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Is Do-It-Yourself Biology Being Co-opted by Institutions?

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Abstract : Rather than a revolutionary phenomenon, do-it-yourself biology seems to be increasingly linked to traditional institutions. Its interactions with scientific, state and corporate institutions can be seen as a form of ongoing institutional co-option.

Keywords: DIYbio; Do-it-yourself biology; Institutions; Citizen science; Co-option

Despite recurrent rhetorics that depict do-it-yourself biology as a revolutionary phenomenon that happens outside or even against institutions, the everyday reality of biohacking is often closely linked to existing institutions in which biology is performed, negotiated, and regulated. I argue that this interaction between citizen biology and scientific, governmental and corporate institutions signals a process of ongoing co-option.

Let's take a step back: co-option phenomena typically affect social movements that use technological innovation as a tool for social change. These alternative technologies and processes are often developed with the help of entrepreneurial coalitions and are eventually incorporated by industry, which then transforms and adapts them according to its needs [1]. One standard such story is the rise of open source software as a market-friendly evolution of free software – a betrayal, in the view of free software activists [2]. This trend mirrors well-known processes of co-option undergone by political movements, which always run the risk of "losing their souls": institutions tend to partially integrate their demands while at the same time altering and neutralizing them.

In this paper I propose a series of spatial metaphors to help position DIY biology in relation to institutions: is it ahead, behind, inside, or outside institutions? Where is it directed? Spatial metaphors are useful for situating do-it-yourself biology within worlds that are neighboring and overlapping but can still be thought of as separate. This move forces me to distill the practices and institutions at stake and elucidate their borders, as well as to assign values to their respective positioning. For example, above vs. below can signal a one-way relation of dependence. I am aware that DIY biology is a rather diverse and heterogeneous field, including actors as different from one other as, e.g., hackerspaces, artistic practices, and educational projects [3]. In addition, do-it-yourself biology is an increasingly global phenomenon, with very different local group structures and activities diffused across North America, Europe and Asia. Whilst acknowledging and taking into account this diversity, here I try to summarize some common characteristics of the positioning of DIY biology in relation to three different worlds: the world of science, the world of the market, and finally the world of the state. Positioning DIY biology with respect to these three worlds will allow me to propose a description of its present and future trajectory.

Scientific institutions

The first world is that of scientific institutions. Different actors involved in citizen biology projects have different views on the importance of independence from institutions. Yet in many cases do-it-yourself biology is entangled with academic and corporate laboratories: for example, it relies on them for skills, equipment, and tools. According to a recent survey, 28% of the members of the global DIYbio community also work in an academic, corporate or government lab [4]. These members are crucial because they bring their laboratory skills to hackerspaces and community labs, but also because they are sources of second hand tools and other equipment, such as reagents or scrap

machinery that can be repaired and adapted to the needs of DIY labs. Also, academic institutions appear to have a growing interest in funding do-it-yourself biology, as recently suggested by a Nature editorial. This follows a trend of inclusion that is already established for other forms of citizen science [5].

