of how schools are funded), and are seen as the repositories of the collective knowledge acquired by generations of scholars and researchers, as Fuller [2004] knows well from his study of Thomas Kuhn. So, the very idea that "science isn't naturally a public good" seems puzzling, but perhaps it is only meant to bait us into a debate. Naturally or not, science is in fact a public good, whether encountered in textbooks, libraries, or websites or more expansively in our daily encounters with natural and artificial environments, the former humanly constructed and the latter humanly comprehended.

In this sense, then, it is unclear if Fuller supports the view that science is a public good or merely poses the question as a provocation. Contextualizing his comments within the coronavirus pandemic, he says that "Indeed, a U.K. ARPA [modelled after the U.S. Defence Department Advanced Research Projects Agency (DARPA)] offers a unique opportunity for the U.K. to set a clear world example in redefining what it means for science to be a genuinely 'public good'". Sounding patriotic, he still goads us to rethink what it would mean to be "a genuinely" as opposed to a fake(?) "public good". It seems that scientific inquiries that are undertaken in public universities or government agencies and paid for by the public in the service of the public interest are genuinely public science. Likewise, in the continuing age of Big Science, the coordination of numerous scientists, technicians, engineers, and experts continues in the public domain, whether it is funded by the military-industrial-academic complex or not, and in this sense, too, its operation is "public" and therefore turns science into public science. Whether or not such coordination is as needed today as it was in the race to defeat enemies in World War II (and develop a nuclear bomb) is beside the point: the technical apparatus of scientific inquiry requires resources only national and international "publics" can afford (e.g., CERN, the European Organization for Nuclear Research). Likewise, anything scientific that is circulated and published (regardless of peer-review processes that are elitist and constitute a "closed society" in the Popperian sense) is public as well, at least in the sense of being accessible to those outside the scientific community proper.

Yet, for Fuller, the state seems to be as much a hindrance to science's public character as an enhancement: "Indeed, the state may need to reverse its role since the end of the Second World War and become a kind of 'epistemic trust-buster' in order to convert science into a public good". Perhaps Fuller has in mind militarized union busters or rational myth busters when using this locution, or he may have in mind the "state" – however he thinks of it but never fully defines its various agencies and political apparatus – as a political and legal framework in Karl Polanyi's

sense [1944] which protects and regulates other institutions, like market capitalism and science. Either way, Fuller would have to admit that science is genuinely public when considered in light of state intervention rather than in terms of the private ownership by individuals and corporations of this or that patent. In this rendition, Fuller might be inadvertently setting another false binary of autonomous science on the one hand and state-sanctioned (perhaps totalitarian and planned) science on the other, since there are different degrees of autonomy and autonomy itself could be understood internally and externally (and thereby disturb clear lines of demarcation). Five interrelated issues come to mind to reframe the discussion and avoid the pitfalls of false binaries.

The first has to do with the question of the autonomy of science. As I have argued elsewhere [Sassower, 2020], this notion must be contextualized and critically examined within the scientific community (and its various practices, from laboratory research, funding sources with or without strings attached, all the way to training and promoting young scientists). To think of scientific autonomy in abstract terms is misguided and at times dangerous, because it presupposes externally the possibility of complete detachment from social and cultural settings and internally the ability of one not to stand on the shoulders of giants in order to see farther into the future of technoscience [Merton, 1965; Agassi, 1981]. In short, the very question of autonomy is accompanied by all too many implicit presuppositions that reflect wishful thinking at best (about freedom of thought and unlimited resources with no strings attached) and are ideological at worst (about the government, in Reagan's famous words, being the problem and not the solution to social problems). This means that the scientific community is part of the larger community within which it operates and therefore science cannot but be pubic, regardless of its presumed autonomy.

The second has to do with the view of science and scientific knowledge as a golden goose that lays golden eggs: it is either caged (protected and confined) or free to roam the land (dispensing knowledge to the highest bidders). This view of science, critically discussed by Isabelle Stengers [2018], offers a novel imaginary with which to approach the complex relationship between the scientific community (the goose that can and at times lays golden eggs) and the public that funds its research and eventually benefits from it (these are, indeed, golden eggs). To think that somehow scientists are not part of the social contract with the rest of their community members (however they signed up for their roles in society) or that their privileged position exempts them from the duties of other contributing members of society abide by is mistaken. To conceive of scientific genius as deserving special treatment is likewise mistaken if by this we mean immunity from accountability and transparency, that is, public scrutiny of standard cost-benefit analyses or answering questions about the impact of technoscience on future generations and the environment.

These are not what economists call exogenous variables, but are the variables that must be considered ahead of time and all the time. The regulatory state is there to police the scientific community because all too often it fails to police itself, despite its protestations to the contrary [Krimsky, 2003; Angell, 2004]. In this sense, science is structurally public and serves the common good.

