

# Enlightening the dark zone

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## VALORISATION ADDENDUM

## STUDYING THE HISTORY OF SCIENTIFIC ACTIVISM TO RETHINK VALORIZATION

In the early 2000s, the Dutch government issued a series of policy papers aiming at strengthening knowledge valorization. The idea behind valorization was to have the academic world give something back to the public.<sup>1</sup> Scientific research was conceived as a public investment which scientists should repay by designing technical innovations, marketable goods and more generally stimulants to economic growth. The enticement to knowledge valorization, and in particular its emphasis on “converting results of research into economic value”, triggered heated debates and provoked a wave of indignation within the academic community.<sup>2</sup>

Despite its limits and the dispute surrounding it, the imperative of valorization is fortuitous in the sense that it compelled the scientific community to think about their place in and relation to society.<sup>3</sup> With this addendum, I would like to contribute to this reflection on valorization by questioning more broadly the existing modes of interaction between scientists and society. I intend to question valorization as a mode of interaction, dissect the forms of engagement pre-existing the imperative of valorization and reflect on what sound valorization could be. My dissertation is to a large extent concerned with the societal engagement of scientists and has shown that engagement was a rich tradition in the natural sciences that took various forms, served competing agendas and often produced unintended outcomes.

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<sup>1</sup> Ministry of Education, Culture and Science, Nota Wetenschapsbudget 2004: ‘Focus op excellentie en meer waard’ (26 November 2003); Ministry of Education, Culture and Science, Valorisatie van onderzoek als taak van de universiteiten (27 January 2005).

<sup>2</sup> Science in Transition, Position paper: ‘Waarom de wetenschap niet werkt zoals het moet, en wat daar aan te doen is’ (9 september 2013) available online: [www.scienceintransition.nl/wp-content/uploads/2013/09/POSITION-PAPER-16-sep-2013.pdf](http://www.scienceintransition.nl/wp-content/uploads/2013/09/POSITION-PAPER-16-sep-2013.pdf), Willem Halffman and Hans Radder, ‘Het Academisch Manifest’, *Krisis: Tijdschrift voor actuele filosofie* (2013) 3, pp.2-18. Elsewhere, and notably in the United States, academic research is growingly showing the negative impact of valorization on the organization of academia. Recent studies by Lawrence Busch and Joseph Hermanowicz have for instance shown how valorization reduces the scope of knowledge that is being produced by scientists and transmitted to students, heightened competition between the members of the academic community who think of themselves less as seekers of knowledge than as economic actors. Lawrence Busch, *Knowledge for Sale. The Neoliberal Takeover of Higher Education*, Cambridge: MIT Press, 2017 and Joseph Hermanowicz, ‘Universities, academic careers and the valorization of ‘shiny things’, *Research in the Sociology of Organizations* (2016) 46, p.303-328.

<sup>3</sup> In this regard, Hans Schouwenburg responded to the imperative of valorization by proposing an interesting reflection on the societal value of history and historians. In his valorization addendum, he attempts to identify the peculiar means and ways by which historical thinking as conducted by historians can have a societal impact and explains how he put his historical expertise and skills to practice. Hans Schouwenburg, ‘Studying the History of Sustainable Development to Further Future Implementation’ in Hans Schouwenburg, *Strategies to Save the Earth. Nature Conservation Experts and Sustainable Development, 1980-2000*, Dissertation submitted to Maastricht University, Faculty of Arts and Social Sciences, 2017.

In this addendum, I will therefore elaborate on the relevance of my dissertation to explore three critical points regarding the imperative of valorization and the societal involvement of scientists today. First, I will reflect on the imperative of valorization from the perspective of the government demanding it and highlight both its limits and value. Second, I will use to explore how the scientific community has approached societal engagement prior to the valorization imperative. I will then discuss what I label as activism and objectivism as the dominant traditions of engagement within the scientific community. Finally, after reconstructing the different modes of interactions between scientists and society proposed by both the government and the scientific community, I will reflect on the power, but also the practical risks and pitfalls faced by each model. I will here intend to move beyond the stranglehold of valorization to re-imagine the societal engagement of academia. Hence, with some irony, this analysis can be considered a valorization of my thesis.