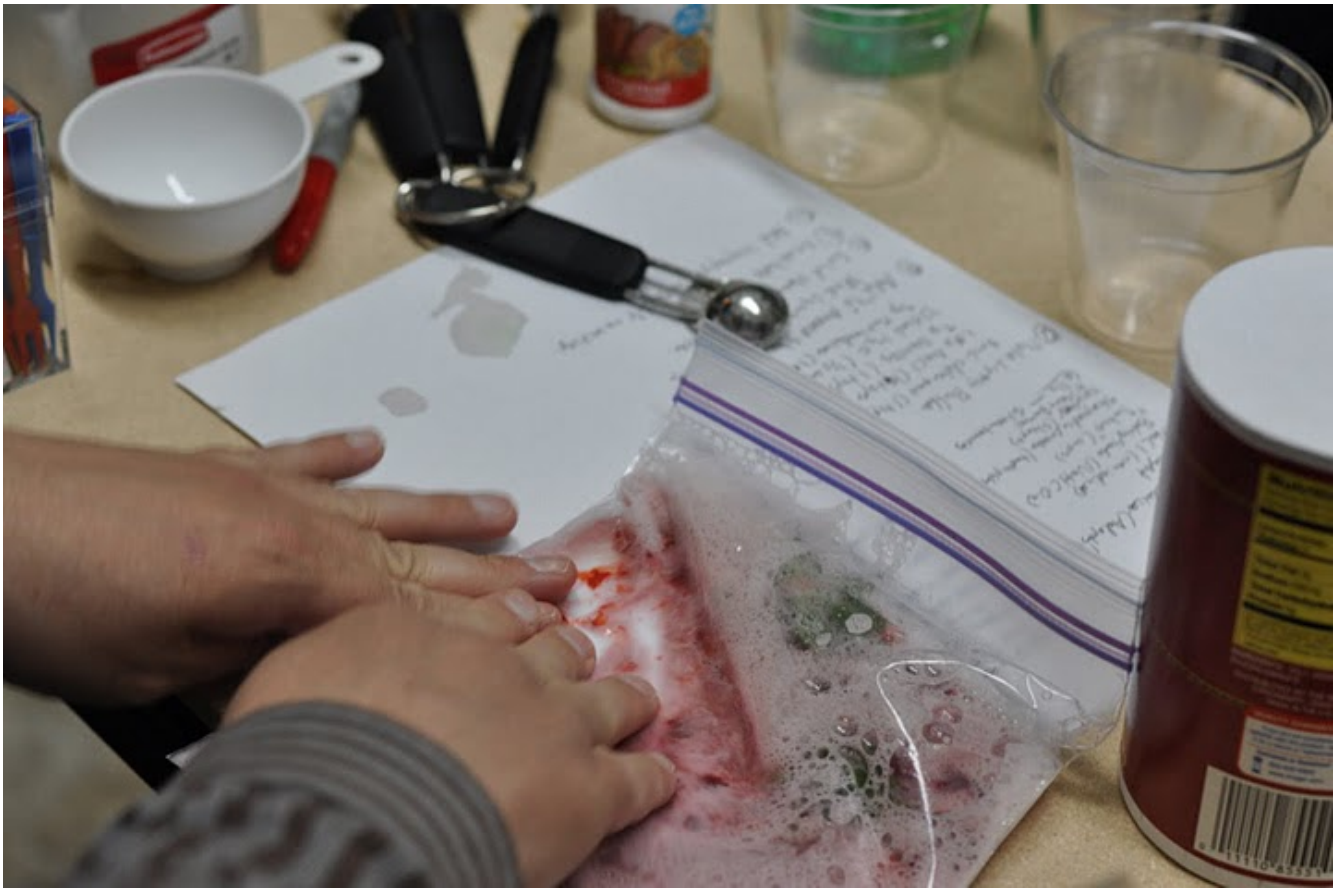

Fig. 1. Squeezing the soul out of do-it-yourself biology? (CC Alessandro Delfanti)

Finally, DIY biology is not currently reaching some of the thresholds that characterize the production of socially validated new scientific knowledge. For instance, DIY biologists are not publishing in Science or PLoS Biology, but rather pursuing educational or social goals. One sign of this trend is the increasing inclusion of DIYbio practices in museum exhibitions, science education projects, and outreach activities for young people. Indeed, most members of citizen biology communities do not seem to identify published journal articles as their main contribution to the scientific enterprise. Do-it-yourself biology is often behind scientific institutions and depends upon them.

The market

The second world is that of the market, where science and health are mediated by private corporations through processes of consumption. This world is increasingly based on citizens' individualization and personal participation – i.e., through direct-to-consumer genetic testing, personalized genomics, and consumer advocacy in healthcare and research. Some DIYbio projects are explicitly entrepreneurial or in conversation with an emergent network of companies, for example in the San Francisco Bay Area where the community lab Biocurious is at least partially seen as an incubator for new biotechnology companies based on open science practices. The openness pursued by such groups is thus twofold: on

the one hand, the establishment of a more open environment for access to scientific information and public participation in science. On the other hand, the creation of a more open market characterized by new opportunities that challenge the dominance of established business practices [6].

More broadly, do-it-yourself biology can be seen as part of an increasingly hegemonic discourse of empowerment and autonomy, whereby the dream of distributed creativity is coupled with the emergence of new forms of private/public relationship that move more and more biomedical activities outside of public medical systems. DIY biology participates in the construction of biology as a personal technology, following the trend set by the maker movement, which constitutes an important part of DIYbio's genealogy [7]. In the early 2000s, the art collective Critical Art Ensemble (CAE) performed several citizen science practices similar to the ones that characterize DIYbio today. CAE explicitly framed its activities as oppositional to the biotechnological industry, theorizing do-it-yourself biology as a tool to challenge the structures of power within market relationships and the role of biotechnology in today's capitalist societies. Similar highly politicized activities are barely visible in today's citizen biology movement, and seem to be confined to the art sphere [8]. Today, do-it-yourself biology is not against but rather ahead of the market and might foreshadow its future transformations.

The state

The last world I tackle is that of the state. Recurrent descriptions of the security and safety concerns that might arise from DIY biology have gone so far as to evoke the spectre of bioterrorism. In fact, the distance between DIYbio's scarce resources and the technical feasibility of biological weapons, as well as the importance of transparency as one of DIYbio's core values, speak against any dystopic terrorist future. Yet in response to these concerns, groups both in Europe and the US have started producing their own safety regulations [9]. Furthermore, while some members claim independence from governmental regulation, others have been actively involved in institutional processes. Through the construction of the need for biosafety regulation, citizen biology has been prompted to engage in negotiations with state actors, especially in the US, where DIYbio members have collaborated with the FBI, to try to counter and manage biosafety concerns [10]. There are still citizen biology groups that fiercely oppose state regulation and which are located in completely informal settings, such as Asian streets or European hackerspaces [11]. Yet do-it-yourself biology is rarely fully outside the space of the state, and often renounces the struggle for full autonomy.

Co-option and transformation

Drawing on the tradition of social movements studies, social science scholars such as David Hess have argued that technology-oriented social movements that propose alternative technologies or innovation processes tend to emerge in dense entrepreneurial environments and are somehow inevitably geared towards processes of co-option by industrial and institutional actors, a process that repeats itself in the life-cycle of every new political-social movement. In the process, institutions inevitably alter the movement's original goals and processes in order to adapt them to market and institutional necessities. New conflicts and disputes then prompt new waves of social and technological innovation [12]. Do-it-yourself biology might be undergoing such a process of co-option, as its position with respect to institutions is stabilizing and increasingly intertwined. In this paper, I have used spatial metaphors to help me situate DIY biology with respect to different aspects of this process. Do-it-yourself biology is often behind scientific institutions as it depends on them for skills and equipment; it is ahead of the market and participates in its transformations; and finally it is never fully outside of the sphere of the state. These positions might signal that DIY biology is losing part of its innovative tension, as its practices are being co-opted by institutions and thus adapted and transformed in the process. It might

become a source of renewal for market and scientific practices while never achieving the role of a revolutionary, autonomous set of practices that many media narratives have attached to it. Yet this transformation would not be the end of the matter. Rather, it would present a challenge: the search for the next spaces of autonomy and independence: do-it-yourself biology's transformative potential might soon emerge again.

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