The third has to do with what Mariana Mazzucato [2014] has argued about the skewed relationship between the state and its corporate (and indirectly scientific) constituents. For her, investment risks are "social" insofar as they are paid for by the state (through taxes and fees), but rewards are "private" insofar as profits accrue disproportionately to corporate America (which has not shouldered the original investments in basic research, for example). The infrastructure, whether roads, bridges, and legal institutions or DARPA, the Internet, and Satellites is collectively paid for by taxpayers in one form or the other, while rentier-like conduct by privately owned corporations is legally sanctioned and ideologically encouraged. The standard example of the Global Positioning System is only one of many, where the fruit of military research and development is eventually licensed to private entities who then charge customers a second time for something they already paid for. Technoscientific innovations are public even when licensing agreements permit extracting fees from the public. What makes them public is not only the fact that the public paid for them and that they were originally pursued on behalf of the public (national defense), but that they reappear for public consumption.

The fourth has to do with the preposterous notion of intellectual property as part of what we think of as the private ownership of "property". Perceived primarily in terms of patents and copyrights (admittedly already part of the U.S. Constitution), this practice should be abolished: it makes no epistemological sense (who can personally "own" or control a "piece" of knowledge?) and it uses flawed arguments about incentivizing individuals who would otherwise hypothetically cease to have any innovative ideas or produce any novel gadgets. As many industries have shown, from fashion and sports to humor, cuisine, music and software, innovation is enhanced rather than retarded by being open to copying and remixing by others; in many cases, it increases competition and changes outmoded paradigms [Raustiala and Sprigman, 2012; Lessig, 2008]. The binary of legal protection that encourages invention versus no legal protection that discourages innovation is both logically false and practically falsifiable. The likes of Elon Musk follow the practices of some German car manufacturers (e.g., Mercedes-Benz) who reveal their engineering developments for adoption by competitors. In this sense, too, technoscientific know-how is public from inception to application, and what is more interesting, some of the apparently most vested in gaining an advantage through its protection from public dissemination (competitive capitalists)

are in fact party to its open and free disclosure, sharing their knowledge for no financial remuneration.

The fifth issue, or more accurately example, with which to reframe the false binaries of public versus public science or between autonomous and state-controlled science is the "Science for the People" movement that began in the U.S. in the late 1960s and has been revived in 2014. This movement has been especially committed to the idea that the scientific community is not isolated from the rest of society and that science can use its privilege and authority, not to mention the fruits of its research and development, to enhance social justice initiatives. Among these initiatives are strong anti-militarist stance, concern with nuclear energy, scientific education, race and gender representation and equality, access to health care and medical research, and agricultural practices and environment degradation. However marginal in contemporary cultural discourse, this movement exemplifies the ways in which some scientists and engineers have seen themselves as active participants in the affairs of the state. Their activities are similar to the Union of Concerned Scientists, an organization that continues to ring alarm bells to remind the public that the Scientific Enterprise cannot evade its responsibility to the rest of society while amassing profits for its corporate benefactors and shareholders, hiding as they do behind the banner of national security. There is no question in the minds of members of these two groups that science remains a public good for which we are all responsible.

These five overlapping issues, autonomy, value extraction, imbalanced risk-reward matrix, the protection of intellectual property, and social responsibility for scientific research and development all contribute to a view of the Scientific Enterprise being a common and public good that deserves state support and should be free to all members of the state. Being a communal enterprise, despite its attempts to be private and serve the interests of the few at the expense of the many, it must be publicly monitored and its fruits, when they come in the form of golden eggs, should be available to anyone regardless of their ability to pay for them. Returning to the context of the coronavirus pandemic, the recommended technoscientific model should be Jonas Salk and his polio vaccine and not Big Pharma and its monopolistic tendencies. We remember Salk for his genius and his benevolence, refusing, as he did, to patent his invention and to personally benefit from extracting licensing fees. As we now lavish generous funding on pharmaceutical companies that promise to deliver in record time vaccines, we might remind our political leaders to appeal to the best in our researchers and not their greed. If the funding is collective – through state grants – why shouldn't the rewards – an effective vaccine – not be collectively enjoyed? The "tragedy of the commons", mentioned in brief by Fuller, is a "lamentation over the abuse of communal ownership" (OED), an acknowledgement that when no one is in charge or no one monitors conduct, overuse of the commons may be

the case and the result might be disastrous. This lament, though, may be misapplied here, since it is not about the obvious fact that we own things in common, like the air we breathe and the Internet we use, but that this communal ownership should be cherished and protected, regulated and monitored to prevent exploitation and predatory behavior [Zuboff, 2019].

In closing, it might be useful to note that, according to the Pew Research Center [2015], "A survey of 3,748 American-based scientists connected with the American Association for the Advancement of Science (AAAS) finds that 87% agree with the statement 'Scientists should take an active role in public policy debates about issues related to science and technology'. Just 13% of these scientists back the opposite statement: 'Scientists should focus on establishing sound scientific facts and stay out of public policy debates'". If we ask scientists, they seem fully engaged in and committed to public policy debates, such that the question of public science from their perspective is not as problematic as science studies scholars make it sound. If we accept, then, that science or more accurately technoscience is a public good we hold and enjoy in common, we can more readily accept our responsibility for its production, dissemination, and consumption, scientists themselves seem to recognize on some level. This would mean demanding that our governments relinquish the toxic neoliberal ideology to which they are wedded and replace it with an ideology that reflects our moral commitments to fairness, equality, and human dignity. Liberty conditions these commitments, it does not stand on its own separate metaphysical ground to dispense individual rights, because any rights worth fighting for are always balanced against duties and responsibilities associated with these rights, and that together form a social contract worth fighting for.

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