### *The problem of valorization*

With valorization, the government determined a particular type of knowledge production that should be stimulated. As we have seen above, public authorities argued that the scientists' societal duty lies within the economic sphere and knowledge production should yield products suitable to participate in the knowledge economy. Furthermore, the advocates of valorization invoked its necessity to overcome what is widely assumed as an active choice of scientists to refrain from engaging with societal debates. My research has however displayed how, since the late 1920s, a significant number of scientists were concerned and involved with society.<sup>4</sup>

In this dissertation, I have highlighted how the societal involvement of scientists intensified through the mid-twentieth century. Scientists from a broad range of disciplines and from the whole breadth of the political spectrum engaged with society by mobilizing their scientific insights and expertise to inform their actions. We have seen for instance how the British biochemist Joseph Needham and the crystallographer John Desmond Bernal mobilized their scientific authority and expertise to advance pacifism, socialism and anti-fascism. Moderate reformists like the Brazilian chemist Paulo Carneiro and the British biologist Julian Huxley advocated and endorsed state-led social reformism. While Huxley participated in designing scientific interventions to modernize the British Empire, Carneiro attempted to create new technical institutions to rationally solve issues of social

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<sup>4</sup> Although the societal engagement of these scientists modelled contemporary modes of interactions between science and society, one should bear in mind that the way these scientists behaved close to a century ago might be different from the ways scientists act nowadays.

inequity in the Brazilian state of Pernambuco. Finally, we saw how conservative figures like the Brazilian military chemist Alvaro Alberto da Motta e Silva, who pioneered Brazil's postwar scientific policy, promoted the state-led development of science as a matter of national security.

The premises of the imperative of valorization hence erroneously suggest that scientists did not engage with society. Valorization denies a complex and rich history of interactions between scientists and society that bore significant implications. My research has demonstrated, for instance, that the activism of Needham at UNESCO led to the extension of the peace-building mandates of the main cultural agency of the UN system to encompass the natural sciences while the policy work and leadership of the Brazilian historian Arthur César Ferreira Reis defined the model of development of the Amazon that has informed the modernization of the region ever since.

Another limit of valorization lies in its normative character. The advocates of valorization further deny science's history of activism by disciplining scientists to mainly focus on the production of economic value at the expense of social and political engagement. Although the Dutch government proposed in 2009 a new definition of valorization that considered activities that enable scientists to make knowledge available to societal problems and to third parties beyond business and industry, this update, as commentators like the Rathenau Institute pointed out, continues to insist on commercial value and fails to define adequately the non-economic dimensions of the concept.<sup>5</sup> Again, my dissertation yields interesting insights and examples to expand the terms of interactions beyond economic valorization. The scientists I examined embraced a variety of societal functions ranging from political activism to institutional leadership and policy making including already valorization in the narrow economic sense as well.

I have looked for instance at how Joseph Needham and John Desmond Bernal reflected on the social responsibility of scientists and the social function of science. Together with a small group of leftist scientists, they invented a form of scientific activism in the 1930s where scientific research and leftist activism merged to advance pacifism, socialism and anti-fascism as well as the application of science to social needs. They also participated in political life by experimenting with policy advocacy. Via the Cambridge Scientists' Anti-War Group, Needham and Bernal conducted experiments in the late 1930s to scientifically test the Air Raid Precautions measures of the British government.

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<sup>5</sup> Leonie van Drooge and Stefan de Jong, *Valorisatie: Onderzoekers doen al veel meer dan ze denken*, Den Haag: Rathenau Instituut, 2015, available online: [www.rathenau.nl/nl/publicatie/valorisatie%C2%A0Onderzoekers-doen-al-veel-meer-dan-ze-denken](http://www.rathenau.nl/nl/publicatie/valorisatie%C2%A0Onderzoekers-doen-al-veel-meer-dan-ze-denken). See also: InnovatiePlatform, *Van voornemens naar voorsprong: Kennismet circuleren. Voorstel voor een Nederlandse valorisatieagenda* (Den Haag: InnovatiePlatform, 2009).

The results of their tests led to revisions of the government's policies on gas-proof rooms, masks and anti-bomb shelters.<sup>6</sup> Meanwhile, Huxley championed technocratic policy-making in the period by bolstering the debates on state planning in the 1930s, by intervening in the technocratic reforms of the British Empire in the 1940s, and by leading, as Director General, the peace-building work of the newly created UNESCO in 1946. In Brazil, Carneiro and Reis conducted what the Dutch government today understands as valorization work. Carneiro, who envisioned his scientific work as a service to the nation, went on to produce knowledge that improved the commercial value of several endemic tropical plants of Brazil such as curare, whereas Reis coordinated the modernization and valorization of the Amazon basin at the SPVEA.

By applying a narrow, economic definition of societal interaction, valorization puts knowledge production in direct subordination to the needs of economic competition. In doing so it tends to ignore a variety of other modes of interactions by which scientists actively participate in the social, cultural and political life of society.

### *The problem of engagement*

As the examples above suggest, interactions between scientists and society pre-existed the imperative of valorization. Historically, these interactions can be distinguished in two distinct modes of engagement, which scientists have used to interact with the world: activism and objectivism. As described above, scientific activism appears as a century old tradition and designates forms of engagement by which scientists organized knowledge production or mobilized scientific knowledge to inform political actions and produce political statements about society. In that regard, my research depicts how scientists deployed various forms of activism, which ranged from militantism, societal critique to policy advocacy and policy-making. It also highlights that this tradition echoed and exceeded the more commonly known figure of the 'public intellectual' that is generally associated with the humanities.<sup>7</sup> On the other end, what I call objectivism designates a rapport of science to society that maintains science outside society, marks its neutrality and nonpartisan character. Objectivism arose in direct opposition to the raise of scientific activism. It builds on the traditional values associated to modern science and the attempts of scholars to detach themselves from society, its norms and biases via the so-called

<sup>6</sup> On the work of the Cambridge Scientists' Anti-War Group, see Gary Werskey, *The Visible College: a Collective Biography of British Scientists and Socialists of the 1930s*, London: Free Association books, 1988, p.223-234.

<sup>7</sup> A tradition that we have seen as being deeply anchored in the humanities with the work of the International Institute for Intellectual Cooperation and the international activism at the League of Nations of literary figures such as Alfred Zimmermann, Jean Jacques Mayoux and Paul Valéry.

scientific method, to observe society objectively. Objectivists concur on a conception of science as value-free and autonomous from society's moral, political and social values. For them, neutrality, autonomy and disinterestedness are the values that grant scientists the power to speak with authority about nature.

Although scientific activists also mobilized the value of objectivity to legitimize their engagement, advocates of objectivism increasingly frowned upon their political commitments and received their scientific claims with suspicion. Objectivists raised the imperative of autonomy and the imperative of neutrality to reject scientific activism. The wartime advocacy of Needham, Bernal and Huxley in favor of governmental planning in science that I depicted in my research was for instance criticized by the Society for Freedom in Science (SFS). Spearheading the combat against the spread of Marxist ideas among the British scientific community and defending the neutrality of science, the SFS contributed to sideline politically active scientists from Britain's scientific establishment.<sup>8</sup> We also saw that the leftist activism of Needham and Huxley eventually dented their scientific authority causing their ousting from UNESCO and their blacklisting by the US government.<sup>9</sup> Similar concern for the neutrality and autonomy of science fueled defiance in Brazil as well. In the 1950s, scientists at the SBPC opposed Alvaro Alberto's activist and state-led conception of national science. They sought to reassert the autonomy of science and its capacity to speak freely about nature against the stranglehold of the newly created National Research Council (CNPq) and the restriction its political agenda imposed on the production of scientific knowledge in Brazil.

Altogether, the kind of scientific activism described in my dissertation lost strength in the second half of the twentieth century, tamed by the Cold War. It instead gave way to the rule of objectivism within the scientific community. Today the scientific experts of the Intergovernmental Panel on Climate Change (IPCC) exemplify the objectivist mode of interaction that dominates the rapport of science to society. Set up in 1988, the IPCC is the international body in charge of providing policy-makers with a scientific basis regarding climate change. The panel is objectivist in the sense that it is framed in such a way as to keep the action of its experts strictly outside of politics. The panel assesses climate change and reviews the options taken by government to tackle climate change but does not tell policy-makers what actions to take. The work of the panel is organized as to cultivate

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<sup>8</sup> On the Society for Freedom in Science, see: William McGucken, 'On Freedom and Planning in Science: the Society for Freedom in Science, 1940-1946', *Minerva* (1978) 16, pp.42-72; Jessica Reinisch, 'The Society for Freedom in Science, 1940-1963, M.Sc. Dissertation, submitted to Imperial College London, 2000.

<sup>9</sup> On the causes behind Needham's blacklisting by the government of the United States, see: Tom Buchanan, 'The courage of Galileo: Joseph Needham and the « germ warfare » allegations in the Korean war', *History* (2001) 86, pp.503-522.

neutrality, autonomy and objectivity, and produces knowledge that is policy-relevant but not policy-restrictive.<sup>10</sup>

Yet, despite symbolic and procedural distancing as exemplified by the work of the IPCC, objectivism is hard to maintain in practice without some form of activism. How hard it is to maintain science depoliticized was illustrated very well by the March for Science of 22 April 2017. The March was organized worldwide to protest against anti-climate politics and anti-science policies that were impersonated by Donald Trump. It aimed to claim the societal relevance of science but also re-assert the necessary autonomy of science. Although it mobilized activist methods by taking the streets in multi-city demonstrations, the organizers intended to keep the movement nonpartisan.<sup>11</sup>

The March is interesting in two ways, reflecting the legacy of academia's established tradition of interactions. First, it blended objectivism with activism even though the participants aimed to defend an objectivist standpoint for science. The March set to protect the a-political nature, autonomy and capacity of science to produce irrefutable facts about nature and society that, the participants in the March believe, may prove of value to the latter as a provider of unbiased facts for policy decision. Yet, the participants of the March mobilized methods and attitudes of scientific activism such as street demonstrations and political commentary that scientists like Needham and Bernal had introduced and cultivated in the 1930s. Although they strove to maintain the objectivist binary between scientific facts and political ideology, many embraced activism by pronouncing engaged declarations against Trump's scientific and environmental policies that were as political in character as Trump's denial of the environmental crisis and the science backing it. Second, although the March pursued an objectivist agenda, it still strongly divided the scientific community. Some scientists opposed the March. They saw it as a mobilization against Trump's government that was guided by activism and partisanship, which they believed would eventually threaten rather than strengthen science's autonomy from society.<sup>12</sup>

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<sup>10</sup> 'IPCC factsheet: What is the IPCC?' and 'IPCC Fact sheet: How does the IPCC select its authors?' retrieved on 8 August 2018 from: [http://www.ipcc.ch/news\\_and\\_events/docs/factsheets/FS\\_what\\_ipcc.pdf](http://www.ipcc.ch/news_and_events/docs/factsheets/FS_what_ipcc.pdf) and [http://www.ipcc.ch/news\\_and\\_events/docs/factsheets/FS\\_select\\_authors.pdf](http://www.ipcc.ch/news_and_events/docs/factsheets/FS_select_authors.pdf)

<sup>11</sup> Nicholas St. Fleur, 'Scientists, Feeling Under Siege, March Against Trump Policies', *New York Times*, 22 April 2017, retrieved on 7 August 2018 from: <https://www.nytimes.com/2017/04/22/science/march-for-science.html>

<sup>12</sup> Michael Roston, 'The March for Science: Why Some Are Going, and Some Will Sit Out', *New York Times*, 17th April 2017, retrieved on 7 August 2018 from: <https://www.nytimes.com/2017/04/17/science/march-for-science-voices.html>



## *The challenges of societal engagement*

In the face of these established traditions of interactions that I described above, we could question the value of valorization as formulated by the Dutch government. As we have seen, scientists have not only made valorization an integral part of their activities but also exerted a variety of societal roles and functions that exceeded the mere economic valorization of scientific knowledge. Despite its apparent redundancy, valorization remains nonetheless valuable as a question to scientists. The imperative of valorization invites scientists to reflect on their existing traditions of engagement, rediscover their societal value and seize the opportunity offered by the current debate to evaluate their societal impact. Such exercise, which I will conduct as the concluding part of this addendum, should also enable scientists and valorization advocates to keep in mind the pitfalls and challenges inherent to societal action.

Today, and since the neoliberal turn of the mid-1980s, activism has been frowned upon. Scientists are regularly warned against the risks activism may entail for both their personal career and for science more generally while those partaking in political protest, as some of the March participants did, underwent heavy criticism from their peers. Yet, and as my research showed, rejecting activism is rejecting a model of interaction that proved beneficial for science and society more generally.

Scientific activism may empower by giving a voice to ignored actors and visibility to disregarded causes. In my research, I have examined multiple instances where the activism of some scientists produced valuable effects for both science and society. A case in point is Needham's campaign for science at UNESCO. During the war, Needham succeeded in establishing science as a significant peace-building domain of UNESCO and made the isolation and underdevelopment of the scientific communities standing outside North America and Europe an issue of international importance. At UNESCO, Needham contributed to broaden the international community of science, strengthen the capacities of non-western scientists to participate in the advancement of science but also reinforce the role of scientists as peace-builders. What was true of Needham in the 1940s continues to be true of scientists to this date. As Steve Epstein has convincingly shown, the engagement of scientists in politically controversial issues and their collaboration with activist groups made possible major advances in medicine and the environment.<sup>13</sup> And as we have seen in the case of the March for Science, scientific activism offers scientists tools to raise public awareness about neglected issues.

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<sup>13</sup> Steve Epstein, *Impure Science: AIDS, Activism and the Politics of Knowledge*, Berkeley: University of California Press, 1996

Such interactions may open new perspectives for the concerned actors. Although not a natural scientist myself, I have shared my historical insights into the origins of UNESCO with the staff of the UNESCO department of the Dutch Ministry of Education, Culture and Science. During this workshop, I broke down the official origin story of UNESCO by highlighting how, and for some years, UNESCO juggled with multiple identities, experimented with innovative ideas such as the creation of a diplomatic passport for scientists and involved a variety of informal agents, like scientists, to elaborate and implement its policies. All in all, my historical account of the origins of UNESCO brought my audience to perceive the UN agency with which they interacted differently, to explore alternative policy designs, to consider unforeseen partners and, as they argued, to eventually revive forgotten legacies. This experience in historical thinking gave the concerned actors a new sense of agency and widened their horizon of possible policy actions.

Yet, and despite their inherent values, activism, objectivism and, as we have seen above, valorization, are all three precarious postures. Engagement is rarely straightforward and entails various, often unintended and, to some extent, unforeseeable complications for the concerned actors. This is particularly true for scientific activism as my research showed in the case of Needham and Reis. As I mentioned above, Needham launched at UNESCO a program to empower the isolated and underdeveloped scientific communities of the South to participate in international scientific exchanges. Despite its pro-south agenda, the program relied on Eurocentric and imperialist conceptions of modern science unintended by its promoters, which appeared less emancipatory than oppressive in the eyes of the southern scientists it intended to assist. Heavily criticized, Needham's plan was accused of scientific imperialism and eventually discontinued a few years following its launch. Another instance that my dissertation highlighted concerns the Brazilian agency for the development of the Amazon basin (SPVEA). In the 1950s, the planning experts and scientists of the SPVEA launched a vast program of scientific research to modernize Amazonian society, improve the welfare of its populations and valorize the natural resources of the Amazon region. The program created multiple scientific institutes to provide rational-scientific responses to various developmental goals related to agro-farming, industrial forestry, welfare, urbanization and the construction of modern infrastructure. Despite the scientific and rational character of its policies, the valorization program of the SPVEA produced a variety of unintended adverse effects. Not only did it generate dramatic increases of poverty and inequality for local, and particularly indigenous communities but it also paved the way to the wholesale destruction of large sections of the Amazon rainforest in the 1970s and early 1980s.

Although Needham and the experts of SPVEA believed in the power of science and relied on sound science, both their initiatives produced unintended adverse effects nonetheless. Needham's plan was impeded by cultural biases inherent of the sciences while the modernization policies of the SPVEA uncritically served a productivist-modernist agenda that proved disastrous to the Amazon habitat. Both examples illustrate less the powerlessness of scientific activism, than the necessity for the 'activist scientist' to not only operate from scientific mastery but to also critically address the politics and values inherent of science and the politics for which a scientific intervention operates.

Objectivists proposed the neutrality of science as a remedy to prevent the unintended effects of activism. By maintaining a strict separation between the operation of science and the operation of politics and cultivating the objectivity and neutrality of science as the IPCC experts strove to endorse, it is generally believed within the scientific community that scientists can more authoritatively contribute to society by offering technical and objective solutions to its problems. However, the objectivists do not actually remove politics and ideology from science, which they believe to be the cause of society's malfunctions and the scientific activist's misfortunes. They more often than not ignore politics, despite it being a phenomenon that is as inherent of society and its challenges as it is to the sciences themselves. The separation between value-laden activism and value-free science is not only an untenable paradigm but as treacherous and perverse for the objectivists as uncritical engagement is to the scientific activist.

Recent studies, including my dissertation, have shown that objectivism was not neutral and a-political but inherently political as its conceptualizations are entangled with various political, social, economic and religious interests.<sup>14</sup> Science, Technology and Society studies (STS) have pointed out how all sciences make value judgments that produce varying interpretation of realities. Science is organized around norms and political hierarchies that, as my research repeatedly demonstrated permeate the scientific work and societal interactions of scientists.

If scientists are political, even, and all the more so when speaking in the name of scientific neutrality, the scientific concerns they seek to tackle are often inescapably political as well. Just as the scientists of the SPVEA researching and organizing how to valorize the Amazonian forest, the experts of the IPCC investigating ways to mitigate climate change grapple with issues standing at the intersection of science and politics. In that regard, the objectivist attitude that still dominates climate change is untenable. First, the deficit of adequate international measures to contain climate change is a stark illustration

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<sup>14</sup> On the politics of neutrality see the work by Rebecka Lettevall, Geert Somsen and Sven Wildmalm (eds.), *Neutrality in Twentieth Century Europe. Intersections of Science, Culture and Politics after the First World War*, New York, London: Routledge, Taylor and Francis Group, 2012.

that scientific neutrality fails to generate the political attention required to produce the changes the IPCC demands of society. What is more, environmental skeptics attack the IPCC neutrality posture and weaken the scientific soundness, and therefore authority of its arguments by insisting on the values and interests IPCC experts inevitably have about climate change. Second, continuing to believe in the neutrality of climate change science (and any science) and therefore ignoring the political and ethical dimensions inherent to the issues at hand, also impedes the capacity of scientists to produce robust, scientifically sound and socially adapted understanding of and alternatives to climate change. By depoliticizing climate change and delegating the necessary reflection on the political feasibility and desirability of mitigation policies to society, the objectivists withdraw the scientific community from accounting for matters of social equality, development and power. Because of its objectivist posture the IPCC evinced these aspects despite their importance to provide a robust and full-blown understanding of the climate change crisis and to find the kind of allies within society that are indispensable to diminish the impact of climate change, clarify the ecological agenda and respond to climatoseptics.

## CONCLUSION

In this valorization addendum, I have questioned the imperative of valorization and, in doing so, addressed, in broader terms, what the societal engagement of scientists means and entails. Valorization is problematic not just for the neoliberal pressure it imposes on academia. Based on my findings, I demonstrated that valorization also obliterates a long and rich history of societal engagements where scientists invented various ways to participate in societal debates. To foster the societal relevance of science, valorization advocates should seek to include rather than exclude existing practices of engagement.

This historical reflection on the societal engagement of scientists helped problematize the imperative of valorization but also questioned the nature of the existing modes of interactions with society that scientists chose to cultivate for themselves in the past century. Although each model of interaction - valorization, activism and objectivism - conceptualizes differently what scientists can do for society and how they should do it, all three are in one way or another challenged by politics (or lack thereof). Valorization tends to instrumentalize science to serve the needs of the market and in turn contribute to restrict both the realm of science and its potential contribution to society. Objectivism depoliticizes both science and society to speak authoritatively about the social and natural world. Yet in doing so objectivists are not jut unable to address the politics of neutrality and therefore their own, inevitable biases, but their statements are also contested for

ignoring the political fabric of the issues they intended to understand and mitigate. On the other side of the spectrum, if activism does recognize politics and scientific activists tend to do politics from science, their actions are bound to lash back for an ill-conception of the politics of science and the politics of engagement.

This query revealed societal engagement to be politically treacherous. It is not self-evident and scientific facts do not speak for themselves. Scientists often fail, or, in the case of the objectivists, refuse to produce the political work required to allow science to speak authoritatively and relevantly to society. Altogether, the manner scientists handle the politics of societal engagement appear in many ways inadequate and counter-productive and humanities scholars may prove useful allies to solve this deficiency. This addendum and the research supporting it, is a case in point. By contextualizing societal engagement and critically reflecting on the politics of science, my addendum provides tools and guidance for scientists to actively grapple with rather than ignore the political implications of societal engagement. It is through activities like these that the societal relevance of science may be improved and the societal engagement of scientists strengthened. As such, the conclusions of this critical appraisal of the modes of societal engagements of scientists, which I built on the contents of my dissertation, thus turns this appendix into a 'proper' valorization piece, however ironically.